Ten Lectures on Cognitive Semantics

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Ten Lectures on Cognitive Semantics

by

Leonard Talmy

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Preface

The present text, entitled *Ten Lectures on Cognitive Semantics by Leonard Talmy*, is a transcribed version of the lectures given by Professor Talmy in October 2007 as the forum speaker for *the 4th China International Forum on Cognitive Linguistics*. Professor Talmy received his PhD from the University of California at Berkeley in 1972. He has been devoted to cognitive semantics research throughout the succeeding nearly four decades. He is one of the founding fathers of Cognitive Linguistics. His contribution to the field has been original and extensive. In these lectures, he elaborates on major issues in his research. The text is published, accompanied by its videodisc counterpart and Chinese guide, as one of the *Eminent Linguists Lecture Series*.

The transcription of the video, proofreading of the text, and publication of the work in its present book form, have involved many people's strenuous inputs. The initial drafts were done by the following: Mo Chen, Yan Ding, Tao Li, Wei Li, Fan Wang, Shuying Yin, Jing Yu, Wenjuan Yuan, Weiwei Zhang, Yujie Zhou. Then we editors did the word-by-word and line-by-line proofreading work and prepared the Chinese guide. To improve the readability of the text, we deleted the false starts, repetitions, fillers like *now, so, you know, OK, and so on, again, of course, if you like, sort of*, etc. The speaker, Professor Talmy did the final revision with his assistant Teresa McFarland. The published version is the final version approved by the speaker.

The China International Forum on Cognitive Linguistics provides a forum for eminent international scholars to talk to Chinese audiences. It is a continuing program organized by six prestigious universities in Beijing. The main organizing institution is Beihang University (BUAA); its co-sponsors include Tsinghua University, Peking University, Beijing Normal University, Beijing Foreign Studies University, and Beijing Language and Culture University. Professor Talmy's lecture series was mainly supported by *the Beihang Grant for International Outstanding Scientists* for 2007 (Project number:Z0741, Project organizer: Thomas Fuyin Li).

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Leonard Talmy is Professor Emeritus of Linguistics and Director Emeritus of the Center for Cognitive Science at the University at Buffalo, State University of New York. He is presently a Visiting Scholar at the University of California, Berkeley.

He is the author of the two-volume set *Toward a Cognitive Semantics* (2000) and of the volume *The Targeting System of Language* (2018), all with MIT Press. Most of his written work—including his 1972 dissertation, the two-volume set with MIT Press, and articles published since 2000—are freely available on his website: https://www.acsu.buffalo.edu/~talmy/talmy.html.

He was the recipient of the 2012 Gutenberg Research Award from the Johannes Gutenberg University of Mainz, Germany, for outstanding contribution to research in the area of linguistics. In 2011, he was honored as one of the three "Founding Fathers" of cognitive linguistics at the 10th biennial conference of the International Cognitive Linguistics Association. He was elected a Fellow of the Cognitive Linguistics Society in its 2002 inaugural selection of Fellows.

His broader research interests cover cognitive linguistics, the properties of conceptual organization, and cognitive theory. His more specific interests within linguistics center on natural-language semantics, including the following: typologies and universals of semantic structure; the relation between semantic structure and formal linguistic structures—lexical, morphological, and syntactic; and the relation of this material to diachrony, discourse, development, impairment, culture, and evolution.

LECTURE 1

How Language Structures Concepts

This first talk pretty much lays the foundation for most of my cognitive linguistics. Not all the talks will fall under these features, but a lot will, so let's get to the first. Language begins with what we consider a mystery. It's a particular feature or a property of language in general. It acts kind of like if you find a little thread on a sweater and you start pulling it, and pretty soon you've got the whole sweater undone. From this rather humble beginning of an observation, all linguistic cognition starts emerging, and the observation is that it's a design feature of language that every language has two main formal categories. The traditional terms for them are 'open-class' and 'closed-class' forms. There are other terms for them: open-class forms are sometimes called lexical and closed-class forms are sometimes called grammatical.

Let me begin by just doing the formal part of it and then go on to the semantic and the functional part. The formal part is: what are open-class forms? An open-class is any set of forms that is rather large in any given language; it has many members, and it is easy to add new members. For example, in any given language these could include nouns, verbs, adjectives, maybe ideophones—that will do for now. For example English has hundreds, perhaps, thousands of basic nouns, and you can learn ten new nouns today. Just by going, for example, to a class in geology, you can learn ten new nouns for different kinds of minerals.

Everything else is closed-class. Closed-class is a class of forms that has relatively few members and it's very hard to add to them, to augment them. For example, if you look over the bound forms that are formally bound, which includes affixes, inflections, derivations, and clitics. There are also free forms making up a closed-class category, for example in English, the category of prepositions. There are several dozen prepositions, but that is all. It's not hundreds. It's not thousands. It's just several dozen. And it is very hard to add a new

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preposition. Maybe in the course of one century, you add a couple of prepositions and lose a couple. Prepositions are examples of closed-class forms that are free, not bound. You also might include the suprasegmentals, intonation patterns, for example. If a language has a small closed set of distinct intonation patterns, then you have to consider them as a closed-class set. For example, English has just a certain number of intonation patterns. One of them, for example, would be what I call the 'admonitive', used in a warning like 'I'm going to tickle you', which is kind of a teasing intonation. I bring that up because an American Indian language I worked on has the exact same meaning, but done by suffixes on the verb. Those are all closed-class forms with actual phonological content, substantive content. Then there are abstract or implicit closed-class forms, for example, word order, and the abstract concepts like grammatical categories, like nounhood per se, verbhood per se, or grammatical relations like subjecthood, direct objecthood, indirect objecthood and so forth. Maybe one would include the grammatical complexes such as 'constructions', but in general I won't rely on them. I'd rather rely on the simplex forms.

This is the initial observation: that every language in the world has this distinction between open-class and closed-class forms, and described in this formal way. The next issue is: so what? What does this give you? This could be a minor observation. The next observation built on top of this is that a semantic distinction correlates with this formal distinction. Namely, that the open-class subsystem, for the most part, is not constrained as to what it can refer to. It's semantically unconstrained. There ARE a few constraints, but we don't have to worry about them. Whereas the closed-class forms are highly constrained semantically, that is, in terms of what they can mean. They are constrained in two ways. One way is in terms of the conceptual category that they can belong to, so let's first look at that. If you look around the world's languages, look at all their closed-class forms, whether affixes or free forms, whatever, you'll find many languages with closed-class forms that express the number of a noun. Many have closed-class forms in association with a noun that will tell you the number of a noun, for example, singular or plural. But no language in the world has a category of closed-class forms that will tell you the color of the noun. I would accept anything, red, blue or just dark or light, anything, but that just doesn't exist. Number yes, color no, for the noun. So, closed-class forms are semantically restricted in terms of the kinds of conceptual categories they can ever address.

The second restriction is even within a conceptual category that is otherwise okay, such as number, you also have constraints on the particular number concepts within the category that can be expressed by closed-class forms. For example, around the world's languages, if you look at the closed-class forms

that are bound to the noun, you'll find distinctions like singular, dual, plural, and paucal (which means a few). If you take closed-class forms that are free, like in English, you have in addition such concepts as all, some, many, more, much, no, and so forth. These are numerical concepts. But you'll never have any closed-class form in association with a noun that expresses the concept of an odd number or even number. They are not among the closed-class forms. Neither is dozen, you never get a dozen, or countable. None of these ever show up. On the other hand, open-class forms are not bound in this way; they are not restricted in this way because of the words I just used. I just used these words like odd, even. These are open-class adjectives: countable, and so forth. But you don't find the same concepts ever expressed by closed-class.

We find that there are strict constraints on closed-class forms semantically. In fact, if you start setting up two columns and in one column you put all the conceptual categories that closed-class forms ever express, you'll get number, tense, aspect, gender, causality, what have you. Color would not appear, and many other things like food, gymnastics, lots of things, whatever you can't express by closed-class forms, many categories. So it's highly constrained. Also within each category it's highly constrained. That is the second level observation, that there is a semantic distinction that correlates with this formal distinction between open and closed-class.

You can still say, 'So what, what does it matter?' There's a third level of observation that is built on top of that. That's the functional distinction, and it correlates with the formal and semantic distinction. In general, the function of the open-class forms is to represent conceptual content, and the function of the closed-class forms is to represent conceptual structure. There is a division of labor between these two subcategories or subsystems of forms of languages between content and structure, structure and content. The closed-class forms are kind of structures. They represent this division of labor, this functional distinction, in two venues. One venue is any portion of the discourse, such as a sentence, and another venue is within the structure of language in general.

Let's clarify how the two subsystems differ from each other. Let me give some examples. First, within the first venue, a sentence, let's say. Here is an example sentence: *A rustler lassoed the steers*. To understand the sentence, you have to have seen a lot of cowboy movies. A rustler is a person who steals cattle, a lasso is a rope, and the steer is a cow. Let me first go over all the closed-class forms, and then the open-class forms in this one sentence. Semantically, the closed-class forms are going to be more spare in their conceptual content, going to be more structural in their function, and there are going to be more of them. Whereas each of the open-class forms is going to include much more semantic content of many different kinds taken together, in a rich kind of way that's not

so spare. They contribute the majority of the content. In the first venue, the way this functional distinction works out, is that any given sentence will evoke some cognitive images, some conceptual complex in your mind.

In that conceptual complex, it is the open-class forms of the sentence that will contribute the majority of the conceptual content within that complex, whereas the closed-class forms will determine the majority of the conceptual structure of that content. That is the basic finding.

Let's go through this one sentence. The first closed-class form I will mention is the *-ed* on *lassoed*, which means something like 'occurring before the current speech act, in the speaker's view'. That's the structural meaning. The /s/ on *steers* means something like multiple instantiation—that is, plural. The lack of /s/ on *rustler* means something like unitary instantiation. The *the* on *steers*, means something like the speaker infers that the addressee, the hearer, can readily identify the particular referent. If I say *the steers*, I assume that you know which steers I mean. The *a* on *rustler* means that the speaker infers that the addressee cannot readily identify the particular referent. The *-er* on *rustler* means something like a performer of the specified action. These are overt closed-class forms, not the implicit abstract ones. The nounhood of *rustler* and *steers* means something like objecthood. The verb status of *lassoed*, means something like eventhood, an event. The grammatical relations of the subject and object for *rustler* and *steers*, one of the possibilities is agent versus patient, the semantic function. The active voice of the sentence means something like the point-of-view is at the agent, the subject, in other words. The intonation pattern, which is declarative, and the character of the aspect mean something like 'the speaker knows the proposition to be true and asserts it to the hearer'. All those together are a complex of closed-class forms and their rather spare meanings. By contrast, the open-class forms are rich in semantic content. There are three of them. One is the verb *to rustle*, which the noun *rustler* is based on. It has all these concepts of 'theft', 'illegality', 'private ownership of livestock'. The reason I include livestock is because you can only rustle cattle and horses, you can't rustle chickens, for example. All these concepts are taken together in the word *rustle*. It means to steal property, the livestock property of somebody else. The second open-class form is the verb *lasso*, which means 'to have a rope which is coiled in a circle, to spin it, to cast it, to have it go over a head of an animal, to tauten the thing and start pulling', all that is in *to lasso*. It is a very complicated action. It is rather rich. The third, *steer*, has the concepts of a kind of animal, within the animal kingdom. It has a concept like the institution of breeding for human consumption. It has the concept of castration, because it is a castrated bull. All those things are taken

together. You'd never find a concept of castration showing up in a closed class form. It is only going to be showing up in open-class forms.

To further bring into relief the contrast between these two systems, the way to do that is to keep within the sentence one set constant while varying the other set, and see what happens. We first keep the open-class forms and just change all of the closed-class forms. You might get a sentence like *Will the lassoers rustle a steer?*

Now I shifted it from the past to the future, from a statement to a question; I've shifted around all the plurals and the definites. I even changed the verb around: the *-er* appeared on the lassoers instead of the rustler. Nevertheless, the sentence still leaves you on a western cowboy landscape because the open-class forms are the ones that contribute the majority of the conceptual content of the total sentence. And that content is still roughly some kind of cowboy landscape. All the changes are in the structure.

Conversely, if you keep the closed-class forms constant, and you vary the open-class forms, you might have a sentence like *A machine stamped the envelopes*. Now all of a sudden we are in a different conceptual content area, we're in an office building. But the structure is the same: one thing is acting on another serially, and I am telling you this, and so forth. The conceptual structure is pretty much the same.

This is by way of demonstrating the functional difference between these two subsystems. I will give a bit more of this kind of example. It turns out that since the open-class subsystem is unconstrained semantically, it can express any of the same concepts that are otherwise expressed by closed-class forms. If a concept is expressed by an open-class form, it pretty much has the functional character of being an additional concept, but when it is expressed by a closed-class form, it has the character of being structural.

Let's pick the same concepts. The concepts in this case are 'past' and 'future', and they can be expressed in English either by closed-class forms like *-ed*, like *when he arrived*, the *-ed* makes it past, or *when he arrives* or *when he will arrive* for the future. Here the past and future are expressed by closed-class forms. But there is a parallel construction which doesn't permit these grammatical markers, namely *on his arrival*. If you still want to express relative time, you are forced to use open-class adjectives, so you might now say *on his previous arrival* for the past, or *on his upcoming arrival* for the future. But there is a difference in quality, even though the meaning is pretty much the same between *when he arrived* and *on his previous arrival*. The main difference is that when the same concept of past tense is expressed by the closed-class form, it feels structural; it is experienced as structural in character. Whereas when it is expressed by the

open-class form, it feels like you are adding some additional piece of content or information that you didn't have to. This is a way of teasing out the differences in functions.

Let's take for granted what I have established, this functional difference between two subsystems of structure and content. Now, that was all demonstrated within a single venue, some portion of a discourse, an actual sentence, for example. Now let's consider within language in general. If you do this, you have to look across all the languages in the world and look at their closed-class forms and open-class forms. At the semantic level, the open-class forms together seem to be able to express virtually any concept of any content of consciousness. That is pretty much what they are able to express whereas the closed-class subsystem is semantically constrained. It entails that there is ultimately a closed inventory of possible conceptual categories, and member notions within those conceptual categories, that can ever be expressed by closed-class forms across languages. If you just look at the closed-class meanings across languages, you will see repetition, you keep getting the same ones over and over again. So you form an inventory that will have certain possible conceptual categories, such as number, tense, aspect, gender, and so forth. Those would be on the inventory, and the inventory will exclude categories like food, gymnastics and color and so forth. The inventory can have, within each category a certain number of notions. We are discovering that there must be something like this privileged inventory of fundamental structural concepts. Before I proceed, let me just state the functional distinction here. All the open-class forms together within any language are able to represent all the contents of consciousness in an open-ended way. But the function of the closed-class subsystem within language in general is—here is the main discovery of this project in one sentence—is one of the fundamental conceptual structuring systems of language. That's the main summational conclusion of the existence of this closed class subsystem.

Let's look at the inventory that's available to any language. Whether it is wired-in genetically, or if it's in part acquired during development, is an open question. But there does seem to be some kind of inventory. We can further find several more characteristics of this inventory, not just little things that are present or absent from it, but also that it's hierarchical, it's graduated. Some categories in the inventory may well be universal. They may well have to appear in every language somehow, with some kind of closed-class representation. For example, a candidate for such universal status might be polarity, meaning positive versus negative. Maybe every language in the world has some kind of closed-class way of representing negation. It didn't have to be this way. In fact, I worked on an American Indian language for some time, and this

language came close to faulting, this particular generalization. It is one of these languages that has a main verb 'to not', which indicates 'not', and which inflects in various conjugations and persons, and so forth. So *I didn't hit him* is 'I not-ed him to hit', it takes an infinitive. If that were the only thing in that language, we would have to say that it is an exception to this possible universal fact. But as it happens, Atsugewi also has a closed-class form which is used in some of the conjugational categories So this universal theory was spared.

Other conceptual categories in the closed-class inventory might be widespread but not universal, like maybe number is an example of that. A lot of languages have closed-class representation of number, but maybe not all do.

Third, there are some closed-class categories that are going to be rare but not absent, and one example of those is rate, fast vs. slow. There are some languages that have inflections in their verbs which mean fast or slow, but they are rather rare. And finally, at the bottom of the hierarchy are things not in the inventory at all. As we saw, color is not, food is not, and so forth. That's one property of this inventory, it's graduated.

Another property of the inventory is that in general, in the kind of semantics I do, it doubts the Fodor or Chomsky kind of notion of a watertight module where there is no influence from outside. I call it a system instead of a module, so there is a language system, a visual system, by which I mean that there is much more interpenetration of their interactions or functions. They are not closed compartments. In fact, we should expect that kind of behavior in this inventory. In my view, very little in human cognition is totally compartmentalized, and that would include this inventory. You could never say definitively these are the concepts on the inventory, and these are the concepts off the inventory. You should expect with this kind of perspective that there will be a rough lower boundary, and you should expect that some categories or closed-class concepts will get expressed sporadically, periodically with one language here, another language there. But you can't totally exclude anything. Because of this hierarchical character, even if some language someday shows up with a closed-class form that expresses color, my whole theory is not suddenly overturned. It just means that color now is at the bottom of this hierarchy. This is why I build hierarchy into it.

Here is an example of a grammatical concept that is very rare, in English. If you get in an enclosed vehicle, it turns out that sometimes you say *in*, sometimes you say *on*. You say *on the bus*, but if this is a car, you say *in the car*. So, *in the car* and *on the bus, in a helicopter* but *on a plane*. So helicopter goes with the car, plane goes with the bus. You are *in a rowboat* but *on a ship.* These are enclosed vehicles. Even if the seat is on the inner part of the ship, you still say *on the ship*. You are *in a grain car* but *on a train*. What property is it that

distinguishes when you say *in here* but *on there*? It seems to me that if the vehicle is enclosed, but if it has a walkway, then you say *on*. A bus has a walkway; you can step up on the walkway. A plane has a walkway; a ship has a walking area. All the others have none, you have to sit there. You can't walk around. Furthermore, it is not just the use of *on* in these cases. It is not just the enclosed vehicle with a walkway. It also has to be that the vehicle is currently in use as a vehicle. For example, if there is a bus in a junk yard that two children are playing in, you now say the kids are *in the bus*, not *on the bus*. Or if there is a dog, even in the bus that's moving, you typically would say *The dog is in the bus*, not *on the bus*. If you say that the dog is on the bus, you tend to think that the dog is a passenger which is a notion you didn't intend. This is an example of a very unusual semantic concept, it means mainly in an enclosed vehicle with a walkway that is in use. Nevertheless, *on* is a closed-class form in English. You have to deal with such things, that's the nature of the beast. This is about the theoretical.

We have said we have an inventory of conceptual categories and member notions that closed-class forms ever represent. But the next question is 'Is this inventory random, or are there principles that govern it?'; 'Which category concepts are on the inventory and which ones are off?'. I have not found any single master principle that governs this. But there are a number of smaller principles that determine part of it. One of the principles is that the closed-class categories and forms, if they refer to space or time or certain other domains, have to be topological in character in their geometry. They cannot be Euclidean. Euclidean is the geometry of precise angles within triangles, precise shapes, this form is different from this form, these rectangle are different sizes. It is sensitive to magnitude and shapes. But in topology, all of this is abstracted away from it. It's another kind of geometry. In topology a circle is the same object as an oval or as any sort of closed loop. That is topology. It's neutral to size, to shape, to angle, and so forth. That's a formal property of geometry called topology. It turns out that closed-class forms in language are topological. They exclude the Euclidean.

First, let me give you some examples. They are magnitude neutral: they exclude distinctions of magnitude. For example, let's take the *across* schema in English, the preposition *across*. This is the basic *across* schema: two parallel lines with a path that from one perpendicularly leads to the other. That is fine, it is magnitude neutral. It doesn't care about the magnitude. You can say *The ant crawled across my palm* and *The bus drove across the country*, where *across* simply doesn't care. It abstracts away from magnitude. The same goes for *this* and *that*. You can say *This speck is smaller than that speck*, and you can say *This planet is smaller than that planet*. It completely abstracts away from the

magnitude of an object or the magnitude of distance. The schema for *this* and *that* is there is some kind of speaker, and some kind of conceptual partition through space and time. If the reference object is on the speaker's side, you say *this*, but on the non-speaker's side, you say *that*. That is the set-up, but where this partition is relative to the speaker is irrelevant. This particular schema just doesn't care. That is why I can say *this versus that*.

The same is true for time as well as for space. For example the *-ed*, the past tense of English, doesn't care about magnitude. Let's say this is the time line. Here is the present moment. You can say Alexander died with dignity. It could be something new, a year ago, so the interval is this or it could be Alexander the Great who died three thousand years ago or so. Anyway he died at a much larger interval. All that *–ed*, the past tense, cares about, is whether it's on this side of 'now'. It doesn't care about the magnitude of the temporal interval. That is magnitude neutrality.

These are topological properties. One is magnitude neutrality, another is shape neutrality. For example, one of the uses of the word *through* in English is to move along a line that lies within a medium. You can say *walk through the woods*. Fine, but you can say *I walked straight through the woods, I circled through the woods, I zigzagged through the woods*. The word *through* doesn't care. All it wants is motion along the path that lies in the surrounding medium. It doesn't care about the path, so it's shape neutral.

The same is true for the *across* schema. This is an oddly shaped lake, and I swim like this. I can still say *I swam across the lake*. It tolerates an amount of variation. If it is Euclidean geometry, this would be totally different from that. But in topology, they are structurally identical. That is all the closed class forms of language care about.

One of the observations I have is that a lot of early science in the history of science is an expanded and theoreticized version of conceptual structure that's already built into language and other cognitive systems. I think, in general the mathematical system of topology itself is a form of science which derives from language. It's a conceptual category that's built into the fabric of language and which becomes schematized. Still, once it becomes science you can start seeing distinctions.

I want to contrast language typology with mathematical typology. There is another principle, I think, for cognitive linguistics in general, which is that there are various people coming from other fields such as mathematics or from literature. In fact, my field before linguistics was mathematics. But it's wise not to import all the theoretical particulars of the other fields into language. They probably don't fit. Cognition works in its own way in each area such as language. You have to be careful not to impose on language conceptual structure

from outside language. Here is a case in point. Linguistic topology corresponds to mathematical topology in some regards, for example, in terms of being magnitude neutral. We take the word *in* in English. *In* refers to a plane so curved as to define a volume of space. And *in* is location of some object at any point of that volume of space, so defined. That is what we characterize as *in*. You can have *in the thimble*, the thing you have on your finger when you sew, or *in a volcano*. The word *in* doesn't care. It is magnitude neutral. It is also shape neutral. You can say *in a well* where you get water out of, and you can say *in a trench*. Different shapes, still *in*. This much is like mathematical topology. But linguistic topology is even more abstract than mathematical topology. For example, it is what I call closure neutral. This is *in a ball*, but this is *in a bowl*, a ball or a bowl, still *in* in English. Other languages may have a distinction, but English *in* doesn't care, whereas in terms of mathematical topology, these are completely different objects.

English topology is more abstract than mathematical. The same goes for, let's say, a bell-jar, it's a glass jar, and a birdcage. Topologically in mathematics, they are completely different objects, but within language, the *in* structure is still more abstract geometrically, so both are *in*. On the other hand, there are some things where mathematical topology is more general than linguistic topology, or linguistic topology is more specific. For example, this is *I swam across the lake* (the full diameter), this may be *I swam across the lake* (only to the middle), but a shorter distance swim is not. If you are completely, consistently neutral to magnitude, this should also be *across*, but it's not. It turns out that this magnitude neutrality feature of linguistic topology has a constraint. It has additional characteristics. Let's take the *across* schema. If you draw down lines and consider there to be an area on either side of the perpendicular path, these areas have to be of comparable magnitude for the schema to work. That's why this is a good *across the lake*, the two sides are pretty well evenly divided, but this is not. They are very different magnitudes. So here is an example where linguistic topology is more specific, less abstract than mathematical topology. You have to be careful not to simply import something into something else.

I started this by asking are there any cognitive principles that govern which conceptual categories of notions are on the inventory and which are off. One principle is that anything that is Euclidean is excluded from the inventory, anything specific as to quality, shape, magnitude, and so forth. So that's excluded. Of course, as usual, open-class forms are not excluded in the same way. We can have open-class forms that are specific. For example, as for quantity or magnitude, we have words like inch, mile, minute, hour, gallon, and so forth. That is specific for quantity. We have forms that are specific as for shape, such as square, spiral, ricochet, specific aspects for a shape. So this restriction is only in closed-class forms.

There are further kinds of restrictions that could be found. One is bulk neutrality. It could be considered as an extension of topological characteristics. In bulk neutrality, for example, you have the word *along* in English. That's another preposition. Here's let's say is a thread, and here is a caterpillar, the baby butterfly, and you can say *The caterpillar crawled up along the thread*. *Along* means 'on the line', moving on the line that is parallel and near to some other line. You can also say, if this is a big trunk of a tree, *The caterpillar crawled up along the tree trunk*. The word *along* doesn't care, because the tree trunk can be idealized, boiled down to the minimum abstraction within it. It's neutral to its bulk. This is the bulk. It's bulk neutral.

A further kind of abstraction is in term of proper nouns. It turns out that nouns can be proper. That means it can refer to a unique entity within the continuum of space and time. If you consider there to be like a unique Einsteinian continuity. The word Shakespeare refers to a particular figure, cuts through space and time as he lives his life. You can say the same for Manhattan, the city. So Shakespeare and Manhattan are both proper nouns in English, and they refer to unique things in space and time. You can imagine the same kind of thing holding for a preposition, which is a closed-class form. I, in fact, invented several proper prepositions. What would a proper preposition be? It should be some pathway that you can conceptualize as being unique in this space-time continuum. Let's take, whether it is true or not, let's say Jesus on the path of the hill of crucifixion. This is the pathway. Maybe it is unique in time. You should be able to make up a new preposition 'Astation' with capital A and say something like *Jesus walked Astation the hill named Calvary*. Or to give equal time to a Jewish version, Moses was supposed to have divided the Red Sea and walked across it. Maybe there is one path. You can make up a new preposition 'Amatzah' and say *Moses walked Amatzah the Red Sea*. But such proper prepositions don't exist. And so it's another example of what is excluded from the inventory. What is excluded is anything that is unique within the space time continuum. So there are no proper prepositions.

Open-class forms of course are not. They do have specific Concepts, such as fact and thing, and they have token specific forms like Shakespeare, Manhattan.

I only get 25 more minutes to talk. I've gone a bit slower because I am assuming that a number of these examples are unfamiliar and the language is not your native language. So I'll just take my time. If I can't get to something important, we'll just have to skip it.

Let's go on to the next stage. So far we've got an inventory of concepts which can be expressed by closed-class forms around the world. I should have said what any single language does. It draws a selection from this universally available inventory of particulars, so no single language ever expresses all the concepts on this universally available inventory. Every language has some kind of

selection from them, and what the principles that govern the selection are, I don't know, I haven't worked on it. I assume there is some kind of representativeness. No language will have all aspects. This is something that has distribution. I have to work that out.

Going on now, we've got all these concepts, but I just picked them at random. Is there something way that they pattern together? The answer is yes, they do. Looking at these areas, we've already seen that individual closed-class concepts group together into categories, and furthermore the categories group together into larger systems which I call 'schematic systems', from the word *schema*. There are schematic systems. And there are several major schematic systems that I work with in this closed-class subsystem that all languages seem to offer. One of them is what I call 'configurational structure', which is the closed-class forms that structure space and time and various other related dimensions. Then there's what I call 'perspective point', which gives this structured scene of the closed-class form a place where you are looking at from to conceptualize it. Another is the distribution of attention. If you've got the structured scene and look at it from some particular perspective viewpoint, which parts of it are in the foreground of attention, and which parts of it are in the background of attention?

So those are three major categories or schematic systems. The fourth one is called force dynamics, I will talk about that this afternoon. There's still more. Let's look at the first schematic system and I'm going to skip all the rest of section two and I am going to talk about three.

There is probably going to be some kind of parallelism between how a category structures space and how it structures time. The first category of plexity is the number of comparable elements in any given quantity. This refers to objects in space. It amounts to what we consider as number, it amounts to singular versus plural, and my term for that is 'uniplex' for 'singular' and 'multiplex' for 'plural'. The reason I chose these new terms is to show their commonality for the exact same structuring for events in time. Previously those were categorized as separate domains. A single event in time, which is considered as a kind of aspect, was technically called semelfactive, and multiple acts in time were called iterative. But now I use the term uniplex to cover both singular for objects in space and semelfactive for events in time. The whole category, which covers both number and aspect, is now called plexity. If any particular closed-class form brings about an effect, I consider that a cognitive operation. For example let's take a word for an object in space, let's take the word *bird*. As a noun, *bird* is intransitively uniplex. But by adding *-s* to it, *birds*, you can perform an operation of multiplexing, which takes the original single referent

and copies it onto various points of space. The same parallel thing takes place within the domain of events in time. If you've got the verb *to sigh*, it is intransitively uniplex, if you sighed once. But you can say *He kept sighing*, and it takes the single action and copies it onto various points of the time line. You can say that the operation of multiplexing words works in both space and time, by taking some original solo referent and copying it onto various points of space and time. That's the operation of multiplexing words across the two domains.

If you get one operation like multiplexing, you'll typically be able to find the reverse operation, where the open-class form refers to a multiplexity and then when you have closed-class forms, you take one element out of its multiplexity and it gives you one, which is now an operation I call 'unit-excerpting'. That in fact does exist in some languages. It exists in English, not in a simple way, you have to have a complex structure to get it. For example, the noun *furniture* in English is intrinsically multiplex. You can't just look at a chair and say *That's furniture*. Furniture has to be chair plus couch plus TV set, for example. You have to have multiple objects. In fact, the way you then get a single element out of the multiplexity is that you have to have a construction like 'a piece of furniture'. You have to have a whole original formula that does that. That is how you get unit-excerpting in English. The same holds for events in time. Some verbs in English can be conceptualized as having multiplexity. *To breathe* is one of them, so you can say *She breathed with full concentration*, that's in out, in out, in out. But you can excerpt one of these units by saying *She took a breath with full concentration*. Again, English performs this inverse operation of unit excerpting, because of a specialized sequence. As it happens, other languages do perform this unit-excerpting operation in a direct, simple, closed-class way. Yiddish, for example, performs it for nouns. So *zamd* is 'sand', the multiplex form of *sand*. How do you get 'one grain of sand' in Yiddish? You say *zemdl*; by adding certain suffix, it's 'a grain of sand'. The same for 'grass'. *Groz* is multiplex for 'grass', and *grezl* is 'a blade of grass'. The same goes for 'snow'. *Shney* is 'snow', *shneyele* is 'snowflake'. That's how Yiddish does it. Russian does this as well. It also does it for verbs. The verb 'to sneeze', *chix-at'*, means 'to sneeze a multiplex number of times'. That is what the basic verb means. If you want to say 'to perform a sneeze once', you have to add a suffix which performs the operation of unit excerpting on an action. You now get *chix-nu-t'*, which means 'to sneeze once'. This is the category of plexity.

Let's take another category. The category of plexity has two main members, uniplex and multiplex, probably in both space and time. We've found closed-class forms that can convert open-class forms from uniplex to multiplex, and we've found the reverse, forms which can get you from multiplex to uniplex.

Let's look in the same way within the domain of boundedness. The category of boundedness also has two main members. It has unbounded and bounded. Unbounded means the concept is understood as going on indefinitely, with no intrinsic boundary. Bounded means the concept is intrinsically conceived as being a unit entity with its own boundary. For example, there are both nouns and verbs that have either of those intrinsic characteristics, and there is a test for it. If it can be used with *in* within a temporal expression, it's got to be bounded. For example, you can say *We flew over a sea, a lake in one hour*. But you cannot say *We flew over water in one hour*. Water is unbounded, it fails the test. A lake is bounded. It passes the test. Therefore it's bounded. The same holds for actions. You can say *She dressed in one hour.* That's fine. *To dress* is bounded. But you cannot say *She slept in one hour*. You have to say *She slept for one hour*. The question is, are there any operations that can be represented by closed-class forms that can be performed on these lexical items? And the answer is yes. Can you perform the operation of bounding on intrinsically unbounded forms? Let's take water. Yes, you can perform an operation of bounding by saying 'some water'. You say *We flew over some water in one hour*. It's not the best English, but it's still okay. By adding *some*, you can now perform the operation of bounding or another term I used for it 'portion excerpting'. Or English can also say *We flew over a body of water in an hour*. Can you do the same for *to sleep*? The answer is yes. You can say *She slept some*. That means for a portion of time, or *She slept for a while*, or *She slept for an hour*. These are operations of bounding.

Is there an inverse operation of debounding? The answer is yes. Certainly there is for nouns, objects in space. For example, the noun *shrub* means 'a bush' in English. It refers to a plant shaped like that. But if you add the closed-class form *-ery*, it effaces the outer boundary; it takes the material from the inside and extends it in an outward way. You can say *Shrubbery covers the front of the Summer Palace*. The same goes for a panel. You can put a panel on a wall to face the wall. There is a possible operation of debounding, by adding *-ing*. 'Paneling' now refers to indefinite extension.

That's one kind of debounding. There are many kinds of debounding in English. One is just by adding the plural. You can say a tear is the drop that comes from your eyes. What do you do to debound that, to make it the equivalent of, let's say, lachrymal fluid? You say *Tears flow through that channel in Hades*. Hades is like hell. So it's a lot of tears together. Well, adding the *-s*, you first multiplex it, and then you conceptually juxtapose them so that they all form a single mass. And you partially efface their boundaries, and you wind up with an unbounded mass. So you can say *Tears flowed through that portion*.

Another way is by turning it into a mass noun, so you can say, here is a pencil. You can say *There is miles of pencil* without *a*, you've turned it into a mass noun. *There must be miles of pencil in that stationery store*. In fact you conceptualize that you lined pencils up along their linear dimension and made it into an indefinitely long object. The same goes for two dimensions: *There must be acres of film screen in that old film studio*. You know, you line them up into a plane. Finally, there is the case of the count noun turning into a mass noun. So, 'a cat'. You can say *There is cat all over the driveway*, without *a*. You've turned it into a mass noun that means some cat was squashed by a car and now is spread over the driveway as a mass.

So these are forms of debounding. Now, let's put several of these together into a single diagram. Let's go to the diagram on page 12 in the text.

It turns out that this is not going to be the interaction of the members of these categories which you have. You have plexity, you have state of boundednesss. I am going to add one which I skipped, which is state of internal dividedness. This is the internal continuum. This is part one. This is internally divided. This is multiplex, unbounded and bounded. This is uniplex, the single dot. These are the bounded forms and here are the unbounded forms. So we've got the intersection of all these categories we just looked at. It turns out that most nouns and verbs and lexical items are going to represent a specific intersection of one or another of these complexes. Then you use closed-class forms to get them to the other. For example, take the unbounded multiplexity with internally discrete. The verb *to breathe* is an example of that. You can perform the operation on it of unit-excerpting, and you get 'take a breath'. Also, there is the noun *timber* or *furniture, a piece of furniture or timber*. Seldom do we have separate nouns that are used for each of the intersections. We do for trees. Here is a tree. Here is a grove. A grove is a bounded set of trees. Here is timber, meaning a forest. It's an unbounded multiplex of trees. In this case, English has squandered part of its vocabulary to give you separate nouns for each of these, but usually it doesn't. It usually picks one set of characteristics for a noun and lets you derive the others by adding closed-class forms. That is what we just saw for *breathe*, and for *furniture*. If we start here, this could be a family. A family is a bounded multiplexity. You can say *a member of a family*, so you go down to take a uniplex form. Then you can say *members of a family*, so you can go up there. You can also go from *a tree* to *trees*, or from here, *sigh* to *keep sighing*, and then you go from here to here, *to sigh for a while* or *a bird*, *a group of birds*. In various ways by surrounding the original noun to refer to one of these complexes, you can then maneuver to get the other complexes that you want. That's the way language is built. It doesn't have millions of separate nouns and

verbs to give you every substantive concepts in each of these different structural formats. It usually, for a content, gives you one selection in its lexicon and then gives the means to derive it into other forms of structuring.

The next thing is embedding or 'nesting'. We already saw that you can embed one thing into another, but this is really extensive. There is lots of embedding and nesting. Again it's across space and time. Take the verb *to flash*, like *Lightening flashes*, or *The beacon flashed from a lighthouse for boats. The beacon flashed*. The verb *to flash* is intrinsically uniplex. You can say that represents *The beacon flashed*. You can perform the operation of multiplexing, and you can say *The beacon kept flashing*, so that's flash, flash, flash, flash. Now you can perform the operation of bounding on this and say *The beacon flashed 5 times in a row*. Now you can consider this as a single new uniplex entity, and you can again remultiplex it. You can say *The beacon kept flashing 5 times at a stretch*. Again, you can re-bound the entirety of this, you just multiplex this, and say something like *The beacon flashed 5 times at a stretch for 3 hours*. That's what I mean by structure when I talk about configurational structure, that particular schematic system. This is an extensive example of that. The same is homologous in time as in space. This is in time. You can also say it in space. You can say *I saw a duck in the valley*. You can multiplex it and say *I saw ducks in the valley*. You can bound it: *I saw a group of 5 ducks in the valley*. You can multiplex it again and say *I saw groups of 5 ducks each in the valley*. And you can re-bound it by saying *I saw 3 acres of groups of 5 ducks each*. So the same exact structural homology takes place. All that is for this first schematic system.

Now let me switch to another schematic system, point of view or perspective point. Let me give you a quick sense of how it works. Perspective point is where you mentally put your eyes to conceptualize the scene that is structured in terms of the first schematic system. It has a number of categories, just like you saw with plexity, the state of boundedness, and so forth. This too has a number of categories. One of the categories is the distance away. Typically you have three: proximal, mid-range and distal. For example, let's take an event, *She climbed the fire-ladder*. It's like looking at something up close, it is a proximal perspective point. The object becomes debounded, mid-range becomes bounded, and distal perspective is reduced to a point. Those structural changes correlate. Let's say *She climbed the fire-ladder in exactly 5 minutes*. That's a bounded extent of time, and it is a kind of mid-range perspective point that you witness. Then you can take a distal perspective point, in which case you reduce the object down to a point conceptually. All this is conceptual manipulation. It is not about the real world. It is all about conceptualization. What language does is let you manipulate. All the closed-class stuff is telling you how to conceptualize the content that is otherwise being expressed, how to

conceptualize it structurally. So you can reduce it down to a point by saying *Moving along on the training course, she climbed the fire ladder at exactly noon*. You now treat the time like a point. It isn't 5 minutes. You treat the time like a point on the timeline, at exactly noon. You've done the reducing by saying things like *Moving along on the training course, she climbed it*. Then you can do the opposite of reducing. You can magnify and take the close-up perspective point, and say something like *She kept climbing higher and higher up the fire-ladder as we watched*. All the closed-class forms in there change the whole perspective line, as if you're up close and you sort of debound the whole event, so that it no longer has boundaries, beginning and end, and because of the ongoing progression. So those are some kinds of manipulation.

Now this particular category is what I call mode. There are two perspectival modes. One is the synoptic mode, where you see everything all at once. The other is the sequential mode where you think of them sequentially. Again, all of these are the same content but conceptualized in two different ways. The closed-class forms direct you how to conceptualize. For example, the first kind, the synoptic mode, is where you have a distal perspective point, a far-away perspective point, which is stationary and has a global scope of attention. The other type, the sequential mode is where you have a moving perspective point with a proximal, close-up distance with a local scope of attention. I borrow attention from the next schematic system for this mode. We have sentences that can let you switch from one to the other. Just the same way, just like we have bounded and debounded, and so forth, we can have sequentializing and synopticizing. For example, let's say here is a valley and there are houses in the valley. If you take the synoptic mode where you see it all together, you might say something like *There are some houses in the valley*. All of it globally taken together as if from a distance, and static. But you can refer to it in another sentence: *There is a house every now and then through the valley*. English lets you do this. There, it's as if you are considering each house in turn from up close, you are there looking at that house, you move on to see another house, you move on to see another house. It's a local scope of attention from a moving proximal perspective point. That's what that sentence does.

Again there is 'a house', a singular of 'the houses'. It is a house. 'Every now and then' is a temporal expression, it means periodically, but used for spatial spread unusually, in fact it means you can think of it as your viewpoint moving through time, looking at each one in turn. And it is not 'in the valley', which is static, but 'through the valley' which is dynamic, so all of this is possible. You can do the opposite, take something which is inherently dynamic and turn into something static, so you can synopsize it. For example, the succession of events like *I took one aspirin after another in the course of the last hour*. Here is

the time line, here is *I took an aspirin, I took another aspirin, I took another aspirin*. Here is an hour. So that's *I took one aspirin after another in the course of an hour*. That's sequential, and it's intrinsically sequential, the actual events. But you can conceptually synopsize it by saying *I have taken a number of aspirins in the last hour*. So you use the perfect *I have taken,* which kind of summarizes the consequence of all these events. You cumulatively took one aspirin after another. You say *I have taken* which kind of adds it all up. Then you have a number of aspirins, plural. 'In the last hour', treating like an enclosure, instead of 'in the course of the last hour', which treats it like an ongoing event. So you can reconceptualize the whole thing.

I'll show you the last one, how you can nest the perspective point. My sentence on the nesting, at the end of the section, is *At the punchbowl, Jack was about to meet his first wife-to-be*. It's at a party. Here is a punchbowl. Somebody is standing at the table. Here is the time line. Here is Jack standing at the punchbowl. From that perspective we're going to look forward to a woman coming over to the punchbowl and meeting Jack. He is later going to marry that woman as his first wife, that would be his wife-to-be, but she is only his first wife-to-be. So therefore he divorces her, and from that perspective we then see another woman that he marries later. All this is contained in that and it's all seen from the current moment. Here is the present moment with a perspective point looking at that whole set of events, because only from the later perspective can we know at that initial point what is going to happen. This is an embedding of perspective points. All these structural phenomena are taking place, embedding conversion from one structural thing to another and back again. All these take place with these different domains, different schematic systems. I gave you two schematic systems. One is a configurational structure with plexity and state of boundedness, and another is location of perspective point, and this is how the whole conceptual system seems to work. The closed-class seems to give you these structural delineations of large conceptual content.

The function of this is that it permits you to form a gestalt, a single unified structured whole over space and through time, and you can include temporal discourse. There are a lot of closed-class forms that perform things through discourse, phrases like *yes, but* or *moreover* or *therefore* or *also*. I call them 'logic gating'. They link and structure formal conceptual parts that you express in a discourse with current ones in the overarching structure. They are logical structures through the time of the discourse. So the overall function therefore, of the closed-class subsystem is to structure things conceptually and tie them together into a unified whole. That's the end of this talk.

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Note: all these works are accessible on my website:
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Handout Lecture 1

1 Language comprises two subsystems: the open-class and the closed-class

1.1 A fundamental formal property (design feature) of language

it has 2 subsystems: the open-class and the closed-class

1.1.1 Open-class or "lexical" (open-class forms = OCs):

any category of linguistic forms that are large in number and easy to augment

in any language, can comprise the roots of: nouns / verbs / adjectives / ? ideophones
as well as collocations ("lexical complexes")

1.1.2 Closed-class or "grammatical" (closed-class forms = CCs):

any category of linguistic forms that are relatively few in number and difficult to augment

in any language, can include:
- overt (phonologically substantive):
  - bound: inflections / derivations / clitics
  - free: determiners / adpositions / conjunctions / particles / ...
  - suprasegmental: intonation/stress patterns (if comprising a small closed set)
- abstract / implicit:
  - word order
  - grammatical categories (e.g., N, V, A, NP, V P)
  - grammatical relations (e.g., subject, direct object, indirect object)
- grammatical complexes:

syntactic structures / grammatical constructions / phrase structure & immediate constituency / complement structure

1.2 A semantic distinction correlates with this formal distinction

1.2.1 OCs are almost unconstrained as to what they can refer to

1.2.2 CCs are highly constrained, in two ways:

a. as to categories of concepts
number but not color
space, time, causation, but not food, health, work

b. as to member concepts even within acceptable categories
number: singular / dual / trial / plural / paucal
not: even / odd / dozen / numerable

OCs not subject to these constraints, as preceding lexical items attest

1.3 A functional distinction correlates with this semantic distinction

OCs represent conceptual **content** / CCs represent conceptual **structure**

These semantic and functional distinctions appear in two venues:
within any specific portion of discourse, e.g., a sentence
within the lexicon of any language and within language in general

1.4 First venue: OCs / CCs semantic + functional differences in discourse

in any portion of discourse, e.g., a sentence,
semantically: OC meanings are characteristically rich (much meaning of many different categories together);
referentially unconstrained
CC meanings are characteristically spare / schematic; within referential limits

functionally: in the cognitive representation evoked by a portion of discourse
most of the **content** is contributed by the OCs
most of the **structure** is determined by the CCs

1.4.1 Demonstrating OCs / CCs differences in a Single Sentence

(1) A rustler lassoed the steers.

a. the closed-class forms in this sentence:
(a) -ed 'occurring at a time before that of the present communication'
(b) the 'speaker infers that addressee can readily identify the specific referent'
(c) a 'speaker infers that addressee cannot readily identify the specific referent'

(d) -s 'multiple instantiation of object'
(e) a…-∅ 'unitary instantiation of object'
(f) -er 'performer of the specified action'
(g) grammatical category "verb" for *lasso* 'eventhood'
(h) grammatical category "noun" for *rustler / steer*
'objecthood' (for one possibility)
(i) grammatical relations "subject" / "object" for *rustler / steer*
'agent'/'patient' (among the possibilities)
(j) active voice
'point-of-view at the agent'
(k) intonation, word-order, character of auxiliaries
'the speaker "knows" the situation to be true and asserts it to the addressee'

b. the open-class forms in this sentence: each is a complex of concepts including—
(a) rustle property ownership, illegality, theft, livestock
particular mode of activity
(b) lasso a rope configured into a loop and a tail gripped by the hand
the loop twirled, cast over the neck of an animal, tautend, and drawn
accompanying cognitive intending, directing, monitoring
(c) steer object of particular appearance, physical makeup, etc.
relation to animal kingdom
castration
institution of breeding for human consumption

c. Changing one type of form while keeping the other constant

(2) Will the lassoers rustle a steer?
A machine stamped the envelopes.

1.4.2 The same concept functions as content when in an OC / as structure when in a CC

the concepts 'past' and 'future' are experienced as setting structure when expressed by CCs:
when he arrivED—when he arriveS / WILL arrive
but are experienced as contributing additional content when expressed by OCs:
on his PREVIOUS arrival—on his UPCOMING arrival

1.4.3 OCs and CCs CAN incorporate each other's characteristic type of concepts,but then assimilate them to their native function

a. OCs CAN incorporate CC-type specifications, but
in a conflict, the CCs always determine the final structure, as per their function

(3) She's somewhat pregnant.

usual 'all or none' meaning component of *pregnant* may here shift to a 'gradient' sense in accommodation to *somewhat*
but *somewhat* will not shift from 'gradient' to 'all or none'

b. CCs CAN incorporate OC-type specifications,
but those specifications there become backgrounded / difficult to localize / "structuralized"

(4) a. We marched / rode / sailed / advanced / … upon them.
b. We marched / rode / sailed / advanced / … towards / past them.

an OC-type notion of 'attack' is incorporated in *upon*, but not in *towards / past*

as with any concept expressed by a CC, the 'attack' concept:
(a) is attentionally backgrounded—unlike when expressed in a verb, as in: We attacked them.
(b) is difficult for speakers to associate with the word *upon*
(c) may acquire a structural character as a kind of path notion

1.5 Second venue: OCs / CCs semantic + functional differences in Language / a Language

1.5.1 Within language in general as a system

considering the meanings of OCs and CCs cumulatively across all (possible) languages:

a. semantically:
the semantic freedom of OC meanings entails: they constitute an open-ended conceptual pool
the semantic constraint on CC meanings entails:

there is a relatively closed inventory of conceptual categories and member concepts
that can ever be expressed by CCs

properties of this inventory:

(a) hierarchical in the extent of occurrence across languages:
universal: e.g., polarity (positive / negative); mode (declarative / interrogative)
widespread: e.g., number
rare: e.g., rate (fast / slow)
absent: e.g., color

(b) fuzzy lower boundary: occasional concepts appear as a CC in perhaps just one language
e.g., English 'at the interior of a vehicle with a walkway and in use':
on / otherwise: *in*
in a car / on a bus; in a grain car / on a train;
in a helicopter / on an airplane; in a rowboat / on a ship
The kids played in/*on the abandoned bus.

b. functionally:
OCs can potentially represent all of conceptual content
CCs meanings together constitute the fundamental conceptual structuring system of language

c. diachronic implications

consider the OCs *keep -ing* vs. *hate -ing*, both now regular verbs, as in:
I keep skiing. / I hate skiing.
Only the former is likely to grammaticize into a CC
whose meaning is close to the core meaning of the original OC
reason: in the inventory—temporal structure is high
but affect in general is low, and 'hate' in particular is apparently absent

NB: grammaticization theories are good at accounting for starting-points of change;
but we need the present theory to account for the end-points arrived at

1.5.2 Within any specific language

the inventory is a universally available set of conceptual categories and member concepts

from which each language selects a different subset for representation by its CCs

this subset constitutes that language's particular conceptual structuring system

1.6 Principles governing the inclusion / exclusion of concepts in the universally available CC inventory

no single global principle yet evident determining the included / excluded CC inventory concepts

but several partially extensive principles appear, including topology and other neutralities:

1.6.1 Topological character of—Euclidean exclusion from—CCs meanings

a. Magnitude Neutrality

(5) in space: The ant crawled across my palm. / The bus drove across the country.

This speck is smaller than that speck. / This planet is smaller than that planet.

in time: Alexander died with dignity. (my acquaintance last year / the Great BC)

b. Shape Neutrality

(6) a. I zig-zagged / circled through the woods.

b. The ship sailed across the sea. [with zig-zag path & shoreline]

c. hence, kinds of concepts present in / absent from CCs:

included: topological / topology-like, relativistic, qualitative, approximative

excluded: Euclidean, absolute, quantified, precisional

d. other cognitive systems are fully sensitive to the factors excluded from CCs.

thus, in the ant across palm / bus across country example, other systems process differences in:

scope of perception / span of attention / constancy of scene / manner of locomotion

but none of this makes it into CCs meanings; these only constitute abstracted schemas

e. Linguistic vs. Mathematical Topology

in: a plane so curved as to define a volume of space

like math:	magnitude-neutral:	in the thimble / volcano
	shape-neutral:	in the well / trench
unlike math:		
more abstracted:	closure-neutral:	in the bowl / ball
	continuity-neutral:	in the bell-jar / birdcage
less abstracted:	comparable parts of a schema must be of comparable magnitude:	

*I swam across the lake.
[when path's endpoints are close on shoreline]
*This glass has water, and that glass has wine.
[if glasses are 20 and 21 feet away from speaker]

1.6.2 Further Neutralities that exclude certain specifics from CC Meanings

a. Bulk Neutrality

(7) The caterpillar crawled up along the filament / flagpole / trunk of the redwood tree.

b. Token Neutrality

proper nouns occur: Shakespeare, Manhattan
no "proper CCs", e.g., "proper prepositions":

(8) a. *Jesus walked Astation the hill named Calvary.
b. *Moses walked Amatzah the Red Sea.

c. Substance Neutrality—but Phase-of-Matter Sensitivity

English: *through the water / milk / mercury*
but Atsugewi has distinct CCs for:
'into solid substance' / 'into liquid' / 'into fire' / 'into empty space'

1.6.3 OCs Not Referentially Constrained like CCs

OCs have referential freedom covering both structural abstractions and specificities

magnitude: inch / yard / mile / pint / gallon / hour / month / year

shape: N: circle / square; A: straight; V: r icochet

bulk: A: fat / slender

token: N: Shakespeare / Manhattan

2 Categories of Closed-Class Concepts

individual CC-specified concepts → conceptual categories → integrated "schematic systems"

three major schematic systems:

configurational structure / location of perspective point / distribution of attention

(other schematic systems include: force dynamics / cognitive state)

2.1 Properties Characteristic of CC Categories—typically in a language:

2.1.1 Intra-categorial convertibility

where A and B are 2 concepts in the same category and L1 is a lexical item incorporating A:

some CC_1 exists where L_1+CC_1 expresses B instead of A

—the CC triggers a particular cognitive operation for this conversion

2.1.2 Reverse convertibility

where an L_2 incorporates B, some CC_2 exists where L_2+CC_2 expresses A instead of B

2.1.3 Nestability: the output of one operation can be the input to another operation

2.1.4 Space-time homology

parallel conversions and operations occur for spatial referents of NPs and for temporal referents of Vs

2.2 The Category of Domain --cross-cuts subsequent schematic systems

2.2.1 Space and Time

(9)

domain	*continuous*	*discrete*
space:	mass	object
time:	activity	acts

(10)

act:	*reified as an object:*
John called me.	John gave me a call.
I was called by John.	I got a call from John.
activity:	*reified as mass:*
John helped me.	John gave me some help.
I was helped by John.	I got some help from John.

(11)

	Object(s)/mass	*Actionalized as:*
a.	Hail(stones) came in through the window.	It hailed in through the window.
b.	Ice is forming over the windshield.	It is icing up over the windshield.
c.	I removed the pit from the cherry.	I pitted the cherry.
d.	He has blood coming from his nose.	He is bleeding from his nose.
e.	She ejected spit into the cuspidor.	She spat into the cuspidor.
f.	Crowds (A throng) of people went to the fair.	People thronged to the fair.

2.2.2 Other Members of the Domain Category

identificational space--

(12) a. smoker to passer-by in unfamiliar neighborhood:
   (i) Where can you buy cigarettes around here?
   (ii) Where do they sell cigarettes around here?
b. potential tobacconist to business consultant for that neighborhood:
   (i) Where can you sell cigarettes around here?
   (ii) Where do they buy cigarettes around here?

3 1st Schematic System: Configurational Structure

3.1 The Category: Plexity

plexity: state of a quantity's articulation into equivalent elements
uniplex / multiplex
= for space: singular / plural
for time: semelfactive (punctual) / iterative

3.1.1 Multiplexing

the CC-triggered cognitive operation of "multiplexing":
an originally solo referent copied onto various points of space or time

(14)

	matter	*action*
a. uniplex	*A* bird flew in.	He sighed (*once*).
b. multiplex	Bird*s* flew in.	He *kept* sigh*ing*.

3.1.2 Unit-Excerpting

the inverse CC-triggered cognitive operation of "unit-excerpting":
placing into the foreground of attention a single unit taken from a multiplexity

(15)

	matter *action*
a. *multiplex*	Furniture overturned in the earthquake. She breathed with full concentration.
b. *uniplex*	A *piece of* furniture overturned in the earthquake. She *took a* breath / breathed *in* with full concentration.

a. grammatical Complexes for Unit-Excerpting

(a)

$$\left[N_{unit} \text{ of } + [\_\_]_{N_{mpx}} \right]_{N_{upx}}$$

e.g., *furniture: a piece of furniture*

(b)

$$\left[V_{dummy} + [\ [\ \_\_\ ]_{V_{mpx}} + \text{DERIV}\ ]_{N_{upx}} \right]_{V_{upx}}$$

e.g., *breathe: take a breath*

b. grammatical Simplexes for Unit-Excerpting

(16) Yiddish for NPs representing matter in space
zamd 'sand': zemdl 'grain of sand'
groz 'grass': grezl 'blade of grass'
shney 'snow': shneyele 'snowflake'

Russian for Vs representing action in time
cˇix-at' 'to sneeze a multiplex number of times'
→ cix-nu-t', 'to sneeze once'.

3.2 The Category: State of Boundedness

unbounded: conceived as continuing on indefinitely
without necessary intrinsic boundaries / finiteness
bounded: conceived as individuated unit entity

OCs incorporating one of these:
unbounded: *water / to sleep;* bounded: *a sea / to dress*

syntactic test: bounded if can occur with *in* + 'temporal extent'

(17)

	matter	
	action	
a. *unbounded*	*We flew over water in 1 hour.	*She slept in 8 hours.
b. *bounded*	We flew over a sea in 1 hour.	She dressed in 8 minutes.

3.2.1 Bounding

CC-triggered cognitive operation of "bounding" / "portion-excerpting"

(18) We flew over some water / over a body of water in 1 hour.
She slept from 2 a.m. to 3 a.m. / for one hour. / for a while. / some.

3.2.2 Debounding

inverse CC-triggered cognitive operation of "debounding"

a. for NP-represented matter in space
several subtypes-- conceptual extension beyond outer boundary by:

(a) effacement of boundary and extension outward by the addition of like material:
shrub → shrubbery / panel → paneling

There is shrubbery along the front of the house. / There is paneling along the front wall.

(b) contiguous multiplexing with perhaps only partial conceptual effacement of boundaries
tear → tears (*tearery / *tearage 'lachrymal fluid')
Tears flowed through that channel in Hades.

(c) contiguous multiplexing along 1 or 2 dimensions with original entity remaining
physically intact
pencil → $NP_{measure}$ of pencil
There are probably miles of pencil in that stationery store. (1-D alignment)
There are probably 10 acres of movie screen in that old film studio. (2-D alignment)

(d) effacement of boundary and distribution of the interior with physical deformation of original entity
cat_{count} → cat_{mass} There is cat all over the driveway.

b. for V-represented action in time
curiously underrepresented by CCs

(19) As punishment through eternity, the demon had to
?keep dressing / ?dress and dress / ?dress on and on / dress without end / dress without a stop.

3.3 The Category: State of Dividedness

= state of a quantity's internal segmentation:
composite / internally discrete vs. internally continuous

perhaps no simplex CCs directly specify either category notion, or operations:
the operation of "discretizing" cf. Water → Particles of water (filled the vessel.)
the operation of "melding": cf. Leaves → A mass of leaves (lay on the ground.)

spontaneous melding: a plural form → a singular form referring to a multiplexity
trees → timber / leaves → foliage / pieces of furniture → furniture

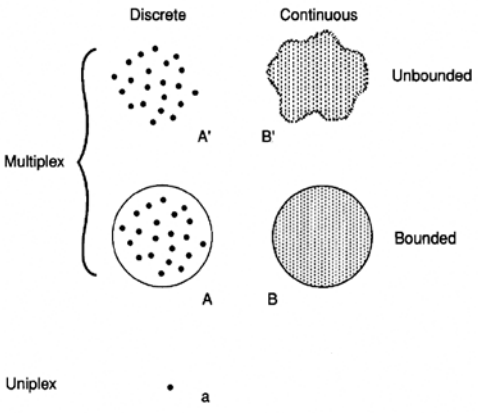
cline from most discrete to most melded:

matter in space:
a. this tree and that tree and that tree (are mature.)
b. those trees (are mature.)
c. those cattle (are mature)
d. that timber (is mature)
e. That wine (is mature).

action in time:
a. The shaman stepped once, stepped again, and stepped once more across the coals.
b. The shaman took steps across the coals.
c. The shaman stepped across the coals.
d. The shaman walked across the coals.
e. The shaman slid across the patch of ice.

3.4 The Disposition of a Quantity: An Intersection of Categories

intersection of: plexity / state of boundedness / state of dividedness



+ the distinction between *matter* and *action*, which crosscuts all of the above

3.4.1 Lexical Forms Incorporating each Intersection of 3 Categories

A′: timber/furniture
(to) breathe

B′: water
(to) sleep

A: (a) grove/family
(to) molt
(The bird molted.)

B: (a) sea/panel
(to) empty
(The tank emptied.)

a: (a) tree/bird
(to) sigh

3.4.2 Conversions from One Intersection Type to Another (Sometimes Nested)

A′→A	a stand of timber breathe for a while	B′→B	a body of / some water sleep for a while
A′→a	a piece of fur take a breath / breathe in		—
A→ a	a member of a family ?molt a single feather		—
A^A‘	members of a family (A→a→A′) molt and molt	B→B′	paneling empty and empty
a→A′	trees keep sighing		—
a→A	a stand of trees (a→A′→A) sigh for a while		—

3.5 Nesting

= embedded structure, or output of one operation as input to another

(20) in time:

a. The beacon flashed (as I glanced over).—uniplex event
b. The beacon kept flashing.—multiplexed
c. The beacon flashed 5 times in a row.—bounded
d. The beacon kept flashing 5 times at a stretch.—the new uniplexity is multiplexed
e. The beacon flashed 5 times at a stretch for 3 hours.—re-bounded

(21) in space:

a.	I saw a duck.	[… in the valley.]
b.	I saw ducks.	“
c.	I saw a group of 5 ducks.	“
d.	I saw groups of 5 ducks each.	“
e.	I saw 3 acres of groups of 5 ducks each.	“

the structural complexes that are represented:

a. !
b. …!!!!!! …

c. [!!!!!]
d. ...[!!!!!] - [!!!!!] ...
e. [[!!!!!] - [!!!!!] ...[!!!!!] - [!!!!!]]

4 2nd Schematic System: Location of Perspective Point

4.1 The Category: Perspectival Distance

perspectival distances: distal / mid-range / proximal
"degree of extension" of viewed object: point / bounded extent / unbounded extent

4.1.1 Operations

adopting alternative perspectival distance
can alter object's conceived degree of extension

triggered cognitive operations: reduction / magnification

a. on an Event

mid-range perspective point—bounded extent (basic):

(22) She climbed up the fire-ladder in 5 minutes. distal perspective point—point

(23) Moving along on the training course,
she climbed the fire-ladder at exactly midday.

proximal perspective point—unbounded extent

(24) She kept climbing higher and higher up the fire-ladder as we watched.

b. on an Object

(25)	*point*	The box is 20 feet away from the wall.
		I read the book 20 years ago.
	bounded extent	The box is 2 feet across.
		I read the book in 2 hours.

4.2 The Categories: Perspectival Motility and Mode

perspectival motility: perspective point is stationary / moving
perspectival mode = correlation of
motility + distance + [from 3rd schematic system] scope of attention

two types:

a. synoptic mode: the adoption of—
a stationary distal perspective point with global scope of attention

b. sequential mode: the adoption of—
a moving proximal perspective point with local scope of attention

4.2.1 Operations

sequentializing: synoptic → sequential mode
synopticizing: sequential → synoptic mode = inverse operation

a. Sequentializing

(26) There are some houses in the valley.
There is a house every now and then through the valley.

(27) All the soldiers in the circle differed greatly from each other.
Each soldier around the circle differed greatly from the last / next.

frequent bias towards sequential mode:

(28) The wells' depths form a gradient
that correlates with their locations on the road.
The wells get deeper the further down the road they are.

b. Synopticizing

(29) I took an aspirin time after time during / in the course of the last hour.
I have taken a number of aspirins in the last hour.

4.3 The Category: Direction of Viewing

direction of viewing = correlation of:
location of perspective point + [from 3rd schematic system] focal attention + sequential mode

applies to complex of two events, with perspective point located at one of the events directions of viewing: direct / retrospective / prospective

viewing sequence relative to event sequence:
same direction: "co-sequential"
opposite direction: "anti-sequential"

4.3.1 Co-Sequential Mode of Viewing

(30) a. direct ==> prospective
I shopped at the store before I went home.

b. retrospective ==> direct
After I shopped at the store, I went home.

c. directA ==> directB
I shopped at the store, and then I went home.

4.3.2 Anti-Sequential Mode of Viewing

(31) a. prospective ==> direct
Before I went home, I shopped at the store.

b. direct ==> retrospective
I went home after I shopped at the store.

c. directB ==> directA
I went home, but first I shopped at the store.

4.3.3 Smooth Viewing Sequencing over Single Continuous Event

co-sequential:

(32) This festival dates from 1635 A.D.

anti-sequential:

(33) This festival dates back to 1635 A.D.

4.4 Nesting

(34) At the punchbowl, Jack was about to meet his first wife-to-be.

5 3rd Schematic System: Distribution of Attention

three factors in how attention is distributed over a referent scene:

- strength of attention [from faint to intense]
- particular pattern in which attentions of different strengths are arranged
- mapping of the parts of an attentional pattern onto the parts of the referent scene

5.1 Patterns of Attention

5.1.1 Level of Attention

the same referent attended to at:

- a more integral / general level vs. a more compositional / particular level

a. Level of Exemplarity
higher: full-complement vs. lower: exemplar

(35)
a. Oysters have siphons / a siphon.
An oyster has siphons / a siphon.
b. All oysters have siphons / a siphon.
Every oyster has siphons / a siphon.
c. All the members raised their hand(s).
Each member raised his hand(s).
d. Many members raised their hand(s).
Many a member raised his hand(s).
e. Some members here and there raised their hand(s).
A member here and there raised his hand(s).
f. Members one after another raised their hand(s).
One member after another raised his hand(s).
g. Hardly any members raised their hand(s).
Hardly a member raised his hand(s).
h. No members raised their hand(s).
No member (Not a member) raised his hand(s).
i. She held a gun in both hands.
She held a gun in either hand.
j. English: some friends of mine Italian: qualche amico mio

b. Level of Baseline within a Hierarchy
higher: level of the Whole = the framing level
mid: level of the mid-scope Part
lower: level of Featural content

(36) a. The boy has freckles on his face.
b. The boy's face has freckles on it.
c. There are freckles on the boy's face.

5.1.2 Window of Attention

"event-frame": elements conceived as together constituting single whole event
e.g.: so-conceived entirety of a path / a causal chain / commercial exchangee

but usually not: day of week, geographic locale, ambient temperature,
health of participants

"window" of attention covers that portion of event-frame that is explicitly expressed remainder is "gapped"

a. Path Windowing
initial / medial / final windowing or gapping

The crate in the cargo bay of the aircraft fell--

window over whole:	out of the plane through the air into the ocean.
medial gapping:	out of the plane into the ocean.
initial gapping:	through the air into the ocean.
final gapping:	out of the plane through the air.
initial windowing:	out of the plane.
medial windowing:	through the air.
final windowing:	into the ocean.

b. Causal-Chain Windowing
extensive medial gapping:
(37) I broke the window.
includes only: agent + final event of causal chain
omits: agent's body-part motions / launch of projectile / hurtling of projectile through air / impact of projectile

"cognitive splicing": seeming seamless cognitive fusion between initial and final portions of chain
—parallels one's conscious experience of agency

next-most windowed portion of causal-chain:
penultimate event, as in English *by*-clause
(38) I broke the window by—
*picking up a rock.
*throwing a rock.
*propelling a rock through the air.
*throwing a rock towards it.
hitting it with a rock.

obligatory use of penultimate event: (a) Atsugewi instrumental prefixes
(b) English causal verb + satellite construction:
I burned the house down. / *I kindled/lit the house down.

5.1.3 Center of Attention

center-surround pattern; when applied to attention = focus + periphery
partly analogous to visual perception

A. Figure / Ground roles in space and time

Figure: a moving / conceptually movable object whose site / path / orientation
is conceived as a variable whose particular value is the relevant issue

Ground: a reference object (within a reference frame) with respect to which
the Figure's site / path / orientation is characterized

(39) a. The bike is near the house. ≠ b. The house is near the bike.

(40) a. He exploded after he pushed the button.
≠ b. He touched the button before he exploded.

B. unidirectional Figure-Ground relations in time

In a temporal sequence with causality, subordinate conjunctions can ONLY represent the following:
the earlier / causal event functions as the Ground in the subordinate clause
the later / resulting event functions as the Figure in the main clause

We stayed home because it was raining.
*It rained **to the occasioning of the event that** we stayed home.

We went out although it was raining.
*It rained **in in ineffective counteracting of the event that** we went out.

We 'll stay home if she comes.
*She may come **as a potential event occasioning the event that** we will stay home.

I broke the window by leaning against it.
*I leaned against the window **to** breaking it.

5.2 Nesting

(41) a. The woman bought a vase.
b. The woman was sold a vase.

6 Functions of the Closed-Class Subsystem in Language

overarching function of closed-class structuring: conceptual coherence

over space—within a referent scene (= original observation):
- provides framework / scaffolding over which content is splayed
- allows simultaneous cognizing of disparate material as structured Gestalt
- without CCs: just aglomeration of elements not assembled for integrated conceptual complex

through time—in discourse:
- to be avoided: welter of unconnected notions in succession
- CCs allow: cognitive continuity through flux: Gestalt summated over time
  - e.g.: *yes, but / moreover / nevertheless / besides / instead / also*
- CCs: direct illocutionary flow / specify logical tissue / limn out rhetorical framework

LECTURE 2

Force Dynamics in Language and Cognition

The conceptual structuring system of language has a series of extensive what I call 'schematic systems'. I mentioned three, but so far I only dealt with two. One was the configurational structure; another was the location of perspective point, and the third one was the distribution of attention. Together, these forms, which I sometimes call the architectonic systems, represent how concepts are structured with respect to space and time in particular. Then there are the ergal systems, and the main one is force dynamics. Force dynamics is a fourth schematic system, which structures conception as it's expressed in language with respect to a particular set of concepts. These concepts are force interactions. I should say at the outset that it's a generalization over the traditional notion of causativity or causation. So, force dynamics includes concepts like an object having some kind of intrinsic tendency towards action or towards rest, some other object impinging on it and potentially overcoming that object's tendency. This object can, in turn, resist that tendency to overcome it. So we've got all these complex force interactions. In addition, there are notions of blockage and resistance to blockage. All these are together the system of force dynamics.

It turns out to be much richer in conception and in language than has traditionally been recognized. There is a whole system there to discover, which has its own logic and organization. It generalizes over causativity: causativity was previously taken as a single unitary concept, a block concept. But in this force dynamic framework, it can be seen instead to consist of a number of different components, so that you can now set the whole system within a framework of varying components only certain members of which are content positions, and therefore it places causation side by side with concepts like letting, inhibiting, blocking, trying, preventing, all sorts of concepts of that sort, which had not been previously thought of as in the same vein as causation itself. So, that is what this whole enterprise is about.

All original audio-recordings and other supplementary material, such as any hand-outs and powerpoint presentations for the lecture series, have been made available online and are referenced via unique DOI numbers on the website www.figshare.com. They may be accessed via this QR code and the following dynamic link: https://doi.org/10.6084/m9.figshare.5554786.

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This is a novel concept I can begin by illustrating with a series of sentences. Force dynamics stands between physics and psychology. It applies the same force-dynamic patterns, interactions of forces, applied both to the physical objects, interacting with each other, and to the psychological and to the interpersonal, which is another way of saying social, and to modals modality. All this comes under force dynamics. So just to give you some examples.

In the physical realm, you can have pairs of sentences. The first will be force-dynamically neutral. It won't represent force dynamics and the second one will. So, one is *The ball rolled along the green*. Here we just have a picture of a ball rolling along the green. You can take a videotape of it continuing doing it. Now, you can add force dynamics, and you say *The ball kept on rolling along the green*. There are two force-dynamic patterns that this could represent. One is that the ball's natural tendency is towards rest, and this has been overcome by something stronger outside it like the wind. So you can say *The ball kept on rolling along the green because of the wind blowing on it*. Or conversely, it could be that the ball's intrinsic tendency is in fact, towards motion, and it has been opposed by stiff grass, but the ball rolls anyway, despite the stiff grass. Once again, we say *The ball kept on rolling along the green despite the stiff grass*. So by adding the word 'keep', you can still video this event, you still see the ball rolling, as you did in the first sentence. But conceptually, you've added an additional complex of concepts, mainly opposing forces, the ball's tendency of something either overcoming it, or the ball overcoming something else.

All this is in the physical realm. The next example would be in the psychological realm, and is force-dynamically neutral. It's *John doesn't go out of the house*. Again, you can video this. You'll simply put a video camera in front of the door, and John never leaves it. In the second case, we say *John can't go out of the house*. The video camera sees the same. So in other words, in the actual or overt events, nothing has changed. But what has changed is your conceptualization of it. Again, I stress the one thing that cognitive linguistics studies. It emphasizes the power that language has to impose conceptualizations on the scene. It can impose different patterns of conceptualizations on what would otherwise be the same scene. So, in this case, we say *John can't leave the house*. What you have is some kind of an opposition. In this case, John wants to leave the house. That's a force-dynamic tendency, an intrinsic tendency towards action. And something, we don't know what or where that something is, it's typically external to John, but it could be another part of John, opposes this tendency of John's to leave, and furthermore, it's stronger. So, its opposition wins and manages to block John from leaving the house. Now you have a force-dynamic opposition. The net resultant of this is like a vector addition in math or physics. The net resultant of this is no outside, no

motion. The video camera still reports no motion, but this time we understand it in a different way. It's zero motion as a result of two opposing force actions, one of them stronger than the other, the one preventing it is stronger than the other.

You can have the same kind of force-dynamic patterns also occur inside of the psyche of a single individual. In this case, it involves the concept of the self being divided into two different components, one part that wants one thing and another part wants another thing. All of these will be elaborated further as we get further into the talk. But I want to convey a sense of how the system works beforehand, since it's a novel concept. In this case, the example is *He didn't close the door* versus *He refrained from closing the door*. In both cases, you can videotape this, and there is no closing of the door. In the first case, it's force-dynamically neutral. In the second case, he is understood to have two different portions both within his psyche. One portion wants to close the door; another portion opposes that. This portion wants to close the door; another portion opposes that, is stronger, and wins, and therefore suppresses the intention to close the door. The net result is that there is no closing of the door. And the way that you can say that in English is *He refrained from closing the door*. This psychologically internal force-dynamic opposition can also be captured by different lexical items. So you can lexicalize either force-dynamic neutrality, or force-dynamic opposition.

In this example case are the two words *polite* versus *civil*. You can say She is polite whenever he is around'. It's force-dynamically neutral. But *She is civil whenever he is around* implies a force-dynamic opposition. All of this is lexicalized within the word *civil.* It means some part of her wants to insult him, wants to be rude to him. But an external part of her psyche, another part of her psyche, suppresses that. The net result is that she ends up being polite to him. So, that's *civil*: polite through suppression of rudeness.

Finally, there's an example of interpersonal force dynamics; in this case, both sentences are force-dynamic. One is *She has got to go to the park*. In this case, she doesn't want to, but some external social pressure impinges on her, is stronger, and gets her to go to the park. The other one is *She gets to go to the park*. That means she wants to go to the park, her natural tendency is to go. And something which is stronger, some authority is in the way which is stronger and could block her from going to the park. I represent it in a diagram as followed by some vertical representation in the way. The potential authority that could block her is not bothering to, or just hasn't done so. So she gets to go to the park, manifesting her desire to, because the potential blockage is not in place. That's what it means in English that she gets to go to the park. There are two different force dynamic patterns on the same two cues.

Now we go on to the basic force dynamics. All of these are going to be indicated with diagrams, which turn out to be rather overtly representative. It's good to represent in diagrams, because you can see by manipulating the different components of the diagrams which parts remain to be described to fill out the full matrix, the full framework. And sure enough, the language has force dynamics to represent all these types.

Let's start off with the first part. What are the elements that are going to be diagramed? There are basically four kinds of elements. One is something that wants to move, the fist, something opposing it, the cupped hand. The fist will be represented by a circle, that I call the Agonist. The cupped hand that opposes it will be represented by a concave structure that I call the Antagonist. These terms are taken from physiology, from anatomy of opposing muscle pairs. So, this muscle, the biceps, is the Agonist, and something which opposes it is the Antagonist. Muscle pairs are typically joined in this way to get the muscles moving. That's why I borrowed the terms from anatomy, they are quite appropriate for the force realm. The Agonist is the one whose fate our interest lies in, that is where our attention is at; will the Agonist get to manifest its tendency. The Agonist has two possible tendencies. One is an intrinsic tendency towards rest, which I represent with a solid dot inside the circle, or a tendency towards action, it could be a motion, could be an interaction, represented with an arrowhead inside the circle of the Agonist. So the Agonist is the circle. Then there is the resultant, what results from the interaction. That is shown in a line below the Agonist. After all, our interest or concern is whether the Agonist gets to manifest its intrinsic tendency towards that coordinate. So, the resultant of the interaction between the two force elements is indicated by a line below the circle. If what actually is realized is 'rest', then there is a big solid dot there. If the realization is in fact a motion, there is an arrowhead. Finally, which of these two force entities is stronger? I put a plus sign in that. I don't bother to put a minus sign in the other, because it's automatic unless I need to represent the constructions.

We can now represent with these diagrams the four basic force-dynamic tendencies that are steady-state. There are steady-states force interactions that maintain their constancy. There are ones that shift. I'll get to the shifting ones next. Of the force dynamic steady-state ones, there are really four of them. One is, the Antagonist is in impingement with the Agonist. In the upper left of the diagram is the case where the Agonist is stronger, so it gets to manifest its tendency. So it overcomes whatever the tendency is of this circle. In the upper left one, the tendency of the circle is to be at rest. It just wants to sit there. Then something comes along, impinges on it, which is stronger and forces it to move. So the net resultant is some kind of a motion. You can see a line beneath

that with an arrowhead. The example of this is *The ball rolls along because of the wind* or *The ball kept rolling because of the wind blowing on it*. So, the ball in this case represents the Agonist. The *kept* is there joining in the force-dynamic presence. The wind is going to be the Antagonist. In this case, the ball wouldn't roll for the wind. So, this is an example of extended causing of action. So, it's one of the extended steady-states. It keeps on going. It's caused because the Antagonist doesn't want to be overcome by something stronger. So it doesn't. It's caused to move. That's extended causing of action. I want to compare this with the one on the bottom right which is also causing. That's extended causing of rest. In this case, the Agonist wants to move, but something stronger is blocking it. The Antagonist is stronger, it's got the plus sign. It gets the blockage assignment, overcomes whatever the natural tendency is in the Agonist. In this case, the blockage, the force is towards rest. An example is *The logs kept lying on the ridge, on the incline because of the ridge*. That's the extended causation of rest. The example sentences that go with the diagrams are beneath them, and the a) goes with the a) diagram and b) goes with the b) diagram, and so forth. The diagonal facing you, from top left to bottom right, is the stronger Antagonist, the plus sign is in the Antagonist. So it overcomes the intrinsic tendency of the Agonist. It either forces it to move, or it forces it to stay put even if it wants to move. So the logs on the incline want to roll down the incline, but there's a ridge there that's preventing them from rolling, it's blocking them. Now let's go to the other incline, starting at the top right. Now it's the Agonist that's stronger. The circle is stronger. It has a plus sign. So it gets to manifest its natural tendency, but is nearly opposed by ineffectual opposition.

This is the first of the 'despite' types. This is the other diagonal, from top right to bottom left, it represents the concept of 'despite'. The sentence that goes with the top right is *The shed kept standing despite the gale wind* (*a very strong wind*) *blowing on it.* Here is the shed, its natural tendency is to stay in place. In fact, it manages to do so despite the powerful wind blowing on it. The wind blows and blows, but can't knock it over. So it maintains its natural tendency. When I say this, I phrase it as *the shed wants to stay* as its natural tendency, *it overcomes*. All these words are how we conceptualize it. It's the conceptual pattern imposed on these actual objects. The actual objects are following physics, whatever the minute physical forces are: gravity, friction and everything else. That's not the issue. The issue is that we conceptualize the shed as one object, the wind as the second object, and they are pushing on each other. That's the realm which I am dealing with. It's the realm of conceptualization as it is represented in language. So this is the example of 'despite', *The shed keeps standing despite the gale wind*.

Now I'm going to give you another 'despite' case, down this right line to the bottom left, The example is *The ball kept rolling despite the stiff grass*. You've seen this example already. Here, the ball, the Agonist's, tendency is towards motion, and it gets to manifest its tendency despite the stiff grass. The stiff grass tries to oppose it, but fails. The ball moves anyway. So here we've got attempted inhibition. For the bottom two, in fact, there are words in English, for what those patterns, those force relationships are. The stiff grass is hindering the ball, or impeding the ball, it's an ineffective attempt to oppose or counteract the ball's natural tendency to roll towards this place. It's an ineffective attempt. Therefore, this is called 'hindering'.

But in the next blockage case, where the ridge blocks the logs, that's blockage. It is the ridge that blocks the logs from rolling down. In fact, as a further extension of the force dynamic pattern, in the sentence I have here, *The ridge keeps the log lying on the incline*. That represents where what you name overtly in the sentence is the resultant tendency, the big dot on the line. So the ridge keeps the log lying on the incline. But there are other kinds of sentences that let you name in this sentence the log's tendency, the log wants to roll down the incline. Then you can say *The ridge prevents the ball from rolling down the incline.* Now you have the sentence with *prevent* that means the intrinsic tendency of the log which is displayed with an arrow. So you have side by side sentences which either name the tendency or name the resultant.

What we've got is this first slant or diagonal line, top left to bottom right, that represents extended causation. In particular, it represents the extended causation. The other diagonal represents the concept of 'despite'. In fact, it's definitional of the concept of 'despite', or 'anyway', or 'although'. That's the situation. You can capture together what is blocking causation. In all the causative cases here, we'll find more in the two causative cases of *blow*, the Antagonist has to be stronger than the Agonist. And it has to differ from it so that the Agonists', the circles', resultant is different from its own natural tendencies, its own intrinsic tendencies. That's what happens then with causation. It is forced to do what it doesn't want to do. If it were not for this stronger Antagonist, it wouldn't do it. Whereas with the 'despite' case, the natural tendency of the Agonist would happen anyway, with or without the weaker Antagonist, it will also manifest its natural tendency whether the Antagonist is there or not.. That I think pretty well covers the basic points.

The next one is the shifting one. With the shifting ones, I'm only going to consider cases where there is a stronger Antagonist. That means the case, the diagonal from your top left to bottom right, where the Antagonist has the plus sign. The basic case has the stronger Antagonist, in impingement with

the Agonist, forcing it to do its bidding. If we consider the impingement notions, there are four possibilities. Either the impingement is already present, is constant; or the impingement starts, it comes into impingment on it from not bring in impingment; or the impingement stops; or there never was an impingement. Those are the four types we're going to look at. The first two, coming into impingement, the leaving of impingement, those are the shifting types.

The first case, the top left case, is where the Antagonist is stronger; it forces the Agonist to move. Let's take the case where the Agonist is just sitting there, wanting to sit there, minding its own business. It wants to sit there, and it does sit there. Then suddenly some stronger Antagonist comes into impingement with it, and overcomes its tendency, and forces it to move. Now we've got a temporal sequence, before and after. Before the stronger Antagonist is in place, and after it's in place. Therefore, I made the line underneath show some kind of switch in time with the left of the slant and the right of the slant. The left of the slant, the Agonist is happy just sitting there, just stays put. After the slant, it is forced to move, with the arrowhead.

The example is *The ball's hitting the lamp made it topple from the table*. Again, we have the example sentences beneath the force-dynamic diagrams. Here it's the ball's hitting it made the lamp topple from the table. Before hitting the lamp, it just sat there on the table, happy, wanting to stay put, and its tendency was towards rest. It manages to manifest its rest. All of a sudden, the ball comes over, unasked for, hits the lamp, in fact it's stronger, it overcomes the lamp's tendency, and the lamp moves.

This is what I call an onset causation of motion. Before we had extended causation of motion, *The wind kept the ball in motion*. If it stopped, the ball would stop. This is onset causation of motion. It wasn't there before all of a sudden it is there. This is prototypical causation. If anybody in linguistics ever talks about causation, that's the one they meant. That's the prototype of causation. I have three other types, so four types of causation. And in fact the next one is going to be onset causation of rest, which nobody has talked about.

Shibatani calls this ballistic causation. The very word 'ballistic' implies there's no room in this embedded matrix to consider onset causation of rest which presents something as moving along, wanting to move along. It's happy moving along; its tendency is to move. All of a sudden, something that's overpowering stops it. That's going to be stopping. I think the sentence that I have is *The water's dripping on it made the fire go out*. It's not a good example, but anyway, that's what I have. The natural tendency of the Agonist is continuing in this way, and there the other figure comes and makes it stop. That's going to

be represented by a figure coming into place with this arrow. So that's onset causation of rest. So now we have all four causative types. The first two from the steady-state, so it's extended causation of motion or action, and extended causation of rest. It wants to move, but it is forced to stay still. Now we have onset causation of motion, and onset causation of rest.

All those involve different kinds of impingement. In the extended causation case, impingement was simply present. It was already in impingement. In this case, it comes into impingement with. Causation is defined by positive impingement, either already present or coming into impingement. It's either contact, or come into contact. So causation is defined by that. Where there is a stronger Antagonist, in all cases the Antagonist overcomes the natural tendency of the Agonist, whatever that was, whether it was towards action, or towards rest.

Now we have two kinds of negative impingement. The first kind is where something goes out of the impingement. It leaves impingment. So here we have a stronger Antagonist that kept something still, and it wanted to move. Its natural tendency is to move, and it blocked it. Now suddenly it leaves. That permits this object to manifest its natural tendency, and to move. That is the notion of letting. *The plug's coming loose let the water drain from the tank*. Here the plug was in place in the tank of water. The water in effect had pressure blocking it, its tendency wanted to move, but it couldn't, because the hole was blocked. All of a sudden, the plug comes loose, and now the water moves. You can say *The plug's coming loose let the water drain from the tank*. That's onset letting, it's a shifting case. It previously was blocking, and then it's letting. It's onset letting of action. You also have onset letting of rest. Everything is perfectly symmetrical. Onset letting of rest is something like *The stirring rod's breaking let the ingredients settle to the bottom*. Here you have a vat and a stirring rod. It keeps stirring it, and the solid ingredients it keeps them in suspension. The solid ingredients keep whirling around in suspension. This stirring rod breaks, so you can't stir any more. All of a sudden, the ingredients which were in suspension, which had a natural tendency to drop to the ground, and had been kept in suspension by the action of stirring rod, that stops, and then they settle down to the ground. They manifest the tendency towards rest. So this is onset letting of rest. It lets them; it doesn't make them. That's not causation. It doesn't make the ingredients fall to the ground. On the contrary, it permits the natural tendency of the ingredients, which is towards rest, to manifest itself. It lets it. It removes the overcoming of its own natural tendency. So that's the difference between letting and causing. It permits the natural tendency by going away. So that's the first of two types of letting.

Finally we have the secondary steady states. Remember there are four things the stronger Antagonist could do. In the first case, it could be already in impingement. That's the steady-state type. Then you can come into impingement, and you can leave impingement, and then you can be out of impingement the whole time. I consider those two negative impingement types together. That's also expressed by the word *let* in English.

The example would be *The plug's staying loose let the water drain from the tank*. In other words, here's the water, it wants to go out, to leave, to move all over. That's its natural tendency. There was something that's stronger, that could have overcome it. It could have blocked it, but never did. So the water manifests its tendency. It's an underlying force-dynamic concept. You'd never think of it if it weren't based on the case of blockage. So it's the possibility of blockage without its actually overcoming it. Similar to that act in English, you get *The plug's being loose or staying loose let the water drain from the tank*. Again, we have in a symmetric way, there's the extended letting of action, and here you have the extended letting of rest.

Let's have another example. Let's say there were a wind tunnel for airplane testing, and giant fans that make the wind move. The basic tendency of the air is to be still. That's overcome if the fans keep the air moving. If the fans are broken the air stays in place. Now you can say *The fans being broken let the air stand still in the tunnel*. The cases that have been provided have something in common which English (it's not me, it's English) captures by the specific word 'let', namely that some Agonist is allowed to realize, to manifest its intrinsic tendency, either because something that could have prevented it didn't bother to, or because something that could have prevented it, left its prevention. All those four cases are captured by the English word 'let'. However arcane my analysis may be, it's English that's doing it. I'm simply finding out the underlying conceptualization that governs the use of words in English. We've got the basic kinds of physical force-dynamic paths with this. So just a little bit more of this basic section.

I have touched upon all the physical examples. Everything here, you know, will extend as well to the psychological realm and interpersonal realm. In all these four cases, it was the stronger Antagonists that could or did prevent some Agonist's tendency. Now, however, remember that we had at the outset the four basic steady-state cases. There were two of the patterns where the Antagonist was in fact weaker. Those were the 'despite' cases. We have more of them. We can do the same thing with the weaker Antagonists that we did with the stronger Antagonists. In the original diagrams, they were already in place. There was a weaker Antagonist being moved back. We can also have them go out of place

or come into place or never have been in place. The same exact situation. You have the same parallel set. However, it turns out that English in particular and language in general, is much less endowed with lexicalizations that distinguish all of these patterns. They are very rich in lexicalizations that distinguish the patterns that I just went through. But they must be rich in these patterns. They often don't have any special way of saying them. So I picked out four of the weaker Antagonist cases that in fact do have ready lexicalizations in English. We've already seen two of them, namely the 'despite' cases, one of them being 'hindering'. So we'll do the 'hinder' one. *Mounds of earth hindered the logs from rolling down the incline*. Or *The benches hindered the children in crossing the schoolyard*.

Now, one of these would be 'help' in English. One of its uses, in fact, it refers to the case where the weaker Antagonist leaves, on the contrary. So, you can say *Smoothing out the earth helped*, it's not hindering, it *helped the logs in rolling down the incline*. Or *Removing the benches helped the kids cross the schoolyard*. It's one of the uses of 'help' and in fact, represents the removal of a weaker Antagonist. And the third one that has easy lexicalization in English is 'leave alone'. So that's where the weaker Antagonist never came in. *The teachers left the children alone in their exit from the schoolyard*. They could have come in and been a hindrance, an impedence to the children, but they left them alone in their progress.

So it's just a filler of the patterns we've got, weaker Antagonists not being there at all, some hindrance not being present. It turns out there's a way to describe that. That lexicalization is English 'leave alone'. It's significant by the way that the word 'help', which shows up in the second case, because 'help' is a very special word in English. It's the only regular verb that takes another verb without 'to', apart from reception. So if I say *I helped him push the car up the hill*, or simply, *I helped push the car up the hill*. It's the only verb in English you don't have to have a 'to'. You don't say *I helped to push*. There's no 'to', and that property it shares with modals. We'll see at the end that modals are a category in English which is very much in terms of force dynamics. And modals also don't take a 'to'. You don't say *I must to go*. You just say *must go*. There's no 'to'. So, the fact that 'help' lacks a 'to' may be an indication that English sees 'help' as an example of force dynamics. It combines them globally with what I call gradient force dynamics. 'Help', 'make', 'let', and 'have', all skip 'to'.

Kind of a summary of Section Three is seeing force dynamics as a framework. After going through all these torturous examples, you can see that there is a framework that generalizes over the previous conceptions of causation. So first of all, it not only treats causation, it treats letting, which most systems don't do. Secondly, it treats not only the prototypical cause, force of causing

and letting, but also the non-prototypical ones. So if you look back on all the works regarding causing, you'll see that causing is treated either in the most prototypical case which I call onset causing of motion. Some did a bit on extended causing of motion, but nothing at rest. If it treats letting at all, it was only the prototypical case, namely onset letting of motion. But once you've got this framework, you can fill in all these cases. In addition, it brings in all the notions of hindering, and blocking, and trying, all those extra cases with weaker Antagonists. It brings in prevention as well as causation. In general, by breaking down causation into a series of small components, the ones that are in the diagrams, you see that you have a much wider field of concepts, of which causation per se is only one, in one corner of this whole framework, in the whole.

Let's see how this whole thing extends into psychological representation. It turns out the psyche is typically seen as first of all wanting, which can be treated as a tendency, what I before referred to as an intrinsic tendency of something towards rest, towards motion. So wanting is treated like an intrinsic tendency. It's represented by an arrowhead, or by a solid circle, a dot. In addition, the psyche is typically understood as having two components, a divided self. Typically, you'll see the part that has a natural tendency placed as more central, and the part that is the Antagonist, the part that opposes it, as more peripheral. And in fact, a lot of what shows up as a pattern in the language, shows up written large, extended, figuritized, schematized, by forms of early science, in this case, by Freudian psychology. So, you can almost read Freud's psychology off of the pattern of the sentences. The sentence structure implies force dynamics. So let's take a sentence like *I held myself back from responding*. We'll do the diagram. This dash is to form a square to show this is all contained in a single site. In this single site we've got two parts, the central part, the Agonist which wants to respond, so it gets an arrowhead. But there's an Antagonist which is more forceful, stronger, and keeps the Antagonist from responding. So the net resultant is no response. You can equate the peripheral Antagonist with the subject of the sentence 'I', and the Agonist, the central part which wants to respond, as 'myself', reflexive direct object. *I held myself back from responding*. So, in open English, it gives you all the parts, all the components of this force-dynamic diagram which is introjected into the structure of the psyche.

All this is so conceived in the sentence, something like a folk conceptualization of psychology. It's folk psychology built into the very fabric of the language. Nobody says this is how anything actually works in the neurons. This is the force conceptualization. In fact, it's hard to know which came first, but let's say if you've seen that force dynamics started with the physical interactions of objects, then this was the physicalization of force concepts of the mind. It is analogized mental behavior, force behavior, force concepts of mental behavior

to how physical objects interact or to the concepts they already have of how physical objects interact. I already gave in the first lecture the case where I thought the mathematical typology was a theoretized version of a kind of typology already built into the fabric of language, which I've already described. In the same way, I think the Freudian typology is a theoretized version of the force model of my version of the divided-self built into the language, as well as in other systems and in particular what this represents is Freud's conflict between the ego and the superego. The ego is like the unconscious drive, urges, wishes, your real wishes for what you want to do. That's the Agonist which wants to move, wants to respond, whatever it wants. And then the superego is the Antagonist, in a different word, introjected, or internalized from previously external social pressures which then become a part of the individual's psyche, as you ought to behave. It tends to be more on the periphery. The sentence *I held myself back from responding*. Then of course I show how the refraining example works the same way. It has the same exact structure as *I refrained from responding*, but instead, in this case, you have the structure pattern which doesn't label its distinct forms of the components of the force dynamics set up.

Both the examples are where the ego itself, the Agonist, wants to do something. This is a form of suppression or repression. Repression is unconscious, but suppression is conscious. Freud's terms, which were very force-dynamic, had a real kind of theory of paychodynamics. His terms could be applied once we see how force dynamics gets realized in the relevant psychodynamics, psychological behavior, or conceptualizations. You can now use Freudian terms, like repress, suppress, and this becomes totally relevant. Those words have perfectly clear realizations in terms of the diagrams that I brought. I think it captures something very fundamental in the way we conceptualize stuff. The inference of this is what I call exertion. That's where the Agonist, the inmost self just wants to hang on, sit there, doesn't want to do anything. But some other part of the psyche, presumably, was peripheral, and that's got internalized pressures to get going, pushes on, overcomes it to get the action. So I call it exertion, social convention. You can have sentences like 'exert oneself in', 'press against the', 'push against the jammed doorway', so overcoming a tendency. In the psychological case, we treat objects differently, once we think that of them as having sentience, in other words having a psyche, instead of being inanimate. So the simplest two sentences. One is *The new dam resisted the pressure of the water behind it*. The other is *The man resisted the pressure of the crowd behind him*. In the first one, I think, the way we think about it is that the force dynamics is of the first set I gave you, pure physical interaction. It seems it's one of the original force dynamics diagrams. In this case, the dam

is an Antagonist that keeps the water in place. And it's stronger, so it resists the pressure of the water behind it.

We've already had this one, we think of it as achieving its qualities due to its own physical rootedness in the ground, and its own physical property of strength. We don't think this in the case of the man. Maybe we should think of the man and the dam as Antagonists. We normally think of the man, if the man's psyche was there, and conscious, for example. The man as a physical entity would be a weaker Antagonist, and would be swept along by the pressure of the crowd. It's only because of the man's psyche in which this self-exertion, a kind of internal tendency that overcomes the foes. It seems to transfer into the weaker Antagonist theory that very much fuel and incorporate feelings of opposing forces, so it makes perfect sense to use inner force dynamics.

Well, social dynamics conceptualizes the same thing. I suspect it's universal in all languages. It's an amazing kind of metaphor that seems to exist across all languages, that extends from physical force dynamics to inter-personal force dynamics. And that's this: In the physical case, if you have a real object you can overcome its resistance, through impingement. It's your physical impingement. If you don't go far enough, nothing happens, the bottle sits there. If you go far enough to touch it, contact it, you'll move it. But, what happens with inter-personal sociodynamics? It doesn't work that way, if you force somebody to eat or force somebody to close his door at night or something like that, you don't take hold of his arms and make him grab his key, and take his arm and force it like that. You don't do that. That would be contactual physical force dynamics. On the contrary, what you do is you say something to her, you communicate to her, typically in language, but it could be symbolic and some other way. The person, as a language user or as communication user interprets this message. There could be a period of pondering 'do I want to do this or not', let's say she experiences some pressure to do this, to lock the door. And of course she does it, perhaps after passing through a phase of choosing.

That whole sequence, which is nothing like a physical one, is metaphorically treated as if it were physical, as if it were the exact counterpart of the physical force dynamics. If you did pure physical force dynamics on such a situation, in fact, it wouldn't even use the terms that are otherwise used. You wouldn't say *I persuaded him to,* or I have another example, *The gang pushed or pressed him to do what he didn't really want to do*. They didn't literally get behind him and push him to do that. If they did, you wouldn't say *The gang pushed him into what he didn't really want to do*, you would have to find another way to phrase it. Once you say *push*, in fact you are out of the realm of physical and in the realm of this communication kind of interface. So, the widest

particular rather byzantine kind of interpersonal interface, should universally, apparently universally, show up as accessed by the physical force dynamics form. But, this gets to something pretty basic about it. So anyway, you can use all of the same terms as for the physical case in the interpersonal case, so you can have sentences like *He finally let her speak*, something like that. *He finally let her present her opinion.*

Well, how do you let her? If I let the water come out of the tank, drain from the tank by pulling the plug out, that's physical. Nothing like that happens in the case of letting her express her opinion. All I did was, say, *Why don't you speak now?* or *I will stop talking. You can talk now* or whatever you said. But you didn't pull a plug out of her mouth so that she can present her opinion. So, it's not physical. You can apply this physical force dynamics into this interpersonal case. In addition, you pick a physical locutions like pushing, pressure, against a pressure to do the things you don't want to.

You've got this realm, and it turns out to be really rich. All sorts of lexical items have been lexicalized to refer to this particular realm. It's really extensive. Here is a particular sequence of events that takes place that can be used as a kind of a cartoon strip to stand for a certain kind of force-dynamic sequence. It's the same sequence that already underlies a lot of physical things which I didn't include in the handout, in this same cartoon strip. It underlies expressions like 'try', *I can try to open the window. I succeed in opening the window. The window wouldn't budge*, things like that are covered. But we can also use the exact same sequence for interpersonal kinds of pressures.

You have three phases, and in the first phase you have the same two, the Antagonist and the Agonist. In the first phase, the Antagonist is weaker. It tries to get the Agonist to do something, but it's too strong, it just stays put. In the second phase, somehow, they shift their power. Either this gets weaker or this gets stronger, but all of a sudden a shift in the power balance takes place. In the first phase, the mainly stronger Antagonist overcomes the Agonist and forces him to do the thing he didn't want to do before, he was able to keep from doing it. That's the known sequence of events. Well, if we now show this represented in the realm of people acting on each other, trying to persuade and urge and so forth. Well, there are lexical forms in English that represent the various parts of this little diagram. For example, there are two which represent the case where your attention is on the first phase, and you don't know what happens as an outcome, whether it's moving or not. So you can say *She urged him to leave.*

Well, she exerts social pressure on him to leave. We don't know if he left or not. All we know is that she is putting pressure on him. That's the first phase. He is a lot stronger, so he does not bother to leave yet. Usually, there are pairs of sentences. We can find sentences which are lexicalized where it takes the

Antagonist as subject, like this one, or one which takes the Agonist as subject. *He was reluctant to leave. He resisted leaving*. They are both good. That means he kept his stronger position, he didn't want to leave, he kept manifesting his undesire to leave. Then there are all sorts of lexicalizations which show that in fact there is an exchange in the balance of power, and in fact the Antagonist prevails.

We'll take that case first. So in the third phase the Antagonist in fact prevails. So you could say, *She persuaded him to leave.* By saying *persuade*, this means there was this prior struggle. You can't just say *persuade*, unless you imply this preceding struggle. She intended, she intended, she intended, and finally she won. He gave way. *She persuaded him to leave* represents that third phase diagram. Again we have a counterpart case where he is the subject, and we say *He relented in the end*, or *gave way in the end.*

Both of them represent the third diagram, the third phase. I also have cases of the first phase, we know what happens, but in fact the outcome was a failure. The Antagonist did not get stronger, and so we end with the status quo.

In American English we would say *She struck out with him in the evening*, so she tried, she tried, she tried, gave up, failed. It didn't work. She's subject in this case. And if he is subject, we say *He refused to leave*, or *He wouldn't leave*, 'wouldn't' means after a lot of social pressure on him, he nevertheless stayed his course, like president Bush, and wouldn't leave.

We've found that the same force dynamics diagrams are now applying as well. We experience some of the same patterns in whole stretches of vocabulary. It turns out whole swathes of vocabulary can start following this pattern.

Let's end with the modals. It turns out that the modal system in English is a syntactic category that is rather well defined. It seems to be semantically dedicated to force dynamics as a whole.

First of all, let's formally define what a modal is. A modal is a verb-like thing, which unlike regular verbs, doesn't take 'to'. You say *You must leave*, you don't say **You must to leave*. It doesn't take an 's' in the third person, you don't say **He musts leave*. It takes 'not' like *You must not leave*. You don't say **You don't must leave* as you do with the normal verb. It permits inversion with the subject like *Must you not leave?*, things like that. All the verbs of modals in the first couple of lines do this. Some of them have all these traits, then you start losing a couple of these traits. The 'honorary modals' don't have any of these traits, but they semantically were so much like modals that if you are going to describe English modals you can't really ignore them.

I have a list of them, just to show you how you can play with that semantically as a set that is in fact force-dynamic. I don't have to, but I'm going to use them in sentences which have the word 'not' in it. *You cannot leave this house.*

You must not leave the house. You may not leave the house. You need not leave the house. You dare not leave the house, what have you. If you look at it closely, look at it semantically, each of these represents a different kind of force-dynamic opposition. If you say *can't leave the house*, it means he wants to leave the house, but we went through this in the introduction. He wants to leave the house, but something is preventing him, and it is stronger than him. Therefore, the net resultant is he is unable to leave the house. *He may not leave the house* means it's an opposition between him and authority. He wants to leave the house, it's his desire to leave the house, but (it's intrinsically interpersonal) some other person who is an authority figure doesn't want him to leave the house, and that person is more powerful. Therefore, the net resultant is he does not leave the house.

When we say *He may not leave the house*, the 'may' in this case, in this usage is purely interpersonal. *You must not leave the house* is somewhat similar to 'may not'. It still involves an authority figure, but this authority figure is even more stringent with his means in enforcing his will. He not only says 'no', he makes sure that the Agonist can't leave the house. 'Should not': we are going to go into the detail in a second, but basically, it pits the subjects', the speakers' belief system and value system against the observed behavior, the opposed behavior of the Agonist. I'll go to that in a second. *Will not leave the house* is 'refuses', 'will not'. It's a stubborn intention against other people's wishes about what he would do.

'Need not', *Someone need not leave the house*. Previously he thought there was going to be an external forc—t's also interpersonal, it's in the social realm. It's the release from some authority figure, which is more powerful and which was going to force this person to obey, and now has relented, has now changed his mind. And this person need no longer overcome his own lack of desire to do the task. That's 'need not', 'need not leave the house'. He didn't want to leave the house, and they said that he's got to leave the house. Then he changed his mind, and John, says *All right. I don't need to leave the house*.

Next is the 'dare not' case. And 'dare' is a force-dynamic opposition between courage and threat. It's your own courage and an external threat. When you combine it with 'not', it means that the external threat is stronger and overcomes your own internal courage. So *He dare not leave the house* in fact means he is too cowardly to leave the house. If you were bolder, you might leave the house.

That's by way of demonstrating that every single modal we have in English has as one of its core meanings a force-dynamic opposition between opposing forces. So 'should', as in something like 'She should'. My first observation is any simple sentence like that, where we've got a single subject, is merely a

shortened version of something that semantically, or conceptually, is longer. In fact, you can typically also say it in a longer way if you want to. Typically, there is some other person other than the subject in the sentence whose opinions are involved. So for example, if you say *She should lock the door when she leaves*, it might typically mean something like *I think that she should lock the door when she leaves* or possibly you have some kind of societal norm that exerts some kind of pressure, something like that. Let's just say *He should spend more time with his children* is short for *I think he should spend more time with his children*, and with that set up, you can now analyze what are the components that go with the word 'should'. There are four of them. First, the analogy is with… these two parties by the way, like *I think that she should lock the door*, we've now got an Antagonist and Agonist. The 'she' is the Agonist, and the 'I' is the Antagonist. It's my opinions, my belief system and everything that, either in fact or in principle, wants to exert some kind of pressure on her behavior. That's the nature of force-dynamic direction.

The first component of the word 'should' is the observation that she does not in fact close the door when she leaves. So first of all, it's the negative behavior, the actual behavior is negative to what the sentence actually said. If I say she should X, or she should VP, it means she does not VP. The second thing means 'in my belief system, it would be beneficial to her if she in fact VP, she in fact locked the door'. The third component is in my value system. 'Value' is what I consider as a better word. In my value system, she would be a better person if she locked the door. So one applies to what would be beneficial to her in my belief system, the other is she would be a morally better person in my value system.

Now if we only had those three, it wouldn't be enough to capture the force-dynamic quality of 'should', because if we only had these three, we could in fact paraphrase those three by something like *I think she would be a better person and would be benefited by personally, locking the door when she leaves*. But that's a rather cold neutral system. It doesn't have any of the pushing power that 'should' does. So where does this pushing power come from? It's that we need one crucial force component, which is in fact the force-dynamic component, which is *I want her to lock the door*. So now all of a sudden we have a confrontation of wants. I manifest my desire, I want her to lock it. That's the origin of the push pattern, why 'should' has a kind of force-dynamic push to it. Now in effect we've characterized what 'should' means, but there's a fascinating issue that arises. What happens if those views are not known by X, the person performing the behavior?

Now in some cases, the unknown, the X person, the person who performs the behavior does know my beliefs, my wise beliefs. For example, if I say *You*

should close the door, lock the door when you leave. Now if I express my opinion, so you, the Agonist, are the arena of force-dynamic opposition. Within your psyche now, there could be a conflict between your desire not to lock it and what you've now heard from me, my desire that you lock it.

So your mind is now the arena. Similarly, since I just earlier covered the divided-self, we can have the divided-self with the 'should' state, *I really should lock the door when I leave.* That means I think I should lock the door when I leave. And following our divided-self analysis, that means the first 'I' is what is the externalized value of the self, and the second 'I' is the more central one that has the inmost desire. In this case, 'not'. So in this case, again, both parties know each other's feelings about the matter. I communicate with myself sufficiently to know that I want myself to lock the door. There remains the curious case where in fact the performer doesn't know of the speaker's wish, *She should lock the door when she leaves*. Therefore she just blithely leaves the door open and is unaware that there's any force-dynamic problem. Her psyche is free from force-dynamic problem. Mine, though, has it. I'm the one, the speaker, who wants her to lock the door, and I'm frustrated by watching her not lock the door time after time.

So the force-dynamic conflict occurs in my psyche. There's another case of that happening, and it's just another portion of the force-dynamic logic of words. The other case shows up in the last two sentences of the presentation. If you say, *John finally agreed*, in contrast with *The lizard finally moved*. So *John finally agreed* means John was aware…, this is part of the urging example. This is a personal example. John didn't want to agree. I kept pressuring him. The pressure built, built, built, and finally this three-phase cartoon, the balance of power shifting. He became weaker, and he finally agreed. We do need the word 'finally'. So his psyche was the arena for this conflict to work itself out. He didn't want to leave, and to agree, and he was pressured, he was finally forced to change his mind. And what about the lizard? The lizard finally moved. But the lizard is blithely, happily unaware that anybody watching him wants him to move. The lizard is not conflicted internally. It has no psychological problem. It will do what it feels like. So where is the conflict? The conflict is in the speaker. The speaker wants the lizard to move, the lizard standing there stationary causes increased frustration in the speaker. It builds up frustration which is finally released when in fact he sees the lizard move.

The arena of the force-dynamic action takes place within the subject in this case, within the Antagonist. So it's parallel to the case with the 'shoulds'. What I've done here is to propose a fundamental conceptual structuring system, one of the first four major schematic systems that we use to conceptualize the

structure, the conceptual material. And we find these four. I dealt with the first two of them mainly. In this morning's talk, we find these conceptual structuring systems are highly representative in language through the closed class forms in particular, although they also show up in open class forms. This is highly representative in language forms. There are both closed class forms and open class forms in this case. So the whole point of this approach may start to be clear to you. It's to identify, to discern, to determine how language as a system, as a cognitive system, is built, how it structures conceptual material. The method for doing this is to read the patterns out of language itself, not to impose anything on language from the outside, from some conceit you have, but rather to discern the patterns that language itself has, for how it groups concepts together, schemes of particular conceptional distinctions through the material, and so forth. If you follow them out, and organize all those findings, you find these four. I know several of them, the systems that in fact prove to be the major schematic systems for how language structures concepts. Many of the topics will be elaborated in the next lectures.

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Handout Lecture 2

1 Introduction

1.1 Force dynamics: A previously neglected semantic category

force dynamics: how entities interact with respect to force, including:
the exertion of force, resistance to such a force, the overcoming of such a resistance,
blockage of the expression of force, removal of such blockage, etc.

1.2 A generalization over the traditional linguistic notion of "causative"

it analyzes 'causing' into finer primitives and sets it within a framework that also includes
'letting', 'hindering', 'helping', and further notions not normally considered in the same context

1.3 Illustrating the category

(1) A. be VPing / keep VPing —physical
   a. The ball was rolling along the green.
   b. The ball kept (on) rolling along the green.

   B. not VP / can not VP —physical/psychological
   a. John doesn't go out of the house.
   b. John can't go out of the house.

   C. not VP / refrain from VPing —intra-psychological
   a. He didn't close the door.
   b. He refrained from closing the door.

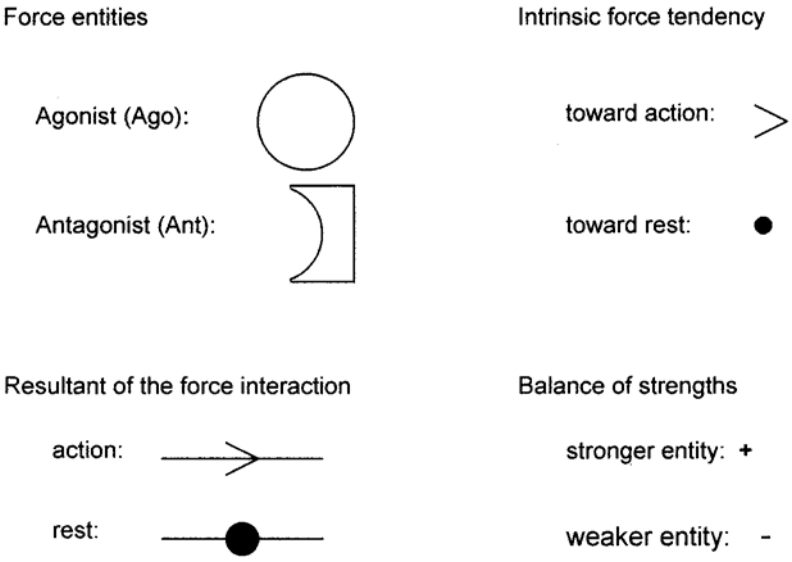
   D. polite / civil —intra-psychological: lexicalized
   a. She's polite to him.
   b. She's civil to him.

   E. have (got) to VP / get to VP —socio-psychological
   a. She's got to go to the park.
   b. She gets to go to the park.

2 Basic force-dynamic distinctions

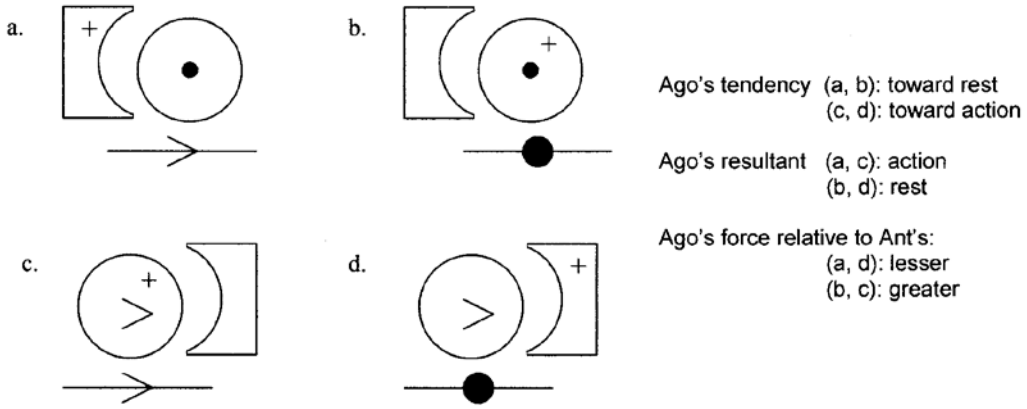
2.1 Components of force dynamic patterns and their diagrammatic representation

(2)



2.2 Steady-state force-dynamic patterns

(3) the basic steady-state force-dynamic patterns



(a) extended causing of action
The ball kept rolling because of the wind blowing on it.

(b) first "despite" pattern
The shed kept standing despite the gale wind blowing against it.

(c) second "despite" pattern = hindrance
The ball kept rolling despite the stiff grass.
(d) extended causing of rest = blockage
The log kept lying on the incline because of the ridge there.

commonalities across the basic FD patterns in the diagram:

top row: Agonist's intrinsic tendency is toward rest / bottom row: toward action
left column: resultant of force opposition on the Agonist is action / right column: rest
diagonal starting at top left: stronger Antagonist / diagonal starting at top right: stronger Agonist

the stronger-Antagonist diagonal = extended causation: the resultant state—
is *contrary* to the Agonist's intrinsic tendency
results *because of* the presence of the Antagonist
and would otherwise *not occur*
the stronger-Agonist diagonal = "despite / although": the resultant state—
is *the same* as that toward which the Agonist tends
results *despite* the presence of the Antagonist
and would otherwise *also occur*

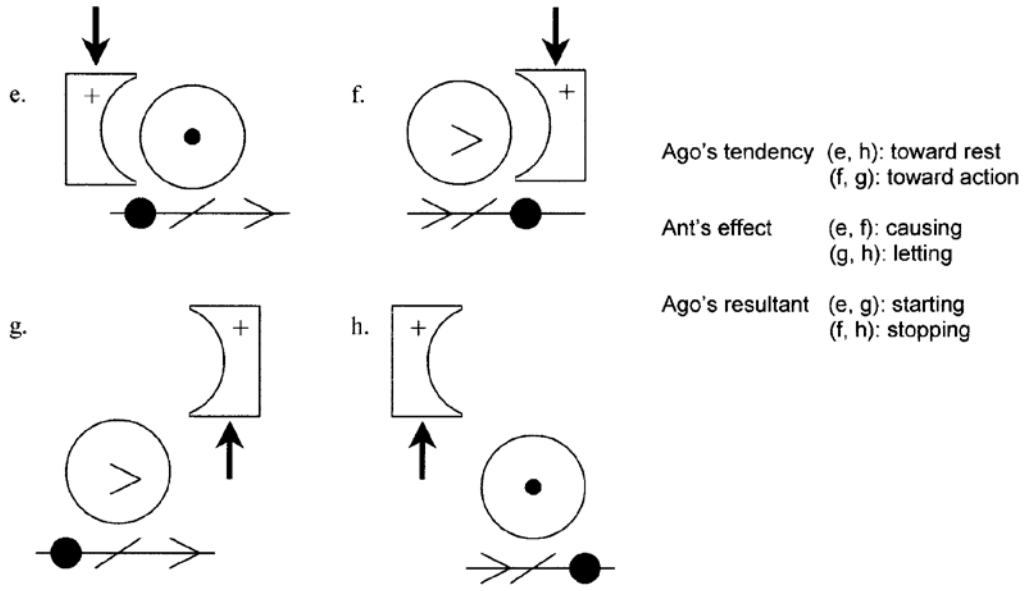
in pattern (c), the Antagonist *hinders* the Agonist
in pattern (d), the Antagonist *blocks* the Agonist

Thus, force dynamics so far counterposes causative 'because of' and 'despite'
and brings these notions together with 'hindrance' and 'blockage' into a single system.

2.3 Shifting force-dynamic patterns

The preceding four patterns were steady-state,
with the Antagonist in continuing impingement with the Agonist.
For each of these, there are two associated patterns in which
the Antagonist comes into or leaves impingement with the Agonist.
The following four patterns show these shifts for a stronger Antagonist.

(4)



(e) onset causing of action = prototype causation
The ball's hitting it made the lamp topple from the table.
(f) onset causing of rest
The water's dripping on it made the fire die down.
(g) onset letting of action = prototype letting
The plug's coming loose let the water flow from the tank.
(h) onset letting of rest
The stirring rod's breaking let the particles settle to the bottom.

A A single causation category for the four causing types

The two onset causing patterns here join with the earlier two extended causing patterns
to form the linguistic category of "causation". In all 4 patterns:
the Agonist's resultant state of activity is the opposite of its intrinsic actional tendency,
whereas in the remaining patterns, these two activity values are the same.
Reason: an object has a natural force tendency and will manifest it
unless overcome by either steady or onset impingement with a more forceful object from outside.

B The four types of impingement of an Antagonist with an Agonist

The types of impingement that a stronger Antagonist has on an Agonist forms a taxonomy:

continuation of impingement = extended causing

start of impingement = onset causing

cessation of impingement = onset letting = the above diagram's bottom two patterns

absence of impingement = extended letting = the next two patterns

Hence, "positive" impingement = causing / "negative" impingement = letting

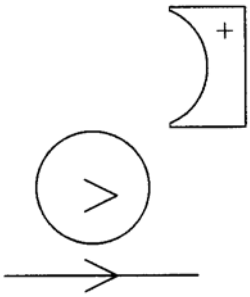
2.4 Secondary steady-state force-dynamic patterns

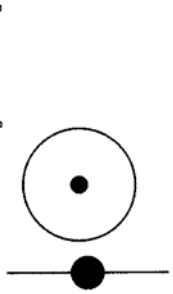
The last two stronger-Antagonist patterns = extended letting.

Here, the Antagonist remains out of impingement with the Agonist.

This is also "steady-state", but it is "secondary" since it is based on a negation of impingement.

(5)

i. 

j. 

(i) extended letting of action:
The plug's staying loose let the water drain from the tank.

(j) extended letting of rest:
The fan's being broken let the smoke hang still in the chamber.

The two extended letting patterns here join with the earlier two onset letting patterns
to form the linguistic category of "letting".

2.5 Force-dynamic patterns with a weaker Antagonist

Two such patterns already seen: steady-state (b) and (c) = the "despite" patterns

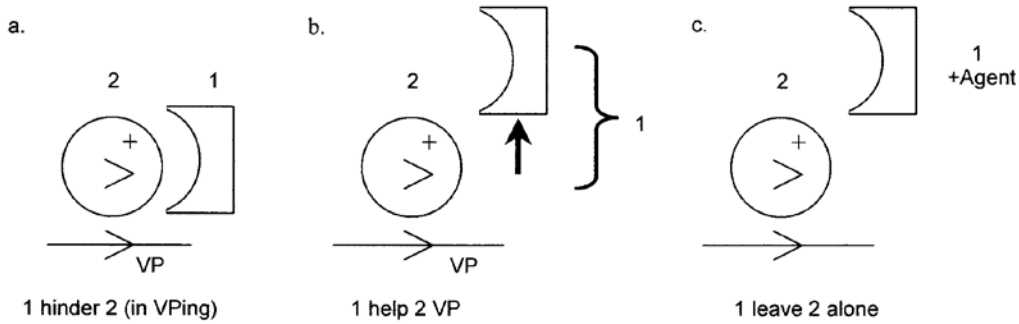
Their weaker Antagonist remains in impingement with the Agonist.

For other pairs of patterns, the weaker Antagonist—

comes into impingement / leaves impingement / remains away from impingement

Three of these eight are diagramed here, with examples representing the Antagonist as subject.

(6)



(a) weaker Antagonist remains in impingement = hindrance
Mounds of earth hindered the logs in rolling down the slope.
The benches hindered the children in crossing the schoolyard.

(b) weaker Antagonist leaves impingement = one type of helping
Smoothing the earth helped the logs roll down the slope.
Removing the benches helped the children cross the schoolyard.

(c) weaker Antagonist remains out of impingement = leaving alone
I left the rolling logs alone.
The teachers left the children alone in their exit from the schoolyard.

3 Force dynamics as a generalization over "causative"

McCawley's (1968) CAUSE was atomic and uniform.

Shibatani (1973), Jackendoff (1976), and Talmy (1976 = 2000, ch. 8) distinguished different types of causing, but all still assumed a primitive 'cause' concept.

But force dynamics breaks the concept of causing into finer primitives,
sees causing as just one pattern—or family of patterns—of those new primitives
and sets causing within a framework of all the patterns of the new primitives.

(7) Force dynamics provides a framework in which can be placed:
not only 'causing', but also 'letting'
not only the prototypical cases of 'causing/letting', but also non-prototypical:
prototypical causing: 'onset causing of action' (e)
seldom considered: 'onset causing of rest' (f)
sometimes considered: 'extended causing of action' (a)
seldom considered: 'extended causing of rest' (d)
prototypical letting, sometimes considered: 'onset letting of action' (g)
seldom considered: other three 'letting' types (h, i, j)
not only the stronger-Antagonist types ('causing/letting'),
but also the weaker-Antagonist types
('despite/although', 'hindering/helping/leaving alone', 'trying …')
not only cases with the result named, but also cases with the tendency named
('causing' vs. 'preventing')
as in: The ridge kept the log lying on the incline.
versus: The ridge prevented the log from rolling down the incline.
not only the affecting entity (Antagonist) as subject,
but also the affected entity (Agonist) as subject
e.g., The wind kept the ball rolling. / The ball kept rolling because of the wind.

4 Extension of force dynamics to psychological reference

The physical application of force dynamics seen so far generalizes to the psychological realm.

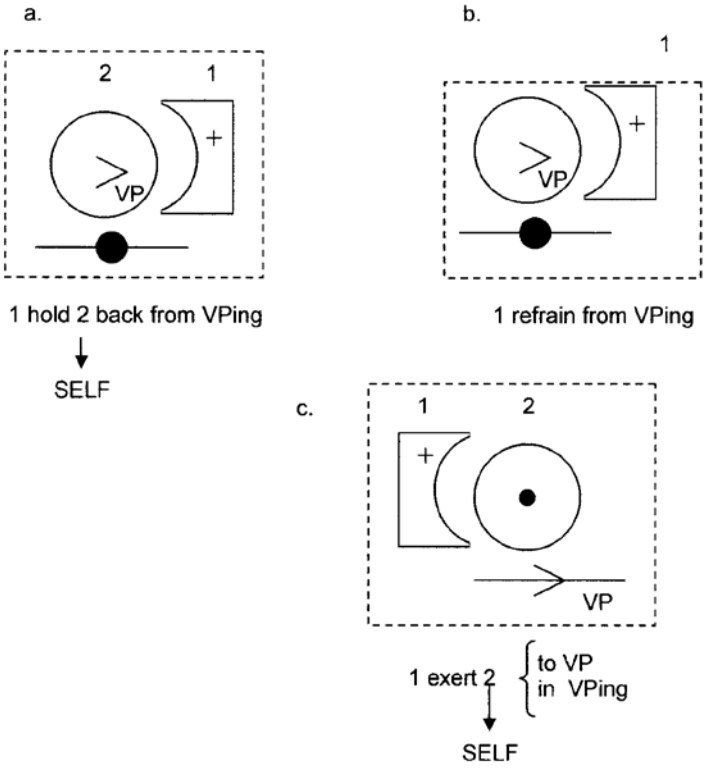
A want / urge—as in *He wants to open the window*—
can be conceptualized as pressure toward the realization of some act or state
and represented by the arrowhead ">" in an Agonist diagram indicating a tendency toward action.

A person's mind can be conceptualized as having two opposing parts—a divided self—
which can be treated as Agonist and Antagonist in force dynamic patterns:

a central part = Agonist, with a desire = tendency, one toward either rest or a particular action
a peripheral part = Antagonist, understandable as a sense of responsibility or propriety
appearing as an internalization of external social values.

A stronger Antagonist/periphery with an Agonist/center tending toward action
= self-inhibition/suppression = force dynamic blocking pattern (d): extended causing of rest
A stronger Antagonist/periphery with an Agonist/center tending toward rest or "repose"
= self-exertion = force dynamic pattern (a): extended causing of action

(8)



(a) stronger Antagonist = suppressing self/ Agonist = self's wish to act; both appear: He/himself
He held himself back from responding.
(b) same as for (a), but without the two components of the self separately marked
He refrained from responding.
(c) stronger Antagonist = exerting self/ Agonist = self's wish to rest; both appear
He exerted himself in pressing against the jammed door.

In (a), the subject can be identified with the blocking part of the psyche, acting as Antagonist
and the reflexive direct object with the desiring part, acting as Agonist.

4.1 Psychological origin of force properties in sentient entities

Non-sentient entities have their force properties through their own physical character
as seen above for wind, a rolling log, etc., and here for a dam.
But the overt force properties of sentient entities are taken not as native to the physical body
but as arising from psychological force dynamics, specifically, from exertion.

(9) a. The new dam resisted the pressure of the water behind it.
b. The man resisted the pressure of the crowd against him.

The dam is conceptualized to stay in place due to its physical solidity and rootedness.
The man, if only a physical body, would be a weaker Agonist swept along by the crowd.
His psychological exertion is understood to render his body a stronger Agonist.

5 Extension of force dynamics to social reference

Force dynamics applies not just to the INTRA-personal or psychological = psychodynamics, as just seen
but also to the INTER-personal or social = sociodynamics.

A possibly universal metaphor from a physical source domain to a social target domain:

Source: one material object directly imposes physical force on another material object
towards the latter's manifesting a certain action
target: one sentient entity produces stimuli (e.g., communication) reaching another sentient entity
that the latter perceives and interprets as reason for voluntarily performing a certain action

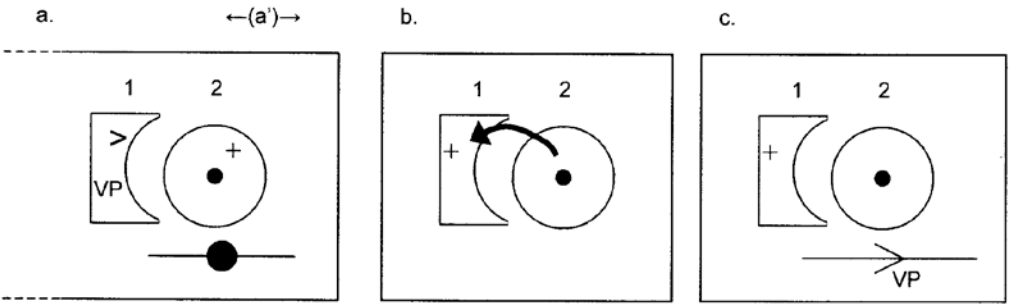
The linguistic constructions for physical force dynamics
can all also apply interpersonally, like *let* in (a)
and further constructions with words like *push /pressure* can be used, as in (b).

(10) a. He (finally) let her present her opinion.
b. The gang pushed / pressured him to do things he didn't really want to.

5.1 Interpersonal patterns based on a certain force dynamic sequence

A particular Antagonist-Agonist pair can shift in time force dynamically through three phases:
phase a: over an extent of time, a weaker Antagonist ineffectively impinges
on an Agonist with a tendency toward rest
phase b: at some point, the balance of strength can shift
either because the Antagonist gets stronger or because the Agonist gets weaker
phase c: if (b) occurs, the now stronger Antagonist overcomes the Agonist's tendency toward rest
and gets it to undergo a certain action

(11)



Interpersonal force dynamic lexical forms and constructions based on this sequence:
With attention on phase a, and the outcome at phase c unknown:
with Antagonist as subject:
She urged him to leave.
with Agonist as subject:
He was reluctant to leave.

With attention at phase c, and a positive outcome at c:
with Antagonist as subject:
She persuaded him to leave.
with Agonist as subject:
He relented. / He gave in to her on leaving.

With attention at phase c, and a negative outcome at c:
with Antagonist as subject:
She struck out with him on his leaving.
with Agonist as subject:
He refused to leave. / He wouldn't leave.

6 Modals as a syntactic category for the expression of force dynamics

English modals form a graduated grammatical category, from more core to more peripheral members,
based on the degree to which they show certain morphosyntactic properties, including:
(a) no *to* for the following verb / (b) no *-s* for the 3rd person singular / (c) postposed *not* / (d) inversion with the subject, as in questions

(12) can may must shall will need dare had-better
could might — ought should would dared (durst)
"honorary modals": have to / be supposed to / be to / get to

Force dynamic opposition is the common semantic factor running through the modals, as in:

(13) John can/may/must/should/ought/would/need/dare/had better not leave the house.

The subject represents the Agonist. The Antagonist is usually implicit.

can not: The subject has a tendency toward performing the indicated action,
some factor opposes that tendency, and the latter is stronger, blocking the action.
may not: In an interpersonal context, the subject has desire to perform the indicated action,
and the opposing factor is an authority's denied permission.
must not / had better not: like *may not* but, instead of merely blocking the subject's tendency,
the authority actively exerts social pressure against the subject to maintain him in place.
should not / ought not: The speaker's values as to what is good and beliefs as to what is beneficial
oppose the contrary behavior of the subject.
will not / would not: The subject refuses to yield to external pressure to perform the indicated action.
need not: The subject is released from a socially based obligation to perform the indicated action,
imposed from outside against the subject's desires.
dare not: The subject's courage or nerve is opposed to an external threat, and proves weaker.

6.1 The force dynamics of *should*

The English modal *should* typically appears in a construction of the form:
X should VP

Examples:
She should lock her door when she leaves.
He should spend more time with his children.

but, semantically, *should* is better represented (and can generally also appear in form) as:
(Y holds that) X should VP
Here, X and Y are both sentient entities.
X, the Agonist, is the subject of *should*.
Y , the Antagonist, refers to the speaker, "I",
or perhaps to some concept of generalized societal authority.

Thus, the first example above more closely means, and can in fact be expressed as:
I think she should lock her door when she leaves.

(14) components in the meaning of: (Y holds that) X should VP
  a. X does not VP.
  b. In Y's belief system, X's VPing would benefit X or others.
  c. In Y's value system, X would be a better person if s/he VPed.
  d. Because of (b-c), Y wants X to VP.

Note: components (b) and (c) alone are not enough. Their import can be captured by:

(15) I think that she would be benefited and would be a better person if she locked her door when she leaves.

But this formulation lacks the force impact of the original sentence.
The (d) component adds the crucial force dynamic factor,
turning Y into an Antagonist that exerts pressure on X as an Agonist.

6.1.1 Whether X is aware of Y's view affects the force dynamic pattern

Where X knows about Y's view, the arena of force dynamic opposition is within X's psyche.
Here, X experiences the opposition between his own wish to VP and Y's wish for him not to.
Y is typically a different entity from X, as in:
You should return the money. = I think you should return the money.

But Y can be the same entity as X, as in a divided self:
I should return the money.
= I (the responsible part) think I (the desiring part) should return the money.

The peculiar case: where X does not know of Y's view, as in:
(I think) she should lock her door when she leaves.
Here, the psyche of Y, the Antagonist, is the arena of force dynamic opposition
between Y's desire and Y's awareness of the contrary actuality.

Sentence (b) = another example of this opposition between desire and actuality.

(16) a. John finally agreed. b. The lizard finally moved.

In sentence (a), the *finally* indicates that John relents after some time
as an outcome of continued outside psychosocial pressure, already described in 5.1
Hence, John's psyche is the arena of force dynamic opposition.
But in sentence (b), the lizard knows of no pressure and does no relenting.
Rather, the speaker's psyche hosts the opposition: the speaker had wanted the lizard to move,
this wish was frustrated and built up in tension
until finally relieved by the occurrence of the lizard's motion.

LECTURE 3

How Spoken and Signed Language Structure Space Differently: A Neural Model

These included are configurational structure and the location of perspective point which we dealt with, attention distribution which we treated, and force dynamics. Today's two talks are going to be elaborations of the first schematic system, which is configurational structure, and particularly how it works on space. The talk really combines two parts.

The first represents the combination of two lines of research. The first part is how spoken language structures space. A number of people, including myself, have worked for several dozen years, trying to work out how language structures space. We are now in a position, with all this research under our belts, to give what might be the fundamental structural system of language use for representing spatial schemas. That's what I am going to present: the system of spoken language for representing space. In doing so, I'm going to concentrate on what I introduced in the first talk, the closed-class forms, because as I was arguing the first time, there is a division of labor between open-class forms and closed-class forms. Open-class forms are devoted to representing the conceptual content, and closed-class forms are devoted to representing the conceptual structure. Since we're interested in how language structures space, I'm going to limit myself to just what closed-class forms represent about space.

The second part of the talk is to look at sign language, particularly American Sign Language. I'm not a sign language expert, but I've worked with enough individuals, and I think what I say has been more or less approved by real experts, including deaf signers, so it's probably fairly reliable. Here's just a little background to sign language research. There was a time, maybe 30 or 40 years ago, at least in the States, I don't know about the rest of the world, when sign language was totally dismissed. It was not considered a real language, just a bunch

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of random gestures. Then progressively, more and more research showed that sign language was an amazingly subtle, flexible, delicate system for representing thoughts, and was a real language. But in the early days of research on sign language, it was politically necessary to still prove that sign language was a real language. It seems like the way we did it then, was to show that it had the same properties that were then being ascribed to spoken language, which was, in those days, Chomskyan linguistics.

A lot of sign language research tries to show how much sign language is just like spoken language, how it followed all the same rules, how a lot of symbols fit into the standard universal grammar module of spoken language. How it was in fact, therefore, governed by what was then proposed by Fodor and also by Chomsky as a language module, which is like a distinct, brain-organ dedicated to language.

Politically, to prove that sign language was a real language, the researchers, I think, felt obliged to show how closely sign language followed this Chomskyan-Fodorian kind of logic. However, in the intervening time, sign language has gained enough status in intellectual and academic communities and in the public in general as a real language, so it is not necessary to bend over backwards to prove its status as a language any more. In fact, it is now politically feasible to notice that there are in fact actual differences between spoken language and sign language. There are a number of differences.

This talk is all about what the differences are. It's how sign language and spoken language structure space differently. Therefore it winds up as a challenge to the Fodor model of a single language module. I end up proposing instead of a single language module which handles both spoken language and sign language, a much smaller core language system, which is neural, in the brain, which is responsible for both spoken and sign language, and that this core model, in turn, interacts with other outlying systems, brain systems, cognitive systems, for the full realization of one or the other of the two language modalities. In particular, this core system interacts most closely with the visual perception system, cognitive system, together, to give you sign language, and interacts with another system, which I haven't named, it's tentative, to give you spoken language. I'll propose what I think this other system is like. That's the background.

Let's start with the first part, which is how seeing how spoken language organizes its structure of space. The first thing to look at is just what kinds of closed-class forms are the target of the investigation. This is the first part, how closed-class forms represent things like the paths and sites and so forth. This includes closed-class forms that are in construction with a nominal, such as English prepositions like *on* or *above*, or prepositional complexes like *in*

front of, and it includes suffixes like the Finnish *illative* suffix, and includes the Japanese spatial nouns (actually Chinese has some of these to some extent), things like *ue* meaning 'top surface', so that to say 'on the table' in Japanese is to say 'at the top surface of the table'. These will all be closed-class forms that associate with a nominal to represent space. That will be part of the target. There will also be closed-class forms that are in association with a verb. English has what some people call verb satellites. They include some things like *they forked, they ran apart, he ran back*. They are things, they are not prepositions. They are in association with verbs. They also represent space. They'll also include things like *home*, which in English means *at home, he is home now*. They'll include deictics like *this* and *that*, include indefinites like *wherever, whatever* and others, and also forms that indicate degree of distance like *way* and *right* as in *It is way/right up there.* All of these will be closed-class forms that represent spatial properties in spoken language. Those will be the main targets of this investigation.

I will skip the next two sections. Let me give you a summary of the findings, which come in three sections. The first section pertains to the fundamental components or elements that constitute the spatial system. The way to get at them is to look at closed-class spatial schemas across languages and start analyzing. They analyze down to what looks like a roughly closed set, an inventory of fundamental elements that tentatively combine in certain patterns to form full-blown schema: spatial schemas that are represented by closed-class forms. We try to analyze down to what are these fundamental properties. It looks like it's an approximately closed inventory of fundamental spatial elements. Furthermore, these fundamental spatial elements group together into some lesser number of categories. These would be also part of the inventory, some roughly closed set, however large, of categories that these more fundamental spatial elements fit into. The third aspect is that, therefore, each category will have some relatively small fixed number of fundamental particles that belong to it and nothing else. Just those and no others will be the concepts that can ever be used to fit into a whole spatial schema.

The second thing, then at the level of the whole spatial schema, the finding is that these fundamental components combine together into larger, more elaborate schemas. That's the full schematic configuration, and these schemas are represented by particular closed-class forms, full form schemas. Any given language, any civil language has some relatively closed number of such schemas that it can represent, because there are some relatively closed numbers of spatial closed-class forms that will represent spatial schemas. Because of polysemy, there will be more image schemas than there are actual closed-class

forms. But, in any case, the number will be relatively small as you find it. The way we look at these schemas is that for any given language, they are a kind of a pre-packaged complex of the fundamental particles, fundamental components in a particular arrangement. So each language makes available to speakers a relatively closed, relatively small set of prepackaged assemblies of schemas built out of these fundamental particles.

The third part applies to spoken languages. (I should point out that almost none of this is the way sign language is going to do it. Almost everything I've said will hold for spoken language, almost nothing for sign language. We are already dealing with two language systems which differ at this fundamental level.) The spoken language spatial system has processes and properties that pertain to the full schemas. These are processes that generalize them or that permit them to classically extend in certain ways and also permit them to become deformed in certain ways. It might be the reason you need this third subsystem within the spatial system is because, since any given language has a roughly closed set of possible schema patterns to represent spatial situations, it needs to do something to be able to represent the infinity of possible spatial arrangements. So it has a third subsystem for extension and formation that lets the closed set of pre-packaged schemas apply to a much larger set of actual spatial schemas.

That's the overview of what the language system is going to look like. Now I am going to elaborate it. First let me describe the methodology I'll use in finding the fundamental components that belong to the inventory.

You have to start with some actual closed-class forms, and what I'll start with is the English preposition *across* in its locative usage, as in *The board lay across the road.* Something like the drawing I will show you. Here is a road, here is a board, and here is *The board lay across the road*. So the methodology can be that *across*, itself as a word, constitutes a whole complex combination of these fundamental particles. How can we discover the pattern of particles? The method is to systematically alter one factor at a time within this situation and see if the word *across* still applies to it. If it does, fine, if it doesn't, we know that that change we just made, that element we just changed, is criterial to the composition that *across* represents.

For example, I am going to now go through a set of these elements. The first thing we need to know is that there are two parts to this: there is the board, which is what we called the Figure, and there is the road, which is called the Ground. So we have Figure and Ground. This much I ask you to grant me, that this particular spatial closed-class form *across* requires a relationship between a figure and a ground. Furthermore, the Ground has to be a ribbon, has to be some kind of plane which is narrower than it is long.

Now let me go through some additional parts that have to be true for it to be able to use the word *across*. First of all, the Figure, the board, has to be linear in character. If it were planar in character, like a plane, you would no longer be able to use the word *across*. This is the road. This is some wall siding. You will now say *the wall siding lay over the road*, not *lay across the road*, typically. One component that the word *across* requires is that the Figure must be linear. We can start adding these up. Here is the *across* word. Number one will be 'the figure is linear'. There is an added mark. If it is planar, there is all this in the adjacent word *over*. The next thing in the *across* schema is what if we move the board? Right now the linear board is perpendicular to the main axis of the road. The figure's plane is perpendicular to the main axis of the ground. What if I make it parallel like this? We can no longer say that the board is across the road. Now we have to say the board is *along* the road. Number two is perpendicular. If it is not perpendicular, then you are already in the realm of *along*, another outline.

Now we've got two elements, components in the *across schema.* Namely, there has to be the figure and the ground. The ground has to be like a strip. The figure has to be linear. The figure has to be perpendicular. There is more. The line figure has to be parallel to the plane of the road. If it is not, then you have to say *the board is sticking out of the road*, you no longer say *the board lay across the road*. That's another feature. Another one is the line of the linear figure has to be adjacent to the plane of the ground, because if it is not adjacent, you can no longer say *The board lay across the road*, you have to say *The board is suspended above the road*. It is *above*, not *across*. If it is in the road, you have to say *The board is in the road*, not *across the road*. That's another feature that's necessary. Another one is that the length of the figure has to be at least equal to the width of the ground. Here is the road, here is the board. Its length is at least equal to the width of the ground. What if it's not, what if it is smaller? Here is a baguette, a French loaf of bread. Everything, except the baguette, is the same as before. It's perpendicular. It's adjacent to the road. Everything I said on the board still holds, but we still cannot say *The baguette lay across the road*. We now have to say simply *The baguette lay on the road.* We have lost *across* again. We're still not done. Here is the road, and we can put the board like this. Well, this fits everything we've listed so far, all the components needed for the word *across*, for the board is perpendicular, it is parallel, it is adjacent. Except you can no longer say it's *across*. The best you can say is *One end of the board lay over the edge of the road*. That is the best you can do with that one. We certainly can't say *across*. We are still not done, there is another requirement for *across* is that the figure has to be horizontal, whereas the ground, the road, is typically horizontal, but it can be vertical. Let's say it's now a wall and we've got a spear

hanging on the wall. We can now say *The spear is hanging across the wall.* That's fine. But this, you can not say *across*. Now you can say *The spear hung up and down on the wall*, but you can't say *across*. So a final component of the *across* schema is that the figure has to be horizontal.

This is the methodology, and by this method alone, we've already isolated some components from the total schema, so that the *across* word represents a total spatial schema complex. We've already been able to isolate certain components within that schema which are necessarily on this proposed universal inventory, a universally available inventory. They are necessarily on it, after all we found some language with some closed-class forms that represent a whole schema which has them, so therefore they are on the available inventory.

We've already therefore learned that on the inventory there will be such primitive spatial components as a point, a line, a plane. We needed those just to describe *across*, and figure and ground are part of it, perpendicularity is a part of it, horizontality. Actually, I forgot to mention *horizontality* means to be parallel to one of the earth-based planes. The earth itself defines a grid, a vertical grid on a horizontal plane, so for example, to be horizontal to means to be parallel with that horizontal plane. So horizontality, parallel, perpendicular, adjacency, these are all fundamental components in the spatial inventory. Also boundedness, so a point bounding a line, a line bounding a plane, and so forth. Just in this one spatial schema, we've already started to fill in the inventory.

This methodology requires that you consider possible elements that are not going to show up on the inventory. One element to consider is, let's say, here is the board, and the board happens to be planar itself. The board is a plane like this across the road. So maybe we should test out whether you need a concept of a planar figure, planarity, and particularly, co-planarity. That the plane with the board is coplanar with the ground, the road. Is that a necessary component? Well, the answer is no, not for the word *across*. The word *across* doesn't care. If the board lay this way, you would say *The board stood across the road on its edge*, or *lay flat across the road*. Either way the word *across* is undisturbed, it doesn't care. So maybe co-planarity should not be on the inventory. But, wait, if you look around for other closed-class schemas to see if it ever gets used in China, and it does. In another English schema, one for *over*, as in *The tapestry hung over the wall*, it has to be coplanar. If it's a string of beads, you wouldn't say *The string of beads hung over the wall*, you would say *It hung against the wall*. So you need a plane here to say *The tapestry hung over the wall*. Well, that's co-planarity. So sure enough, we just look further outside the word *across*, and now we do find co-planarity. Therefore that also has to be one of the fundamental elements on the inventory.

Let's go further. What about the category of the property of flexibility or rigidity, and the category that would belong to is degree of rigidity. You can test out *across*, and you can try using a flexible cable. Would you say *across*? The answer is yes. You could say *The cable lay across the road*. The word *across* doesn't care if the figure is a flexible thing or a rigid thing like a board. Let me look around for some other words, and I might have a hard time ever finding any spatial schema that cares about the state of rigidity of any of the components. If that holds out, then that concept, the degree of rigidity, would not show on the inventory. It would not be one of the fundamental spatial elements. That's the methodology for ascertaining what the fundamental elements on the inventory are, at least you have to look around all the world's languages. You can't do everything, but you certainly have to do a lot of spot checking to see what distinctions other languages are making. Just like we've done. There are a number of distinctions that English doesn't make that other languages do. They are on the inventory that I'm trying to build up.

Another guiding principle in building up its inventory in determining categories is to never be more specific than you need to. You always go down just to the level of granularity that the spatial point itself requires. Let's take another category. One of the fundamental categories on the inventory is relative orientation. There are at least two members or components within this category, parallel and perpendicular. In addition, there seems to be some indication that some languages require a third distinction besides parallel and perpendicular, namely oblique. For example in my English, I'm not sure all speakers agree with this, but in my English, these words make a distinction. We could say *A secondary pipe branches out from the main sewer line*. Here is the main sewer line, and here a secondary pipe branches out. If you say *out*, it's perpendicular. If you say *A secondary pipe branches off from the main sewer line*, you mean that it's oblique. Also I find some Atsugewi, the American Indian language we worked on, who make the distinction. If the linear object is oblique, if you are poling a canoe, like that, it uses one prefix. But if you push down perpendicular there or poke, it uses a different one. This also seems to require the distinction between perpendicular and oblique. So we've got two, probably three distinctions, within this category of relative orientation. No more. You don't need anything finer than those three. Now this is in relation to other cognitive systems, for example, vision and motor control. We can easily see further distinctions of angle and certainly know them, but it seems like nothing finer than that ever makes its way into the linguistic system for representing spatial structure. I don't think I've made this point clear enough in the first talk yesterday. Let me draw this point out again. I was showing you that the word *across* is magnitude neutral, so you can say *The ant crawled across my palm* and *The bus*

drove across the country, so the word *across* abstracts away from magnitude. But other cognitive systems don't. We have plenty of cognitive systems that are able to discern the difference between these two magnitudes. We have cognitive systems that can tell the difference between being able to see something within a certain scope of attention. For instance, with the bus trip across the country, it can't possibly do that, or to take cognizance within a single span of attention, you can do that for *The ant crossed the palm*, you couldn't do it for *The bus crossed the country*. Uniformity of scene, uniformity of the ants and the palm, exchanges with the bus across the country.

We have cognitive systems that can distinguish all of these phenomena. But none of that makes it into the cognitive system that is dedicated to the closed-class forms in language. Instead, all that makes it into those forms is the abstracted idealized delineation of these schemas that is what it cares about. The *across* schema is one line here, a line here, an arrow. That's all it cares about. Everything else is abstracted away. The same is true here. In this case, the degree of granularity is highly limited for spatial perceptions, as far as it goes into this structuring system that language uses for space.

With this methodology, we can now start laying out what are some of these categories and the members that are in them. Let's spend some time doing that. You can define this inventory into three types of categories.

One type of category pertains to partitioning the whole of some spatial scene into major parts. Another are those categories that pertain to the spatial properties of just one single element, one of those parts, and a third class within this is those categories that relate one part to another part, the relationship between two parts.

Let's start with the first one, how a whole scene is partitioned into principal parts. There seems to be exactly three member notions to this category: figure, ground and what I call secondary reference object. Those three, nothing else. We've seen already figure and ground. Let me illustrate the secondary reference object. There are two types. One is the encompassive. This distinction can show up in some different prepositions in English, they'll differ as to what they require in the way of a secondary reference object, whether they require just figure and ground, or if they require three scene components. The word *near* just requires two. If you say *The lamp is near the* TV, the TV is the ground. The lamp is the figure. So the lamp is near the TV. The word 'near' doesn't care about anything else, just those two things. The lamp can be anywhere, within a certain perimeter. But if you now say *The lamp is above the* TV, or *The lamp is over the* TV, then we have to be near it, because *over* requires proximity. But it also has to be vertically aligned with the TV. What is this vertical alignment? It is part of the earth-based grid. So it has to be aligned with it in terms of the

earth-based vertical axis. The word *above* requires not only two things, the figure and the ground, but also a third thing: a secondary reference object, in this case what I call an encompassive third thing, it is earth-based, encompasses everything.

In addition, there is an external type of secondary reference object. Take the word *past*. Here is a border. Here is a car, which has been here, and is driven out to here. I can take my binoculars to the actors. I can look at it from this side of the border, and I can say *The car is past the border*. All that *past* cares about is the two objects, the figure, the car, and the ground, the border. If I now say *The car is beyond the border*, it demands that the viewpoint be on this side—the opposite side of the border from the car. It means that *beyond* in addition requires a third thing, an external secondary reference object, namely, viewpoint location at a particular place. That's the first class of distinctions: the division of the whole scene into major scene components.

Let's look at the next class, which is the properties of individual scene components. I will go through five of them. The first one is just dimension, and there are four of them. It turns out that English has prepositions which are specific as to the number of dimensions for the ground object. For example, *near* just requires a point ground object. You can say *Here is the glass that's near the dot*. But *along* requires that the ground is a one dimensional line, as in *I walk along the path*. *Over*, as we just saw in *The tapestry hung over the wall*, requires a two dimensional plane. It demands that the ground, the wall, be a plane. It also demands that the figure be a plane, but we're just talking about the wall right now. Finally, the word *throughout* demands that the ground be a three dimensional volume. We have a huge bunch of jelly, and here are strawberries. In saying *The strawberries are throughout the jelly*, it means they disperse over a three dimensional volume. So *throughout* demands a three dimensional volume. To be fair, in this case there is no restriction, because there are only three dimensions, zero to three. In fact this system has all four of them, we know that all four are in use by actual spatial schemas in language.

The next one is more restrictive, and I call the next category *number*. It looks like there are only four member notions within this category: one, two, several and many, nothing else. For example, *The bike is near*. *Near* requires one, so *the bike is near the boulder*. *Between* requires two, *The bike is between the boulders*. *Among* requires a few, several, so this is *The bike is among the boulders*. And *amidst* requires numerous things, like *The bike is amidst the weed stalks*. So it is that there are one, two, several and many. It looks like no spatial schema in any language ever requires over four. There is nothing that requires three, or that has the notion of too many. There is nothing that has the notion of dozen. So far they are all absent. In the first part of yesterday, I described how there is

a constraint in general on closed-class forms as to number. Well, what kind of number can ever be represented by closed-class forms? It's even more restrictive when it's a spatial schema, there are just those four. It's more than those four if you talk about closed-class forms in general, but just as far as spatial.

The next category is motive state. There are two members in this category, stationary and moving. Once again, English has prepositions which are sensitive to whether the figure is moving or located, or whether the ground is moving or located. Let's take a stationary ground and a moving figure. The word *at* requires that the figure is stationary. For example, you can say *I stayed at the library*, but you cannot say **I went at the library*. The figure has to be stationary if you use *at*.

On the contrary, *into* is a preposition that requires that the figure move. So you can say *I went into the library*, but not **I stayed into the library.* Built into this preposition is one of the stationary motion components. In addition, there are closed-class forms in English, sets of propositions, that are sensitive to whether or not the ground is moving. So for example, let's say we have a moving figure, like a lion running along. Here is a deer, here is a lion. If the deer is also moving, you say *The lion ran after the deer*. But if the deer is stationary you say *The lion ran up to the deer*. These again distinguish the motive state of the ground. I should add that you might have thought there could be other motive states, there could be 'moving slowly' or 'speeding up'. Or there could be fixed. In fact sign language represents streams of things moving, stationary and fixity, something fixed in a place, but there are just two in spoken language.

Next is the state of boundedness. There are just two members: bounded and unbounded. There are again some prepositions in English that distinguish whether the ground is bounded or not. So they compete. For example, here is a pier out into the water. If you use the word *along*, it demands that it be unbounded. So *I walked along the pier for 10 minutes*. You cannot say **I walked along the pier in 10 minutes* to mean from beginning to end. It is not possible. On the other hand, there is another prepositional complex, *the length of*, which has the opposite properties. *I walked the length of the pier in 20 minutes*. That is fine. But you cannot say **I walked the length of the pier for 20 minutes*. One requires boundedness, the other unboundedness. As it happens, most prepositions in English are polysemous for both bounded and unbounded interpretations. For example, if this is a tunnel, then you can say *I walked through the tunnel for 10 minutes*. That's fine. And *I walked through the tunnel in 10 minutes* is also fine, but now through this end all the way to the other end. So *through* has this polysemy, has both unboundedness and boundedness.

State of consolidation has two members. If you say *She will be waiting there*, *there* is a kind of neutral, but if you say *She will be waiting thereabouts,*

thereabouts is one of the spatial schemas which mean approximately in some general larger area. Whereas *there* is neutral to whether it's confined or extended. Similarly, *at* and *around*. *She will be waiting at the landmark* is pretty close. *She will be waiting around the landmark*, means in some approximate location or some general area. Some of this is built in systematically in some languages like Malagasy. Apparently, the systematic set of deixis used for one is typically accompanied by different gestures, so the compact one is there, the diffuse one is there, with a sweep of the hand gesture. Those five all illustrate distinctions of categories within a class of looking at the spatial properties of just a single scene component.

Now let me go to the third class, where there are things that show the relationship between one scene component and another. We've already seen one with relative orientation. In addition, there is degree of remove. There are four or five intrinsic members to that and no others. There are two with context, coincidence and adjacency, and two without context, proximal and distal, and maybe a medial in some languages. In English again, you can see all four at work in different prepositions. In this case, you have to tease out the distinctions. We start with the prepositional complex *in the front of*. In this case, you have to have the word *the, in the front of*. So this is a fairground. Here is a carousel, a merry-go-round. You can say *The carousel is in the front of the fairground*. It means it is in the front portion of it. This is an example of coincidence. In *in the front of*, the figure is coincident with the ground, they co-occupy the same point. If you say *in front of* without *the*, it automatically means proximal, not in contact with. Here is the carousel. Here is the fairground. Now if you say *The carousel is in front of the fairground*, it means it's proximal. It can't be touching it. It can't be distal. You cannot say *The carousel is 50 miles away in front of the fairground*. So we know it is proximal.

There are also cases that distinguish other kind of things. If you say *The fly is on the table* vs. *The fly is over the table, on* requires adjacency, *over* indicates probably a degree of remove between figure and ground. It has the word *over*, so it has to be proximal. It can't be contact. It has to be no contact and close, because you can't say *The fly is 50 feet over the table*. But to tease out the distinction between proximal and distal, you could say *The fly is one foot above the table*, but not **The fly is 50 feet above the table*. I think in this way you can tease out these distinctions which are used in English prepositions. This is an example of the third class of categories, namely relating one of the basic scene components to another. There are many more. How many categories are there in total? I don't know. I haven't worked them out, but I imagine it's on the order of 50 or so. These are just a sampling. The point is that for each category, there is a constrained number of member elements that are possible. No more,

those and no others. Everything shows up in languages, so it's an extremely constrained system.

To fill out the way the system works further, a lot of spatial schemas that are curiously often accompanied by concepts that are not geometrically spatial. A number of them occur so frequently together that they have to be mentioned here.

One of them is force dynamics, which was described yesterday. For example, the word *on* in English has a spatial geometric component. It requires that the figure be in contact with the ground. So you can say, for example, *There is a poster on the wall*. It has to be adjacent, but not just be adjacent; it also has to be supported in that location against the poster, in this case by gravity. So that is the force dynamic part. Gravity might be pulling it down. But some kind of process, perhaps glue, is acting force-dynamically against the gravity. How do you use this? How do you tease that factor out? Here is a wall, and here is a balloon filled with helium. It's not glued on, now you cannot say *The balloon is on the wall*. You now say *The balloon is against the wall*. It turns out *against* is the preposition in English used for geometrical adjacency without force dynamic support.

That's the distinction that shows up there, that's force dynamics. In addition, just to do one more non-geometric one, let's take the combination of the notion of accessibility or inaccessibility which is perhaps geometric, together with a kind of affective attitude which is something like mysterious, risky, strange and so forth. It rather frequently, surprisingly, shows up in spatial preposition-like things throughout the world. English has a word, *beyond*. If I say *The car is beyond the border*, I'm not only saying that the car is figure, this is ground and my viewpoint is on this side, I am also saying, with the use of that word, that there is something mysterious, risky, intangible about that location. As opposed to using another locution in English, *The car is on the other side of the border*, which also requires a viewpoint over here, everything else is the same. Now all the mystery is dropped. No more strange things. For some reason, something mysterious seems to accompany the word *beyond*.

Let's switch to section five and the second aspect of this whole spatial system of spoken language, which is putting those things together again into schemas. It turns out this is a part of the whole enterprise which I understand the least. You'd think there will be principles of well-formedness that govern how the primitive components can be combined together or arranged into particular patterns. But I don't know what they are. I haven't found them. Some especially elaborate byzantine combinations like schemas with the word *across* and *past* recur in languages around the world, while others that you might think of seem never to occur. Let's in fact go through the word *past*

and show you how it is a symbol. I am not going to get through all of it, but a sample sentence is *The ball sailed past my head at exactly 3 o'clock*. It turns out that all the categories and primitive components that I found and placed on the inventory already are used. This complex schema can now be completely, simply, exhaustively characterized. I will not show you everything. Among other things, the ball or figure is like a point, so is the ground a point. Now we say the ball is moving, not stationary, and describes a line which is a one dimensional linear path. But some of the particulars that are special to this are that the ball has to go to one side. If the ball went this way, you would not say *The ball sailed past my head*, you would say *The ball sailed into my head*. And if the ball were over there, you would not mention my head at all. So *The ball sailed along over there*. Then the ball has to be to one side of my head. If it were in front, you wouldn't say *past*; you would say *The ball sailed in front of my head*. If it were *over*, you'd say *The ball sailed over my head*. It has to be horizontal, because if the ball sailed this way, you'd say *The ball sailed down beside me* or *The ball sailed down in front of me*. This is the methodology that is used for *across*. This is how *past* is built up. I've tried to invent a preposition to see if it could ever occur, just using the same components that I had. I invented a preposition which I call *apit*. It is my new preposition and I say it should mean 'down into a surround which is radially proximal to a center point'. So, for example, here is a house, and here I dug a pit, and I poured water down into it. That is the schematic configuration. It is built up of all pieces that we already discovered. I invent the preposition *apit,* and therefore I should be able to say *I poured water apit the house*. But it doesn't exist and no language has it, I disappointed you. So what is it about *past* and *across* that permits such elaborate combinations and doesn't permit something like *apit*? I do not know. That's the second aspect to this.

Now let's look at the third aspect to the spoken language spatial system. Each language has some relatively closed set of these schemas, each represented by some closed-class forms. How does spoken language then make that do for all the thousands of spatial situations that arise? It uses these processes of plasticity, so the same schema can be extended or generalized and so forth. We already saw some examples of extension and generalization in the first lecture which are repeated here. For example, there is the topological character. The same preposition *across* can be used, regardless of how big the path is, so it's size neutral, and the word *through* can be used regardless of the shape of the path. *I zigzagged through the woods* and *I circled through the woods* and so forth. Those were what we've already discussed, those are the examples of plasticity or generality that allow a single preposition to cover quite a wide range of meaning, whereas sign language would never represent these two different

*through*s in the same way, they wouldn't be grouped together into a single word *through*.

Similarly, let me skip to a new example of extension. That is the one I call extendibility in ungoverned dimensions. Let's take the word *out* in English. It has a radial sense. You can say *The boat slowly drifted out from the island.* That suggests a set of concentric circles and moving along a radius through that kind of composed radial trajectory. That's what *out* means in English. If you don't want that, you say *away: The boat slowly drifted away*. It gives an account of rectilinear motion because the radial sense is *out*. You can extend all of this, you can say *A caravan of boats slowly drifted out from the island*. Instead of one boat, we can fill in this radius. Or you can fill in the circumference, you can say something like *A ripple spread out from where I threw the pebble in*. Again *out* is the same. Or you can say *The oil spread out from where it spilled*. Or you can take this circle and close it over into a sphere, and say *The balloon I was blowing into slowly puffed out*. Or you can fill the interior. You can say *The dough puffed out*. So the word *out* keeps being used for all the additional dimensions that are not built into the original definition. That is another form of extendibility.

In addition to extendibility, there is deformation. For example, you can do some degree of stretching. Let's say this is a perfect *across*, that is, across a square swimming pool. If this is a very long swimming pool, you can never say *I swam across the pool*. The pool is too long. You have to say *I swam along the pool*. What if the pool is square but just a little longer? Could you say *I swam across the pool*? Sure! So, if you stretch it a little bit beyond its ideal schemas, it is still fine in English. So that's stretching.

In addition, you can cancel certain features. You can cancel one of the *across* schema. For example, here is a boulevard. Here is a shopping cart. If the shopping cart rolled across the boulevard, but was hit by an oncoming vehicle, that means the long way across. We don't have a full *across* schema, but it doesn't matter. You can still say *across*. You cancel the feature of the *across* schema which terminates on the further boundary. In fact, you cancel both parts. Here is a desert. Here is a sand land playground. Tumbleweed is a kind of weed that grows on the ground. You can say *The tumbleweed rolled across the playground in five minutes*. But here is a desert. Here is the tumbleweed. You can say *The tumbleweed rolled across the desert for an hour.* No bounds, no boundary on the sides. Again, you can use *across*, the same word *across*, by canceling two of its components. So this seems to be the way that spoken language adapts. It sets up a sort of closed system of prepackaged schemas and then stores them in order to get you to the rest of the thing.

Now let's switch to sign language. We've just gone through the main features of how spoken language works. In sign language, the first issue is what to

compare with what. They are not fully comparable systems. Spoken language has certain subsystems. You have the open-class systems and the closed-class systems, and what I call vocal dynamics, and you want to include gesture and body language. Those are the major subsystems. Sign language has a different set. It has something comparable to the open class, which is called lexical signs. It has a subsystem of modular lexical signs. And it has two systems which are missing in spoken language. It has what I call size and shape specifiers, gestures like this would show this is a certain kind of bucket or indicate a long thing, like a rod. Then there are the classifier systems, which I am going to concentrate on. There are a number of different categories, subsystems: facial expressions are elaborately systematized, gesture is a subsystem that moves in and out, and so forth.

It looks like the best thing to compare with the spatial part of closed-class forms in spoken language is the classifier system in sign language. What is the classifier system? There are many sign languages in the world. Typically they are not related to the spoken language at all. They have more commonalities than with spoken language. The classifier system is dedicated to representing one object moving with respect to another object in space. To illustrate it, this could represent the ground vehicle, and this can represent a tree. This is *The car drove past the tree*. This is *The car drove past the tree, up a hill*. This is *The car drove past the tree up a curved hill*. This is *The car drove past the tree up a bumpy curved hill.* This is *The car did it fast.* And this is *The car started close to the tree and drove away from it*.

This is shown in the classifier subsystem. It's a specialized system. It is not a system of normal signs, it's a specialized subsystem of its own. It has its own set of hand shapes representing kinds of things. Those are called classifiers; this is ground vehicles, this air vehicles, animals and so forth. You can pile up lots of concurrent aspects of space all at once, as I just showed. There's reasons to want to associate the classifier subsystem of sign language with this closed-class spatial system of spoken language. And they contain another property.

In the first talk I made a distinction between the content and structure of concepts. Both of these subsystems are on the structure side of the division. For example, spoken language, let's say English, has open-class forms like *enter* but has a closed-class form *into*. The same kind of distinction shows up in American Sign Language. The sign for *enter* is a real lexical verb sign. But it's not used at all in the classifier system, instead we have a number of more structural kinds of indications like this will be one kind of *enter*. This will be another kind of *enter*, they subdivide into a number of subdivisions. But none of them look like the *enter* verb.

The second thing is that both subsystems are used to represent spatial situations structurally. The third is that they can add what are essentially open-class

or lexical forms if they need it, to amplify the structural things. So in English, you can say *I drove in* or *I drove the motorcycle into the cave*. You can add parts like *motorcycle* and *cave*; you can do the same in sign language. You can give the lexical sign for motorcycle, and then go like that. Or in fact you can spell the word. You can do the whole exact parallel of extension into lexical signs just like in spoken language.

The sign language system in general is different from the spoken language in a number of ways. It's always in the direction of being closer to visual parsing, visual scene structure. It does so in two venues. The first venue is in the inventory of available elements: it typically has more. The inventory has more categories and more distinctions per category than spoken language. There is something notional rather than parallel. It has essentially the same number of distinctions like boundedness as the spoken language. It has only bounded and unbounded. This gesture is a bounded path, and this is an unbounded path. That's pretty much the same as the spoken language. There are some categories that have just a little bit extra. You can look at the category of motive state. It has three of these things, at least in one analysis: moving, stationary, fixed.

There are other categories where it has a small number of notional things. The small number of things include, most probably, degree of remove. In spoken language, I found four, maybe five degrees of remove: coincidence, adjacency, proximal, distal. My guess is that the non-contact ones are more finely divided in sign languages. If you drive past the tree, you can probably indicate more degrees of 'pastness' than spoken language would. The next one was where the sign language inventory of extensive degree had more. This would be the case for path contours. There may be only four path contours that are distinguished in the spoken language. There is a circle, like *around the Maypole*. There is a curve, like *over a hill*. There is a meander, like *walk around about the town* or a straight one like *walk across the plateau*. That's about it. But there's an indefinite number of contours that are represented iconically by the sign system just to show which way the car is moving. Furthermore, the sign system has a category which doesn't exist in spoken language. For example, how close or far you are from the ground object when you start. So if the car passes the tree starting far and ending soon, or if the car passes, starts soon and ends far. That whole category, how close you are at the start and finish, is absent from any indication in a structural way by the spoken systems.

Now let's switch to the second venue. Within the inventory of sign language there is much larger and finer granularity than spoken language, it resembles the visual scene parsing that we do visually. Next is contrast in any single expression. The first thing is iconic in a number of ways. First of all, it's iconic in the way that it clusters components of the spatial scene. If you actually look at a car bumping along the road past a tree, there is a kind of visual clustering.

There is the kind of figure—were it is the car. There is the manner that you see, the bumping. You could see that the pattern there is the factor of motion. You look at the car, you see its motion, it's not stationary. You see the path is straight. What is different is the tree, which is elsewhere. The sign language clusters together all of these components, just as it does in vision. It is faithful to vision. The same single hand clusters together the kind of figure it is, its state of motion: moving; its manner: bumping; its path: straight; so all of this is clustered together. Every spoken language deviates from this fidelity in one way or another. For example, the closest English sentence I might find would be *The car bumped along past the tree*. Well, in this, you get the car: the figure. It is indicated separately, it is not indicated together, even syntactically, with all the other elements of the one object. *Bumps*, that is its manner and the fact of motion. And *along* shows the trajectory, its unbounded linear path. *Past*, the relation of its path to the ground, and the ground object, which is separate. One puzzling mystery for me is why spoken languages in general seem to represent the path that the figure executes in relation to the ground next to the ground object. They don't indicate it next to the figure. So, it is *past the tree*. They don't say *the car passing*. But in sign language, it does. The same hand indicates the car and all other factors. It also indicates the pastness, just as you would do it visually, so it is really close to the other point iconically. In other aspects that I consider that are maintained in all sign languages, the object moving is represented by the hand shape, while the way the object moves is represented by the hand moves. I encourage looking at something from a Martian's perspective. I thought of an alternative that could have happened but never did. And that is where the hand shape will show you a path contour. So a straight set of fingers will show you a straight path, curving fingers will show you a rounded or curved path, and zigzag fingers show you a zigzag path. And the way the hand moves shows you the shape of figures. So this gesture is a round figure, this is a linear figure and so forth. Therefore this gesture for that system should mean 'a round figure moves along a zigzag path'. But that does not exist. No sign language system ever does that. And in fact it's iconic. Again, every spoken language deviates from this in one way or another. So for example, in English, the thing that is moving is prototypically represented by the subject noun. In Atsugewi, it is prototypically represented by the verb root. Similarly, the path in English is typically represented by the satellite preposition, but the path in Spanish is typically represented by the verb. So, there is no iconicity. In fact, spoken language and sign language differ from each other.

Another property of this classifier system is that it seems to represent only what you could see in a narrow scope of focus around the figure object. I don't know if this is an example of visual fidelity or not, but it does seem to

be characteristic. You should expect to be able to express the kind of figure, its manner, and any adjacent instrument next to the figure. Those should all be expressible, and they are. In this respect, they parallel how English can express them. For example, if you want to express the immediate instrument as in *I plucked some moss up off the boulder*, here is the lexical sign for a boulder. Here is the classifier system symbol. In this one hand, you go like this, showing plucking the moss off the boulder. You can say it in English in one clause. You can represent it in one clause, in one expression, in the classifier system. Similarly, you can express also the adjacent manipulator like *I pulled the jug along the counter*. You can say it in English. You can show it in a single classifier expression. Similarly, you should be able to express, because it is a narrow scope, the adjacent instrument. For example, *I scooped the jelly beans up into her bag*. Here is the hand representing the adjacent instrument, the scoop, you actually curl your fingers in, and then going like that.

You should also be able to show the adjacent manner, because you can see the manner of the figure within a single scope of vision. So, here is a cork on the water, bobbing. Here is the seaweed. Here is the cork bobbing past the seaweed. You can show it in a single gesture. You can say it in English. Now, all of a sudden though, as soon as you try to go outside that narrow scope, English keeps on going, sign language stopped, the classifier system stopped. For example, in English you can say *I kicked the football over the goalpost*. Something you can do in American football. One clause in English is now impossible to do in one classifier expression in itself. You have to do two. Kick, here is the kick part. And here is the goalpost. Here is the ball going through it. You have now two separate gestures. This is a pair of clauses. They are temporally separate; the kicking of the ball and the ball's subsequent pass of the goalposts are separate events. English is perfectly happy to combine these into a single clause even though they are temporally separated, but the classifier system won't let you.

Similarly, if you try to look further away from this narrower focus again you can do it in English. You can say *I walked the memo to the home office, I ran the memo to the home office, I flew the memo to the home office*. Sign language can't do that. The best you can do is indicate it in two gestures: grabbed the memo or took the memo and drop it and then rushed, so two separate gestures. You can't do anything like holding the memo showing yourself running along. In fact if you do this in sign language, they laugh. That's another property of the way the classifier system differs from spoken language.

Finally, another way is the sheer number of distinctions that are possible to be indicated simultaneously. They are enormous. At most I found six in spoken language. English is pretty good. In English you can say something like *The bat*

flew way on up into its niche in the ceiling. So here is a cavern. A bat flies. And the bat flew way on up into its niche. So you got *way* meaning long distance. *On* means the continuation of the path. *Up* vertical axis, positively. *In* indicates a concavity. *To* indicates the motion of locativeness, something like that. So that's six.

By my count, the classifier system can make as many as 30 categories of distinction, perhaps in principle all of them simultaneously. I am sure it never happens, there's are co-occurrence restrictions. You can get in any case many more than you could in spoken language, and many more combinations of things that you would have thought possible in spoken language. For example, you can indicate there is a figure there. Under the figure properties there are three distinctions for the size of the figure. So this would be like a small circle thing, maybe a small pizza, medium pizza and large pizza. You get a three way distinction. You can also indicate depth concurrently and independently. A small film case, a larger film case or ball—a small ball, medium ball, larger ball. So you have two size things and two dimensions. Or here is another size-dimension. This is the toilet paper coming off the roll. This is film rolling out of the spool. This is cable coming out from the spool. This is a diminutive, this can be thread coming out of the spool. These are those distinctions.

In addition, I distinguish three kinds of motion. I did this in spoken language before, and it turns out, it's equal to sign language. There is internal motion, which includes anything that changes its shape. This could be a roll of paper that if you let it go and it unfolds, it opens up and settles back down on the table. That's indicating internal motion. Then in addition, there is side motion so paper can move this way, or that way. Some kind of oscillation of rotation. In addition, there is translational motion through space. You can indicate all three kinds of motion at once. You can indicate some like this, some like that. So all this is possible. The last element there of the sign language system, that's 11.2, I guess, is the same thing, but it now stresses the other part of this. It's not just how many distinct categories can be indicated simultaneously within a single expression, but the fact that they are independent of each other. They can vary independently. They are not pre-packaged into some language's pre-selection of a nice schema for this use. On the contrary, you make up a schema that you need on the spot, to correspond to the actual physical characteristics. So all of these things vary independently with each other. The way that something moves, the path it moves along, the figure or shape, the manner and so forth. You can vary all of them independently.

To conclude, we've demonstrated that within this specific realm, namely language structure of space, sign language and spoken language do it quite

differently. Yet they are both full-blown languages done by the human brain. So it demands a reconsideration of theories about the so-called language module of the human brain. It can't be a single language module as described by Fodor and Chomsky, if you've got two full-blown languages both done by humans, which behave so differently not just in their structure but in their very mode of operation.

So what I propose is not a full-blown language module, a language organ. I propose a much smaller language system, and provisionally even that can disappear. The smaller language system accounts for those characteristics which are in common to both spoken and sign language. At most, all the properties that are in common to both spoken and sign languages. This is the more modest language system. In turn, as I said in the beginning, it interacts with the visual processing, the visual structuring system also in the brain, so that together, this system constitutes the language system for sign language. And it seems to interact with another system, for spoken language. What is this other system? That's the system that is used for pre-packaging and the modulation of those packets, so deformation and extension, that is the system that I outlined for spoken language.

Remember that language and culture are the last cognitive systems to have evolved. Other cognitive systems were already in place. Why would this one already have been in place? Maybe it was used for the motor system. It may be that there exist in the motor system notions of pre-packaging rudimentary or fundamental motor components, so motor components might be listed in one way, then in other ways. So if you combine certain sets of motor components, you get actually 'sitting down'. Or maybe that's a kind of pre-packaging. Furthermore, you need to modulate pre-packaging for different circumstances. If you sit on the ledge, it is very different from sitting on a stump, or on a fence. You modify the basic pattern for different circumstances. Maybe there had already evolved something like this packaging and modulation system, and therefore, it was ready to be co-opted by the language system.

These are loose, speculative ideas but that's the direction I'm going in. All this looks more like what neuroscience is currently finding: that any kind of coherent behavior which one would typically identify it as a single thing seems to be underlain by a number of brain components interacting.

So that is what the system looks like. In turn what I call the core might itself dissolve into, resolve into smaller components used themselves for lots of other things as well.

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Handout Lecture 3

0. Overall Introduction

this talk: how perceptions and conceptions of space are schematically structured
in the cognitive system of language

first part—spoken language: the system for representing spatial structure in spoken languages
with perhaps the first attempt to catalog all the basic elements making up their spatial schemas

second part—signed language: the system in signed languages for representing space schematically
and its differences from the spoken-language system

signed spatial representation is systematically more like scene parsing in visual perception

unlike the Fodor-Chomsky language module, these findings suggest the presence in the brain of:

a. a smaller core language system responsible for the common properties of spoken and signed language
b. this core system linking up with different outlying systems for the full functioning of the 2 language modalities

Part I: Spatial Structuring in Spoken Language

1. Introduction

NB: Assumed here from my past work is the notion that, in spoken language, closed-class forms represent conceptual structure,
while open-class forms represent conceptual content
—i.e., that the two subsystems have a functional division of labor.

Thus, to examine how spatial concepts are *structured* in spoken language, I look to their representation in the closed-class subsystem.

1.1 Intended target of present analysis

cross-linguistically, all closed-class forms (CCs) that specify spatial structure,
generally whole spatial schemas, including:

1.1.1 CCs for the spatial structure of paths or locations

a. forms in construction with a nominal
adpositions: *into / above* + adpositional complexes: *in front of*

noun inflections: Finnish "illative" *-:n*'into'
"locative nouns": Japanese *ue* 'top surface', as in *teeburu no ue ni* table GEN top at (= "on the table")

b. satellites to a verb
free: (*run*) *back / apart / ahead*
bound: Atsugewi *-wamm* 'into an areal enclosure'
c. adverbials: *home*, as in *He isn't home*.
d. deictics: *this, here*
e. indefinites, interrogatives, relatives, etc.:
everywhere / whither / wherever (*I'll go wherever you go*)
f. qualifiers: *way, right*, as in *It's way / right up there*.

1.1.2 CCs for the spatial structure of objects

g. markers of plexity / state of boundedness on nominals
English plural *-s*: *birds*; debounding *-ery*: *shrubbery*
h. classifiers: Korean *chang* 'planar object'
i. instrument markers:
Atsugewi *cu* 'as the result of a linear object, moving axially, impinging on the Figure'

1.1.3 CCs for factors involved in / affecting spatial structure (as in a motion/location event)

j. markers for the Figure: some uses of Atsugewi or Caddo verb prefixes
k. markers for the Ground: Atsugewi Path+Ground verb suffix set; Caddo incorporated nouns
l. markers for Manner: Nez Perce Manner verb prefix set
m. markers for Cause: Atsugewi Cause verb prefix set

1.2 Provisional finding of the investigation

1.2.1 basic elements

a. There is an approximately closed universally available inventory of conceptual elements that are basic—perhaps primitive—that recombine in various patterns to constitute the schemas represented by most of the closed-class spatial forms found across languages.
b. There is a relatively closed set of categories that these elements fall into.
c. Each category mostly contains a relatively closed and small number of particular elements—hence, of spatial distinctions that it can ever mark.

1.2.2 whole schemas
- a. these basic elements are combined into the whole spatial schemas that, "pre-packaged", are expressed by CCs—perhaps under well-formedness conditions (the least well established aspect of this investigation)
- b. each language has in its lexicon an approximately closed set of CCs representing an approximately closed set (larger, due to polysemy) of such whole spatial schemas that a speaker must select among in depicting a spatial scene

1.2.3 processes on whole schemas
- a. There are certain properties and processes that apply generally to the whole spatial schemas expressed by CCs
- b. the processes extend or deform the basic form of whole schemas perhaps as a system for fitting a language's closed schema set to more spatial scenes

2 Method for determining basic schema elements

systematically change candidate elements of a schema expressed by a CC those changes preventing the use of that CC show the elements essential to it

consider the locative *across* schema; model sentence:

The board (F) lay across the road (G). (vs. the alternatives below)
(F = the Figure object; G = the Ground object)

2.1 Candidate elements that prove out
- a. G is ribbonal: a plane with two roughly parallel edges
  these edges (as main axis) are longer then or equal to distance between them (as secondary axis)
- b. F is linear (and generally bounded at both ends).
  —vs. The wall siding lay over the road.
- c. The axes of F and G are roughly perpendicular.
  —vs. The board lay along the road.
- d. F is parallel to the plane of G.
  —vs. The board is sticking out of / into the road.
- e. F is adjacent to the plane of G.
  —vs. The board lay (buried) in the road. / The board was suspended above the road.

f. F's length is at least as great as G's width.
—vs. The baguette lay on the road.
g. F touches both of G's edges.
—vs. The board lay over one edge of the road.
h. The axis of F is horizontal. (The plane of G is typically, but not necessarily, horizontal.)
The spear hung across the wall. vs. The spear hung up and down on the wall.

This shows that at least the following elements figure in CC-expressed schemas:
a point; a line; a plane
a boundary: a point as boundary to a line, a line as boundary to a plane
parallelness; perpendicularity
horizontality
adjacency (contact)
relative lengths of 2 perpendicular axes

2.2 Candidate elements that don't prove out

2.2.1 not in *across*, but in other CCs, hence in inventory: F is a plane and coplanar with G
ok: The board lay flat / stood on edge across the road.
so *across* schematizes the Figure only for its linearity, not for any planarity or coplanarity
hence, this CC shows no requirement for coplanarity, but other CCs do:
A tapestry / *A string of beads hung over the wall.

2.2.2 not in *across*, perhaps in no CC, hence not in inventory: F is rigid
ok: The pole / cable lay across the road
so *across* shows no element "rigid" or category "state of rigidity"; maybe never schema-relevant

2.3 Principle: get down only to the largest necessary granularity for elements

cross-schema analysis might yield a category of "relative orientation" between 2 lines or planes
with no more than two member elements: roughly parallel and roughly perpendicular.
some examples suggest an intermediary "oblique" member:
A secondary pipe branches off from the main sewer line. vs.... branches out ...

Atsugewi: Ra- 'as a result of a linear object moving obliquely against a surface'
vs. cu- '... perpendicularly ...'; e.g., by poling a canoe vs. prodding a person
But then, this category needs division into at most 2 or 3 elements—probably nothing finer

3 Sample of basic schema elements and their categories

The categories are here grouped into 3 classes, ones pertaining to:
scene segmentation / a scene component / the relation between 2 scene components

3.1 Categories pertaining to scene segmentation

3.1.1 Basic scene components: 3 members—Figure, Ground, Secondary Reference Object
the Figure and Ground components were already seen in the *across* example above
Secondary Reference Object can be: encompassive / external
encompassive: e.g., the earth-based reference frame—The lamp is above the TV.
vs. just Figure + Ground—The lamp is near the TV.
external: e.g., an observer or viewpoint—He's beyond the border.
vs. just Figure + Ground—He's past the border.

3.2 Categories pertaining to an individual scene component (e.g., the Figure, Ground, or Secondary Reference Object)

3.2.1 Dimensionality: 4 members—0 (point), 1 (line), 2 (plane), 3 (volume)
some English prepositions require a Ground object schematizable for only one of the 4 dimensional possibilities:
0: near a dot; 1: along a trail; 2: (a tapestry) over a wall; 3: (berries) throughout the jello

3.2.2 Number: perhaps 4 members—1, 2, several, many
some English prepositions require a Ground object schematizable as comprising one or another number of points:
The basketball lay—1: near the boulder; 2: between the boulders; several: among the boulders; many: amidst the cornstalks.

NB: not found in this category, for example: 'three', 'too many', 'an even number'

3.2.3 Motive state: 2 members—moving, stationary

motive state of Figure: *at* stationary vs. *into* moving (with stationary Ground)

I stayed / *went at the library. vs. I went / *stayed into the library.

motive state of Ground: *after* moving vs. *up to* stationary (with moving Figure)

The lion ran after the deer. vs. The lion ran up to the deer.

NB: not found in this category, for example:

motion at slow vs. fast rate / location at rest vs. fixedly (staying put)

3.2.4 State of boundedness: 2 main members—bounded, unbounded (also: bounded at one end/side)

unbounded: along—I walked along the pier for 10 minutes / *in 20 minutes.

vs. bounded: the length of—I walked the length of the pier in 20 Minutes / *for 10 minutes.

NB: many English prepositions are polysemous for both member notions:

I walked through the tunnel for 10 minutes. vs. I walked through the tunnel in 20 minutes.

Russian: *Satelit obletel zeml'u za 1 den'* '(the) satellite circum-flew (the) earth in 1 day' vs. *Satelit letel vokrug zemli 3 dn'a* '(the) satellite flew around (the) earth for 3 days'

NB: not found in this category, for example: a gradient or fuzzy boundary

3.2.5 State of consolidation: 2 members—Compact/precisional, diffuse/approximative

compact/precisional (or neutral) vs. diffuse/approximative:

there vs. *thereabouts*: You'll find her there / thereabouts.

at vs. *around*: The other hiker is waiting at vs. around the landmark.

Mexican Spanish: *estar en* 'be located in' vs. *andar por* 'be located roughly in the region of'

perhaps combined with bounded vs. unbounded:
Malagasy locative adverbs: 2 forms for each of 'here' / 'there' / 'yonder' (<Shingo Imai)
e.g., 'there within that bounded region'—typically indicated with pointing finger
vs. 'there spread over that unbounded region'—typically indicated with sweep of hand

3.2.6 Directedness: 2 members—basic, reverse
in a Ground object: The axon grows along the chemical gradient. vs. The axon grows against the chemical gradient.
in a Secondary Reference Object
a queue: She is ahead of me in line. vs. I am behind her in line.
the vertical axis of the earth-based reference frame:
The lamp is above the chair. vs. The chair is below the lamp.

3.2.7 Geometric type: 2 members—radial, rectilinear
elements within the radial geometry type:
a center, a surround, a radius
and motion—about a center, along a surround, along a radius

applied to a reference frame (a secondary Reference Object):
radial: The boat drifted further and further out from the island.
vs. rectilinear: The boat drifted further and further away from the island.

radial geometry applied to the Figure's path—
motion about center: I turned the pail around / over.
motion along radius toward / away from center:
The sloths on each branch of the tree slowly crawled in toward / out from the trunk.
motion along a linear surround: I walked around the Maypole.

radial geometry applied to the Ground—
cylindrical surround: through the tunnel; spherical surround: into the cave

3.2.8 Phase of matter: 3 main members—solid, liquid, empty space
Atsugewi: *-ik's* 'horizontally into solid substance' as in chopping an ax into a treetrunk
vs. *-ic't* 'into liquid' vs. *-ipsnu* 'into a volumetric enclosure'

English: unlike *in*, *inside* accepts only an empty-space Ground, not liquid/solid:
The rock is in/inside the box. / in/*inside the puddle of water. / in/*inside the ground.

3.2.9 Intrinsic parts: ? members
e.g., for Ground object: front, side, back, top, bottom
(The cat lay) before / beside / behind / atop / beneath the TV.
Korean: *mit* '(at) the bottom part of'
(There's dirt on / A bug is flying near) the bottom of the cup [whether beneath or over it]
e.g., of the earth-based reference frame: vertical axis, horizontal plane
vertical: It's up there. / It's down there.; horizontal: It's over there.

3.2.10 Object identity: ? members
for the Ground object: e.g., 'home'—French *chez* 'at the home of

3.3 Categories pertaining to the relation of one scene component to another

3.3.1 Degree of remove: 4 or 5 members
with contact: coincident, adjacent; without contact: proximal, (medial?), distal

coincident: The carousel is in the front of the fairground.
vs. proximal: The carousel is in front of the fairground.
adjacent: The fly is on the table. vs. proximal: The fly is over the table
proximal: The bike is 10 feet / *10 blocks in front of the church.
vs. proximal+distal: The hawk is 1 foot / 1 mile above the table.
perhaps 'medial' needed for languages with here / there / yonder type deictics

3.3.2 Relative orientation: 2 or 3 members—parallel, oblique?, perpendicular
parallel: The caterpillar crawled along the crack in the pavement. vs. perpendicular:... across...
oblique?: A secondary pipe branches off from the main sewer line. vs. perpendicular:... branches out ...

3.3.3 Relative magnitude: 2 or 3 members—less than, (equal to?), greater than
for a Figure's path from one side to the opposite side of a rectangle:
across: rectangle's path-parallel axis is less than or equal to its path-perpendicular axis
vs. along: rectangle's path-parallel axis is greater than its path-perpendicular axis

3.3.4 Degree of dispersion: 2 members—sparse, dense
Figure = multiple elements of lesser dimensionality than Ground and coincident with or adjacent to it
for stationary Figure and 2- / 3-dimensional Ground:
neutral: There are some/many peas on the table. / in the aspic.
vs. sparse: There are peas here and there on the table./ in the aspic.
vs. dense: There are peas all over the table. / throughout the aspic.

3.4 Nongeometric categories

3.4.1 Force dynamics: 2 members—present, absent
English *on*: Figure is in adjacent contact with Ground and supported by that contact
contact + support: The poster is on the wall.
contact, no support: The helium balloon is against the wall.
no contact, no support: The helium balloon is near / next to the wall.

3.4.2 Accessibility: 2 members—accessible, inaccessible; and 3.4.3 Accompanying cognitive / affective state: ? members

one type: Figure's location as—inaccessible; unknown, nonvisible, risky, mysterious

beyond vs. *on the other side of* (NB: these both locate viewpoint at same place)
He's beyond the border. / He's on the other side of the border.

Korean: *sok* 'in the recesses of' vs. *an* 'accessibly in'
e.g., He is "sok" the building—better than "an" in referring to fugitive hiding somewhere in building to escape police outside

3.4.4 Relative priority: 2 members—coequal, main/ancillary
I jog together with him.—we are coequal
vs. I jog along with him.—he is the main entity, I am ancillary

4 The Issue of Constraints on the inventory of elements making up spatial schemas

4.1 Surmise: the inventory is hierarchical

some elements are universal, some frequent, some low but recurrent across languages

the inventory is not sealed—further elements can occur sporadically, novelly

e.g.: in English, the concepts 'walkway' and 'transportation' are elements in one *on* schema:

on: in a (partially) enclosed vehicle with a walkway currently in use as transport
walkway: in a car / on a bus
in a grain car / on a train
in a helicopter / on an airplane
in a rowboat / on a ship
transportation: The kids played in/*on the abandoned bus. (< Fillmore)

example: intrinsic parts like 'front', 'side', 'back' are frequent, but Makah has many verb suffixes with meanings like 'at the neck', 'at the groin' (<Matthew Davidson)

4.2 Response to Bowerman challenge

Bowerman challenge to idea of universal roughly closed inventory of schema primitives:
at same time that kids learn English *in/on*, Korean kids learn
kkita 'put [Figure] in a snug fit with [Ground]'
and *nehta* 'put [Figure] in a loose fit with [Ground]'
the factors 'snug/loose fit' are presumably rare among world's spatial schemas
so they don't come from any preset inventory; are learned from variable adult language semantics

reply—I surmise: Korean closed-class schemas still largely built from preset inventory
the cited forms are open-class verbs, perhaps learned at same time as English *squeeze* or *puffy/gooey*
open-class semantics is a different cognitive subsystem,
drawing from broader and finer perceptual/conceptual discriminations
thus, kids perhaps know early that *squeeze* involves:
centripetal pressure from encircling or bi-/multi-laterally placed Antagonists (typically arm(s)/hand(s))
Agonist that resists pressure but yields down to some smaller compass where it blocks further pressure
and hence that one can squeeze: a teddy bear, a tube of toothpaste, or a rubber ball,
but not: a piece of string / sheet of paper; juice, cooked cereal, sugar; a table / the corner of a building

5 The elements assembled into whole schemas

a whole spatial schema expressed by a closed-class form is largely composed of a selection of particular basic elements in a certain arrangement.

5.1 Example: the elements arranged to make up the schema for English *past* as in: The ball sailed past my head at exactly 3 PM.

(the category of an element is named in brackets)
there are 2 basic scene components—a Figure and a Ground
[scene segmentation]
the Figure is schematizable as a 0 dimensional point
[dimensionality]
the motive state of this Figure point is moving, hence it forms a 1 dimensional line, its "path"
[motive state] [dimensionality]
the Ground is schematizable as a 0 dimensional point
[dimensionality]
there is a point P that is at a proximal remove from the Ground point, defining a line with it
[degree of remove] [state of boundedness]
this line is parallel with the earth-based horizontal
[relative orientation] [scene segmentation (for secondary Reference Object)]

the Figure's path is perpendicular to this line
[relative orientation]
the Figure's path is parallel to the earth-based horizontal
[relative orientation] [scene segmentation (for secondary Reference Object)]
if the Ground has front, back, and side parts, point P is proximal to the side part
[intrinsic parts] [degree of remove]
a nonboundary point of the Figure's path becomes coincident with P at a certain point of time
[state of boundedness] [degree of remove] [coordination of space and time]

5.2 Constraints on the combinations of elements into schemas
largely not yet understood. Note:

5.2.1 No apparent principle based on geometric simplicity/regularity governs legality of combinations
some seemingly Byzantine combinations are frequent, as in the *across* and *past* schemas
but most don't occur, e.g., down into a surround that is radially proximal to a center point
as if in: "*I poured water apit my house." to mean—
I poured water down into a nearby hole dug in the field around my house

5.2.2 Some combinations are rare/absent in spoken languages
but largely present in American Sign Language, and probably also in visual parsing

see e.g., below under the English vs. ASL representation of rotation

6 General properties and processes applying to whole spatial schemas
plasticity—schemas accept processes that extend / deform them

6.1 Processes that extend schemas

6.1.1 Topological neutralities
schemas exhibit certain topological or topology-like properties:
magnitude-neutrality—

The ant crawled across my palm. / the bus drove across the country.
shape-neutrality—
I zigzagged / circled through the woods. I swam in a zigzag path across the irregularly shaped lake.

6.1.2 Bulk neutrality
the bulk of objects is conceptually reduced to particular schematic element types:
the Figure and Ground objects reduced to 0 dimensional points—
The ball sailed past the balloon. / The asteroid sailed past the earth.
the Ground object reduced to a 1 dimensional line—
The caterpillar crawled up along the filament / the flagpole / the tree trunk.

6.1.3 Extendability in ungoverned dimensions
a Figure or Ground of dimensionality N in the basic form of a schema
can generally be raised in dimensionality to form a line, plane, or volume
aligned in a way not conflicting with the schema's other requirements

e.g., *out* (in its radial sense) basically refers to a point Figure
moving along a radius away from a center point through a continuum of concentric circles

the Figure = a point (basic)
The boat sailed further and further out from the island
this point is extended along a radius
The caravan of boats sailed further and further out from the island
or the point is extended along a concentric circle
A circular ripple spread out from where the pebble fell into the water
this circle is extended to fill in the interior plane
The oil spread out over the water from where it spilled.
or the circle is extended in the vertical dimension to form a cylinder
A ring of fire spread out as an advancing wall of flames
or the circle is extended to form a spherical shell
The balloon I was blowing into slowly puffed out.
this spherical shell is extended to fill in the interior volume
The leavened dough slowly puffed out.

6.1.4 Extendability across motive states
a schema basic for one motive state and Figure geometry can in general be systematically extended to another motive state and Figure geometry

e.g., the most basic *across* schema is probably for a moving point Figure, as in:
The gopher ran across the road.
the line path formed by the moving point Figure models a related schema with stationary linear Figure
The board lay across the road.
as well as one with a fictively moving linear Figure
The cable extended across the road.
(all the constraints first seen for the stationary linear Figure of static *across*
carry over from the same constraints on the line path of the moving point Figure)

6.2 Processes that deform schemas
a schema may have a basic form that it can then deviate from

6.2.1 Deviation by stretching (up to a certain degree)
just about okay: I swam across the pool.—along the longer axis of an oblong pool

6.2.2 Deviation by cancellation of one or more schema elements
The shopping cart rolled across the boulevard and was hit by an oncoming car. The tumbleweed rolled across the prairie for an hour.

Part II: Spatial Structuring in Signed Language

aviso: I here approach signed language from the perspective of spoken language
—it is not at this point an area of my expertise
For their help with my questions on sign language, my thanks to—
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7 Introduction

7.1 What to compare between spoken and sign languages

ultimately, comparison must be made between
- the full whole system and associated subsystems of spoken language and those of signed language

candidate division into subsystems for spoken language:
- open-class (lexical) forms—overall representing conceptual content
- closed-class (grammatical and syntactic) forms—overall representing conceptual structure
- "vocal dynamics" (e.g., pitch, loudness, rate, timbre, distinctness, unit separation)
- associated "somatic subsystem" (e.g., facial expressions, "body language", gestures)

candidate division into subsystems for signed language:
- lexical forms (noun, verb, adjective signs)
- modulations of ("inflections" on) lexical forms (e.g., for person, aspect)
- size and shape specifiers (SASS's)
- classifier constructions
- gesture (along a gradient of incorporation into all the above)
- face-head-torso representations
- "bodily dynamics" (e.g., amplitude, rate, distinctness, unit separation)
- associated (overlaid) "somatic subsystem" (e.g., further facial expression, "body language")

7.2 The classifier subsystem of sign language

apparently all signed languages have a subsystem of "classifier constructions" dedicated solely to
- the schematic structural representation of objects moving / located with respect to each other in space

7.3 Optimal initial comparison

for the representation of spatial structure, optimal initial comparison is between:
- that subpart of the spoken-language CC subsystem pertaining to space and
- the signed-language classifier subsystem

analogous across the two domains:

a. both are schematic and represent structure (in a structure/content distinction)

cf. English OCs *enter / entry* vs. CC *into* and ASL lexical signs for 'enter / entry' vs. representations for 'into' in classifier expression

b. both structurally schematize objects moving / located with respect to each other in space

c. in both, schematic representations can optionally be elaborated by "outside" lexical forms e.g., English: I drove it (—the motorcycle—) in (to the cave) and ASL: (C-A-V-E) enclosure (MOTORCYCLE) vehicle-move-into-enclosure

7.4 The basic finding

more than spoken language, sign language parallels the apparent structural characteristics

of scene parsing in visual perception.

in 2 venues: in the inventory of basic elements and categories / in the expression

· first venue: in the inventory

8 **Larger inventory of basic elements and categories**

sign has more total elements, more categories, and generally more elements per category

which seem to parallel elements / categories abstracted out in visual scene parsing

8.1 Comparable category membership in signed as in spoken language

basic scene components: 3 members—Figure, Ground, Secondary Reference Object

dimensionality: 4 members—0 (point), 1 (line), 2 (plane), 3 (volume)

state of boundedness: 2 main members—bounded, unbounded (also: bounded at one end/side)

8.2 Slightly greater category membership in signed than in spoken language

motive state: 3 members- moving, simple stationary, remaining fixedly in place

NB: spoken languages typically distinguish the last 2 in their verb-like forms, not in their preposition-like forms

8.3 Moderately greater category membership in signed than in spoken language

NB: the membership of these categories is probably gradient, but without the capacity to represent many fine distinctions clearly

degree of remove: apparently more than spoken language's 4 or 5 members
(with contact: coincident, adjacent; without contact: proximal, medial, distal)

path length: apparently more than spoken language's 2 members (short, long)

relative orientation: apparently more than spoken language's 2 or 3 (parallel, perpendicular, oblique)

8.4 Much greater category membership in signed than in spoken language

path contour: indefinitely many more than spoken language's probable 4
[straight (*across the field*), curved (*over a hill*),
circular (*around the Maypole*), meander (*all about the city*)]

locus within referent space: apparently many more than spoken language's 3 (here, there, yonder)

8.5 Categories present in signed, absent in spoken language

relative lengths of Figure's path before and after encounter with the Ground: ? members

pattern of distribution: ? members
e.g., for multiple linear Figure objects dispersed over a planar surface (e.g., dry spaghetti over table):
arrayed in parallel alignment, crisscrossing, in a jumble

8.6 Gradient type of membership present in signed, minimal in spoken language

in addition to discrete "elements" that are the "members" of a category,
some sign-language categories include a continuous gradient membership

as for magnitude, rate, contour
vs. spoken language: minimally present, as in English: It's waay / waaaay / waaaaaay over there.

8.7 Closer look: more elements / categories in the semantic domain of rotation

1 spoken-language category: orientation of spin axis: 2 members—horizontal, vertical
e.g., English *over* (fall/topple over) vs. *around* (turn/spin around)

ASL largely distinguishes in addition the following categories and their members:

a. amount of rotation
turning less than vs. exactly vs. more than vs. several times one full circuit

b. relation of spin axis to object's geometry
at center: perpendicular disk (CD disk) vs. perpendicular line (propeller)
vs. aligned cylinder (pencil spinning on point)
at boundary: line ("hammer" swung in hammer toss) vs. transverse plane (swinging gate)
vs. parallel plane (swung cape)
at an external point: a point (earth about the sun) vs. a circle (spinning hoop)

c. uniformity of rotation?
uniformly through object (spinning rope) vs. differentially through object (twisting rope)

· second venue: in the expression

9 Iconic representation in the expression

spatial representation in signed classifier expressions
is iconic with scene parsing in visual perception in several ways:

9.1 Iconic clustering of categories

in one's perception of a motion scene, e.g., a car driving bumpily along a curve past a tree,
it is the same single Figure entity that:
has object properties as a Figure
moves
has a manner of motion
describes a path of a particular contour
relates to other surrounding objects (Ground) in its path of motion
perceived as separate: a Ground object (and an Agent / prior cause)

ASL (for one sign language) closely matches this perceptual pattern of clustering
dominant hand shows all 5 of the above Figure-related factors:
Figure type, motion, manner, path contour, relation to Ground object
nondominant hand shows the Ground object type

all spoken languages diverge from this visual fidelity to a greater or lesser degree
e.g., one English counterpart: The car bumped along past the tree.; its clusters:
a. subject NP (*the car*): Figure
b. verb (*bumped*): motion + manner
satellite (*along*): translational path
c. preposition (*past*): path in relation to Ground
object NP (*the tree*): Ground

oddity: although the Figure is what executes a path and its relation to a Ground,
and is so represented in ASL, many spoken languages represent this in an adposition with the Ground NP
—there is almost never some adposition-like path indicator with the Figure NP
exception: preposition with a demoted Figure indicates underlying TO vs. FROM Vector:
The fuel tank slowly filled with gas./ drained of its gas.

9.2 Iconic Representation of object vs. action
in signed languages, virtually always?:
Figure: represented by hand shape; Path: represented by hand movement

but one can conceive an alternative setup, apparently never realized:
Path: represented by hand shape—e.g.,
a fist = stationary
fingers flat together = a straight path
fingers together in curved plane = a curved path
fingers alternately forward and back = zigzag path
Figure: represented by hand movement,—e.g.,
hand moves straight =straight Figure
hand moves in circle = round Figure

NB: SASSes do permit the hands to trace out an object's contours (=fictive motion)
e.g., representing a bucket or long pipe
but the hands cannot at the same time assume a shape representing the object's path

the mapping in sign language is visually iconic: it assigns the representation o
the material object in a scene to the material object in a classifier complex, the hand
the movements of that object in the scene to the movements of the hand.

No such iconic correspondence is found in spoken language:
material objects prototypically represented in English noun but in Atsugewi verb
path prototypically represented in English satellite/preposition but in Spanish verb

9.3 Iconic representation of further particular categories

many of the categories listed below in section 11.1 are iconic with visual parsing, e.g., an object's:

form is often represented by the form of the hand(s)
size by the compass of the hand(s)
number by the number of digits / hands extended
motive state / path contour / path length / manner of motion / rate of motion by analogs in the hand(s)

by contrast, spatial iconicity is minimal in spoken language:
path length by vowel length: It's waay / waaaay up there.
path length by quantity of iteration: The bird flew up / up up / up up up and away.
perhaps some number by some closed-class reduplication

9.4 Iconic representation of the temporal progression of a trajectory

e.g., for the Figure's path in signing "The car drove past the tree":
the Figure hand progresses from the nearer side of the Ground hand, to beside it, to its farther side

by contrast, the preposition *past* in the corresponding English sentence exhibits no such progression

10 **A narrow time-space aperture represented in the expression**
tentative principle: a classifier complex readily represents—
what appears within a narrow scope of space and time if one were to zoom in
with one's scope of perception around a Figure object
hence, readily represented are:
Figure and its type/shape
immediately adjacent manipulator or instrument
current state of motion (motion / locatedness)
current manner
path contour / direction
thus, ASL and English can both represent within a single clause:
I pinched moss up off the rock. / I pulled the pitcher along the counter (adjacent manipulator)
I scooped jelly beans up into the bag. (adjacent instrument)
The cork bobbed past the seaweed. (concurrent manner)
but temporally nonlocal factors are little represented in ASL, though still fine in English:
I kicked the football over the goalpost. (kick = prior cause: first I kick, then ball moves off)
They locked the prisoner into his cell. (lock = subsequent event: first he goes in, then they lock)
and spatially nonlocal factors are little represented in ASL, though still fine in English:
I walked/ ran / drove / flew the memo to the home office. (concurrent external agentive causation)
The house burned down to the ground. (concurrent external instrumental causation)

signed language here is closer to visual perception in its temporal narrowness problems, though, with the spatial narrowness proposal:
a. vision includes not only focused perception but also wide-scoped perception
b. signed language does permit representation of non-adjacent Ground within same clause

311 More independent distinctions representable in the expression

11.1 Greatly more elements / categories representable within a single expression

in a single spoken language clause, CCs can separately represent some 6 spatial categories at most

e.g., English: The bat flew way back up into its cavern niche.

path length: 0 / way / right
state of return: 0 / back
earth-field displacement: 0 / up / down / over
path conformation: in(to) / across / past /...

but in ASL, by one provisional count, some 30 categories can be represented separately and independently

—with cooccurrence restrictions and different obligatoriness / optionality—

but still very many together in the same classifier expression

perhaps closer to the granularity of visual parsing

a distinct category is here posited for any group of mutually exclusive elements; this entails:

a. joining together what some sign language analyses treat as separate factors

e.g., Figure, instrument, and manipulator, since these apparently cannot be separately represented

b. making distinctions within some categories that spoken languages treat as uniform

e.g., divertive vs. dynamic Manner

a question mark follows any proposed category or member of a category for which I have not yet gotten enough evidence one way or another

A. entity properties

1. identity of Figure / instrument / manipulator

only one sign represents choices for all of a, b, and c, at once

a. entity type: Figure / instrument / manipulator
b. entity property indicated: semantic category membership / physical form
c. granularity: coarser to finer

examples for above 3 subtypes:

a. minimal pair—Figure: 'a flat plane', flat hand, thumb slightly apart
   manipulator: 'hand holding flat plane Figure', flat hand, opposed thumb pressed against fingers
b. category-based for Figure: 'vehicle' / 'animal' / 'rifle'
   shape-based for Figure: 'flat plane (e.g., flat piece of paper)', flat hand 'cylinder (e.g., paper rolled into tube)', fingers together curved to meet opposing curved thumb
   'V shape (e.g., half-folded greeting card)', 2 flat hands in V touching at pinkies
c. a person can be represented as a point / a line / a 2–legged form / a 2–footed form

2. identity of Ground

3. magnitude of some major entity dimension
   e.g., 'pizzalike shape' can be shown as 'small' / 'medium' / 'large' by degree of separation of 2 hands

4. magnitude of a transverse dimension
   e.g., any of the preceding pizzalike shapes, made only with thumb and index finger, can show depth by adding a second finger or remaining 3 fingers (as for bowl)

5. number of entities
   e.g., 1, 2, 3, etc. raised fingers can be used to represent 1, 2, 3, etc. people arriving
   e.g., the use of one or both hands in certain manipulator handshapes can iconically represent the use of one or both hands in the referent action

B. orientation properties
   the angle at which an entity is rotated relative to a canonical position

6. an entity's rotatedness about its left-right axis ("pitch")

7. an entity's rotatedness about its front-back axis ("roll")

8. a. an entity's rotatedness about its top-bottom axis ("yaw")
   b. an entity's rotatedness relative to its path of forward motion

e.g., for b: the vehicle classifier moving forward with its "front" leading / trailing / to one side to represent, say, a car moving forwards / backwards / sideways

C. locus properties

9. locus within sign space
apparently an entity can be located, or its translational path can be begun and ended,
at a choice of points within sign space
that represent locational properties of the space in reference

D. Motion properties

10. motive state: moving / resting / fixed

11. internal motion
certain of the elements making up a Figure or manipulator move relative to each other
—e.g., dilation (expansion / contraction), change of form, twisting, wriggling, internal swirl

example of change of form:
'a sheet of paper that one holds curved into a tube, places on a surface, and releases
that now opens out flat'
dominant hand with palm down, fingers together curved to meet opposing curved thumb
moves onto back of nondominant hand;
fingers and thumb spread out flat and settle gently back down onto back of hand

12. confined motion
Figure or manipulator moves as intact whole within confined region without overall change of location
—e.g., straight oscillation, rotary oscillation, rotation, local wander
NB: rotation = change in orientation (earlier category)

examples of rotation (here combined with translational motion):
motorcycle taking a spill; picking up book lying on table and standing it on shelf

13. translational motion
    Figure or manipulator moves as intact whole through space with overall change of location

NB: all 3 motion types can co-occur. thus, one can show a sheet of paper opening out flat from a tube shape, turning rightward, and moving forward in the process

E. Path properties
   —perhaps pertain mostly to translational motion

14. state of continuity: unbroken / saltatory
    e.g., 2 flat hands held in a single plane, fingertips joined, palms facing signer:
    (a) moved in steady straight path away from one can represent a wall moved progressively outward
    (b) moved in quick up-down arc to a point further away from one can represent a wall relocated to a further spot, whatever its path from the starting location

15. contour of path

16. state of boundedness: unbounded / bounded at start / bounded at stop / bounded at both ends

e.g., as realized for a circular path contour:
1 type of bounded at both ends: whole single arc = one complete revolution
1 type of unbounded: numerous revolutions

17. length of path

18. vertical height

19. horizontal distance from signer

20. left-right positioning

21. up-down angle ("elevation")
e.g., straight path can move sloping upward or downward at some angle
circular path could describe a horizontal or vertical circle

22. left-right angle ("direction")

23. transitions between motion and stationariness
e.g., apparently at least all of the following can be represented distinctly from each other: a Figure's—
stopping normally
slowing to a stop
abrupt stop, as from impact
e.g., showing a pizza that's thrown upward hitting the ceiling
becoming deposited at a point of support
e.g., placing a rifle up onto a rack
being given into someone's grasp
e.g., handing a rifle over to someone

F. Manner properties

24. divertive manner
a movement the Figure makes during and in addition to a forward path motion

probably most of what we think of as manner of motion is simply confined motion
—sometimes internal motion—accompanying translational motion
if so, this category reduces to categories 11 and 12 above

e.g., dominant "vehicle" hand moves forward atop other hand held flat, palm up
to show motorcycle driving along road
adding up-down straight oscillation: bumpy ride on irregular road
adding front-back rotary oscillation: driving along with one flat tire

25. dynamic manner: the dynamics with which a Path is manifested

speed: how many and what kinds of distinctions?

can additional dynamic manners be represented, perhaps concurrently?—e.g.,:
intensity: easygoing / with pent-up energy
Agent's attitude: uncertain / bold
Agent's volitionality: intentional / accidental

G. relations of Figure or Path to Ground

26. path's conformation relative to Ground
—e.g., past it, above it, into it

27. relative lengths of path before and after encounter with Ground
—e.g., for a Figure moving past a Ground, can show long approach with short post-path
vs. the opposite

28. Figure's path relative to the path of a moving Ground
usually Ground object is stationary; but can also show Ground moving along a path
e.g., for Figure pursuing / catching up with / passing it

29. Figure's proximity to Ground
e.g., for Figure passing Ground: brushing past it / passing at usual distance / at greater remove
e.g., for Figure arriving at Ground: touching it / near it / at greater remove from it

30. Figure's orientation relative to Ground
e.g., for front-back type Figure near a Ground: with front / side / rear toward the Ground

11.2 Elements independently variable in the expression—not in pre-packaged schemas

the preceding stressed the sheer number of separate categories representable together in a single expression
corollary stressed here: the independent variability of the categories; one can largely:
a. select a category for inclusion independently of other categories
b. select a member element within each category independently of other selections
—apart from cooccurrence / obligatoriness constraints

e.g., a classifier expression can separately include and independently vary a path's
contour, length, vertical angle, horizontal angle, speed, divertive manner, relation to Ground object.

but in spoken language, each schema represented by a closed-class spatial morpheme is "pre-packaged",
bundling together a particular selection of elements within a selection of categories

The lexicon of each spoken language affords a certain number of such pre-packaged schemas,
a speaker must largely choose from among these to represent a scene, even where the fit is not exact.
the system of plastic extensions and deformations of the set of basic schemas in the lexicon
may exist to compensate for the pre-packaging and closed stock of the schemas

classifier expressions' apparent large-scale lack of pre-packaging, a fixed set of discrete basic schemas,
and a system for extending or deforming the basic schemas
may be more akin to visual parsing

Part III: Cognitive implications of spoken / signed language differences

12 The two language modalities' likeness and difference—a neural model

12.1 Where spoken and signed language are alike

with respect to the spoken closed-class subsystem and the signed classifier subsystem, both—

—represent multifarious subtly distinct complexes of objects moving/located with respect to each other in space
—represent such spatial complexes schematically and structurally.
—have basic elements that in combination make up the structural schematizations.
—group their basic elements within categories that themselves represent categories of spatial structure.
—have conditions on the combination of basic elements and categories into a full structural schematization.
—permit semantic amplification of elements or parts of a schema by open-class/lexical forms outside the schema.
—allow alternative conceptualizations of a spatial scene for alternative schematizations

12.2 Where spoken and signed language differ

there is no one-to-one match of subsystems across the two language modalities

the representation of spatial structure in signed language seems generally closer to visual parsing in particular, the signed language classifier subsystem—

—has more basic elements, categories, and elements per category

—has much more gradient representation in addition to discrete representation

—has an iconic clustering of categories in the expression

—has an Iconic Representation of object vs. action and of other categories in the expression

—represents only a narrow time-space aperture in the expression

—can represent many more categories and category elements together within the expression

—can select categories and category elements independently for representation in the expression

—avoids pre-packaged category-element combinations and processes for their extension / deformation

12.3 Alternative to Chomsky-Fodor model of some distinct whole-language module

both spoken and signed language are based on some more limited core linguistic system

that then connects with different further subsystems for the full functioning of the 2 language modalities.

this core linguistic system might include the spoken-signed commonalities of section 12.1 thus, it might include systems for—

—using individual unit concepts as the basis for representing broader conceptual content

—grouping individual concepts into categories

—associating individual concepts with overt physical representations, whether vocal or manual

—combining individual concepts—and their physical representations—under certain constraints to represent a conceptual complex

—establishing a subset of individual concepts as basic and schematic concepts that, in combinations, represent conceptual structure

in representing at least spatial structure, this linguistic core might then further connect
with 2 different further systems that yield the signed-spoken language differences of section 12.2

a. for signed language: with aspects of the visual system that govern scene-structure parsing
b. for spoken language: with a putative subsystem that—
—packages disparate elements into stable schema-like complexes
—affords processes for extending or deforming such complexes

(such a subsystem speculatively might also serve for acquired motor patterns)

this seems consonant with neuroscientific findings: relatively smaller neural assemblies
link up in larger combinations in the subservance of any particular cognitive function

In turn, the proposed core language system might itself be found to consist of
an association and interaction of still smaller units of neural organization,

many of which might in turn participate in subserving more than just language functions.

LECTURE 4

Fictive Motion in Language and 'Ception'

So we are continuing today's theme of spatial structure in language, and how language structures spatial conception, which is again part of one of the major schematic systems in configurational structure. But in this case, it is ultimately about this enormous, extensive, glamorous system that language has for representing non-veridical things, things that don't really happen. For the moment you can think of them as a form of metaphor, but that can be debated. In particular, the main type will be using motion to represent non-motion, to represent stationary stuff.

To start off with some linguistic examples, just to illustrate how this system works: *This fence goes from the plateau down into the valley.* Here is a plateau. Here is a valley. Here's the fence statically on the lines, standing there. But instead of referring to the fence as stationary, which is the way we know that it is, the language actually uses words that basically refer to motion. The fence *goes*, it's a motion verb, *from* the plateau *down into* the valley. It's an example of fictive motion. *The cliff wall faces towards the valley/away from the valley.* Here is a cliff wall, like big rock promontory, and here's some high land and here's a valley, and you can say that *The cliff wall faces toward the valley*, or if we go up here, *The cliff wall faces away from the valley*, as if there is something coming out of the cliff wall that's projecting, that we can describe linguistically as if there were actual motion there.

We are using motion prepositions like *towards, away from, into*, and so forth. As is known, nothing is moving. *I looked out past the steeple*, (a steeple is a church tower), *I looked out past the steeple* means my line of sight can be imagined, going this way out past the steeple. Again nothing is moving, but it's phrased as if it were. *The vacuum cleaner is down around behind the clothes-hamper*, this is perfect English, but it must be hard for any other language. Here is a clothes-hamper where we put our clothes. Here is the vacuum cleaner, and

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it means that the vacuum cleaner is down around behind the clothes-hamper. It tells you where it is. *The scenery rushed past us*. We are driving along and you can see the scenery rush past us. The scenery is stationary. These are all examples of fictive motion. We will be going over them systematically according to types. In addition to what languages are doing here, there are parallels in visual perception with the other mechanisms of perception.

One of the mainstays of my approach is to see what language does structurally, either similar to or different from what other cognitive systems do. In fact, the seventh topic is about that. It is called the overlapping systems model of cognitive organization, and it tries to look at different cognitive systems for how they're structured. This is what linguistic structure is like, and you can compare it to the structure in visual perception, in motor control, in aspect framing. It seems that the systems overlap. I talked with perception psychologists, and one thing I did while looking at this topic was keep an eye out for possible parallels or disparallels on the grounds that there might be something more basic. There might be cognition, of which the linguistic phenomenon is just one reflection, so that's taking the broader stance. There are different kinds of visual parallels, some of which have been worked on extensively in psychology, some of which have been proposed to be worked on.

For example, there are such things as a traditional apparent motion in psychology, which is otherwise known as the Marquee effect, where you see a row of lights, and the lights go on one after another, and in effect you see a line of motion of lights going along. That's called the apparent-motion effect. There's an induced motion effect, where in a dark room you see a white frame and a rod. You can tilt the frame, some people see the light tilted. That's called induced motion. In either case there is some motion, but you misperceive what is the thing that's moving. There is also Michael Rason's theory of perception. If you see a curved line, you will experience it in terms of a smooth line that doesn't have protuberances or indentations.

The idea is that there may be parallels in visual perception that are displaced motion, or involve perception of motion taking place. I'll be looking, in this taxonomy, in this analysis, for the parallel events taking place with regards to other systems.

First let me give some kind of introduction. Let me say what I think general fictivity is all about. It's not just motion in general process; these kinds of fictivity all take place within the psyche of the single individual. It's a phenomenon happening inside the single individual. It seems that what underlies it, in both visual cases and linguistic cases, are two distinct cognitive sub-systems, each of which bears a representation of the same thing. So there are two different

kinds of representations. They can be felt to be in conflict or they can be felt to be complementary, but they are distinct representations of what is otherwise the same thing/event.

In addition, there's a third part which assesses these two. It assesses that one of the representations is more veridical, that is, true or faithful to reality, and the other one is less veridical. So that's the cognitive set kind of patterns, those at work whenever you have a fictive effect.

The way you work this out in language is a 'factive' approach. The representation which is treated as more veridical I call 'factive', from the word *fact*, and the one which is assessed as less veridical, I call it 'fictive'. I chose the word 'fictive', instead of, let's say, 'fictitious', because fictitious means something like non-existence. I want to avoid any issues in philosophy about actual claims of something beyond, where there is nothing there. I want to reserve the whole realm of this course to cognitive experience and cognitive processing, with reference to some actuality. That's why I appeal to the third cognitive system that assesses this one as factive and this one as fictive. In a sentence like *The fence goes from the plateau down into the valley*, the fact about it is nothing linguistic, it's on the contrary some part of your cognition which has general knowledge about fences and the real world, and knows the fact that fences are stationary. However, what is feeding the fictive portion of cognition in this case is the actual words used in the sentence like *go*, and *from*, and *into*, and *down*, etc. These are all basic motion specifying words.

So we've got two distinct representations, and some other part of your mind assesses one of them as fictive, namely the literal meaning of the word, and something else as factive based on your basic world understanding of fact. Something comparable but different might be taking place in the realm of visual perception, although, I'd like to see it in a parallel way. Let's say that you see a Pac-Man shape, factively you see this kind of shape, statically; fictively you might sense a kind of history as if there were once a full circle and later, from that circle, a pie wedge shaped portion was removed, leaving the resulting shape. Some portion of your perception might sense that kind of sequence of events.

In fact, as technical term, I use the distinction between the word *see* and the word *sense*. Seeing is the palpable, tangible, concrete figure that you see, which the Pac-Man shape is. Some third portion of your cognition assesses that as more veridical, and some other part of your cognition, at the same time, has a different representation for the same thing, one which is sequential in character. The first was a circle and then a pie wedge was removed, and this is sensed at a less palpable, less tangible, more abstract level. That's what I'd say that the third part of you would assess as less veridical. Therefore, I use the word *factive*

for this, and *fictive* for that, in order to use the same terminology for the same two circumstances.

In general, fictivity is a quite general phenomenon. The one that I'll mainly demonstrate today is what I would call *fictive motion*, so that something which factively is assessed as stationery is nevertheless somehow represented, either in some visual sensing manner or literal wording of a sentence, as moving. That's fictive motion. But we can fictivate almost everything. You can fictivate stationariness where, for example, the wording suggests stationariness, but in fact the actual stuff is moving. You can have fictive change, fictive stasis, fictive causes. There're all kinds of fictive phenomena going on. But this time I'll mainly do fictive motion.

Regarding fictive motion, you can ask the question 'What is universal about fictive motion and what is language-specific about it?' What we find if we look around at the various languages is that not every language will have fictive motion in the same place. For example, where English can say *The sun shone into the cave*, with fictive motion, Spanish would not be able to say that. They would say something factively, something like *The sun illuminated the cave*, or *illuminated the interior of the cave*, a non-fictive representation.

So not every language has fictivity in the same places, but probably every language has some forms of fictivity, of fictive motion. What's universal is that when it has fictive motion, it's always in the same direction. It'll be common across languages how the fictive motion is represented as taking place. That's the universality, and I would propose a principle that governs and determines what this direction of the fictive motion is.

Then there is the phenomenology of it, what is actually experienced, and individuals seem to differ. Also the examples seem to differ. They range from the merest sense of some directiveness, to a compelling sense that something must be moving. I mean all these fictive motion examples range that way. Different individuals differ in how strongly they feel it, examples differ in how strongly they seem to induce this feeling. Also phenomenologically, there seem to be differences as to what is felt, in fact, to move. If you say *The fence went from the plateau down into the valley*, the language literally has the fence as moving, but you don't have to necessarily think the fence is moving away. You might think of your focus of attention as moving along the fence or something else, like some motorcycle moving along side the fence along the earth. You might abstract the directiveness inherent in the fence, or abstract the sense of motion. Fictive motion is represented as moving taking place, that's the universality thing. I will propose a principal that governs it in terms of what this direction of motion is. Then there's the issue of the phenomenology of it, what

is actually experienced, as individuals seem to differ and also the examples seem to differ. They range from the merest sense of some directiveness, to a compelling sense that something must be moving. All these fictive motion examples range in that way, different individuals differ in how strongly they feel it, and the examples differ in how strongly they seem to induce this feeling. Also phenomenologically, there seem to be differences as to what is felt to, in fact, move. In saying *The fence went from the plateau down into the valley*, the language literally has the fence as moving, but you don't have to think that the fence is moving away. You might think of your focus of attention as moving along the fence or something else, a motorcycle moving along side the fence, some abstracted directiveness, some abstract feeling of motion. It's not clear what is moving, but something is moving, that's the phenomenon.

There are many categories of fictive motion. In the past, fictive motion was recognized, not in that term, but for a long time we were familiar with things like saying *This road runs from Chicago to New York*. In fact this is one of the types; it is called the co-extension path. But since it is the most familiar type, I put it last. We'll go to other types which are, for the most part, unrecognized.

I call the first type *emanation*. It's the emanation category of fictive motion. Emanation means the fictive motion is depicted as if something is emerging from one object, moves on a straight line through space, and impinges on a distal object. That's basically the emanation type. There are a number of subdivisions. One of the subdivisions I call orientation path. For this, the first object has to have a front, and so this fictive line emanates from the front. There are two kinds of fronts: a point front and a planar front.

With the point front, for example, you have sentences like *The arrow points in towards the city*, or *into the city*, or *points past the city*. You have a sign post with an arrow on it, and the arrow is not moving, the city is not moving, nevertheless English uses words like *towards, past, away from*, not *around* I guess, this has got to be a straight line. The idea seems to be that the arrow has a front, in fact it points to the front, and it's as if some kind of fictive motion that you can't see moves through space in a straight line, and in fact it's coaxial with the shaft of the arrow. It's coaxial with it and it's as if it moves along the path that the preposition tells you. So if the preposition says *towards*, then it moves towards the city. If it's *past*, then it moves past the city. So that's one kind of fictive motion. This is called the orientation type.

Another has a face-type or planar front, like here is the cliff wall, and you can say *The cliff wall faces towards the valley*, again as if the plane is a face, and some kind of intangible line emanates from the perpendicular of the face, and

its path is indicated by a preposition. So it goes into the valley's front. *The cliff wall faces towards the valley, past the valley*, and so forth. That's the orientation path type.

The next type is a radiation path. It's also an emanation type, and it's also the notion of some kind of radiation emanating from some source object and moving in a straight line and impinging on some distal object. As an example, a good sentence is *Light shone from the sun into the cave*. Here is the sun, here is light coming from the sun moving into the cave. It expresses it exactly that way, so *Light shone from the sun into the cave* or *onto the back wall of the cave*. Everything in the sentence involves motion, except the cave wall, from X into X, These are basically motion prepositions. Now what is interesting about this—this is one of the compelling ones by the way—is you can't convince anybody that perhaps nothing is moving from the sun into the cave. Now it's true we have scientists that announce that photons are in fact moving from the sun to the cave. But nobody ever saw photons before. So if our languages are saying something like, *shone from the sun into the cave*, it's not because we know about photons. It's got to be for some other cognitive reason that that direction is picked. It's a very compelling direction, and the point is, it does not have to be that way. If you have something intangible, you can't see any actual motion. Something if intangible can move from point A to point B, something complementary and intangible could be conceptualized as moving from B to A. You could imagine a scenario in which what the sun does is suck energy, attract energy, so say here is the sun, here is my hand, and then here is a clear straight path between the sun and my hand. The sun attracts the energy out of my hand; when the energy leaves it, my hand glows, and when the energy hits the sun, the sun glows, and in fact, it's attracting energy from a lot of different things, so the sun glows lots. There is nothing to fault that conceptualization. However, no language has it. No language would ever say *The light shone from my hand onto the sun*. It doesn't exist. *The light shone from the sun to my hand*, fine, but not the other way.

Similarly you don't get the light emanating from some point in between us. No language would say something like **The light shone onto the sun and my hand from a point between us*. It doesn't exist. Part of the original conceptualization is that the radiation is moving. So no language represents the fact as if it were. You never have something like **The light hung between the sun and my hand*, as if it were depicted as stationary. All these possibilities do not exist. Only one out of the whole range of conceptualizations is ever allowed. In a little bit, I will offer a principle that explains why this is the case. It accounts for it. So that's an example of radiation paths, still a subtype of emanation.

A third type of emanation I call shadow paths. This is where for example, you have a pole and a wall, let's say, and we get the shadow of the pole on the wall. The way you typically can say these things is *The shadow of the pole fell on the wall*. Or *The pole cast its shadow against the wall,* or *threw its shadow on the wall*, or *threw its shadow down into the valley*. The shadow moves, goes everywhere, but with fictive motion, when in fact in this sort of situation nothing is moving. It is factively stationary, but fictively, in the way it's described linguistically, the shadow is moving. In particular, it's always moving from the physical object to the silhouette. You never have a sentence like **The shadow jumped from the wall on to the pole*, it's always this way. The same principle governs why this is. The reason that shadow paths is important is because, while somebody might argue that with radiation path there really are photons, and they are really moving in the way that they are depicted, no physicist claims that there exist particles called shadow lines which in fact move from the pole to the shadow. So it's a good antidote to that claim for radiation paths.

A fourth type of emanation path is a sensory path, and this exists from the sensory organs. First let me consider the case where it is not agentive. In the sensory path , two objects can be named: the experiencer and the experienced object. This will be the proximal object, and this is the distal object. As long as the experiencer is not acting agentively, it turns out that at least English permits the fictive motion to go in either direction. This is the first time we've seen the possibility that it could be expressed in either direction. For example, you can say *I can hear him all the way from where he's standing*, so from him to me. Or *I can hear him all the way from where I'm standing*, from me to him. The same with *smell*. *I can smell him all the way from where he's standing* or *I can smell him all the way from where I'm standing*. I name these two directions in different ways. They seem to evoke different conceptualizations. The first is as if the experiencer, who's a person, emits a probe that goes along so that it encounters and senses some experienced object. That's the first conceptualization. The second one is that this experienced object emits the stimulus which moves along and impinges on the experiencer who then interprets it.

It also happens visually that sometimes you have to stretch a bit. The passive turns out to work better, so you can say *We can be seen by the enemy from where we're standing*. So here we are. Here's the enemy. *We can be seen by the enemy from where we are* or *We can be seen by the enemy from where they are positioned*. In all of these particular examples, I've picked the verb *see* or *hear* or *smell*, which is lexicalized to take the experiencer as subject. So *I see*, that's the experiencer. But often, given the fact that this non-agentive form of sensory path can go in both directions fictively, you often find the verbs lexicalized to take the experienced object as a subject.

For example, here is one in English, *show*. If this is wall, and here is the old wallpaper on the wall and over that we put a coat of paint, you can say that *The old wallpaper shows through the paint even to* (notice the word *to*) *a casual passer-by*. Or you can compare the *see* version, E*ven a casual passer-by can see the old wallpaper through the paint*. We have both directions again.

However, if the experiencer acts agentively in emitting the probe, then it only goes one way. It always goes from the experiencer to the experienced. In English, *see* is non-agentive, *look* is agentive (same with *hear* vs. *listen*). So *look* always goes from the experiencer out, and can be fictive, so I can say *I looked*, as in one of the English examples, *I looked out past the steeple*, or you can say *I looked into the valley*, or *past the valley* and so forth. There's some line of sight, something intangible, that's moving axially along the line of sight in the direction it shone. So you can say *looked into the valley,* or *looked past the valley* or *looked away from the valley*, and so forth. However, in this case, there is no reverse direction. You can't say **I looked out of the distant valley into my eyes*. That doesn't exist.

One more wrinkle on this is that all these things that are technically emanation, the line of sight, which I just described in terms of something intangible moving axially along it, the line of sight can actually move laterally and be so described in English words. You can say *I slowly looked towards the door*. Let's say that's the door, *I slowly look towards the door*. *Towards*, as a preposition, as in *The ball rolls towards the door*, usually involves gradually decreasing distance between the figure object and the ground object. But in this case, if you say *I slowly looked or turned towards the door*, nothing is moving closer, I'm not moving. All that is moving is my head. But it's rotating, it's not moving closer towards the door. It's not decreasing distance. The line of sight comes up directly in front of me, as I turn my head. It would move closer towards the door. It's an example of how fictive motion works for lateral motion of the line as well. You can say all the examples like, *away from the pillar, past the painting, onto the tapestry*, and so forth. English is great with this stuff.

We can also combine lateral motion with axial motion. For example, you can say *I slowly looked down into the well*, where the *down* part is the lateral motion*, into* is the axial part. You can combine these two one after the other.

A fifth kind of emanation type is communication paths, and this is the old conduit metaphor, which has been made a good deal of in the tradition of metaphor analysis. But it really acts very much like yet another type of emanation path. In this case, just as with the sensory path there was an experiencer and an experienced, in communication paths, there's a message that moves, it's sort of a probe, and there's an informer and an informee. These are the three basic elements. Again I just named the three basic elements of a emanation

path, the source, the distal object and the thing that's moving. An example is *I shouted the news down into the mineshaft to the workers below*. Here is a mine shaft, and here I am standing, bending over, cupping my mouth and shouting the news, and the prepositions are, I shouted the news *down into*, or *way down into* the mineshaft *to* the miners below. Here is the informer, here is the informee, and this is the message.

There are lots of sentences like that. *She whispered the answer to him*, or *She whispered the answer into his ear, He smiled his assent to them*, and so forth. There is a rich system in English for this kind of communication path. The message has to be an intellective conceptual thing. It can't be a sensory stimulus. You can say *He told the news to her* and *She heard the news from him*. Both are fine sentences, but you can't say **He told a sneeze to her*, and **She heard a sneeze from him*. These are incorrect sentences in English. A sneeze is just a sensory entity, you can't have a phrase like **She heard a sneeze from him*, it's not allowed. To *hear something from* is the key to this communicative path idea.

In addition, there are sentences that permit one or another of these entities not to be sentient. So the informer doesn't have to be intentional or even sentient. You can say things like *The condition of the bark of the tree told me, informed me of the kind of beetle that attacked it.* So you have a communication path, coming from a source, but it's not an agentively generated source. Finally, again, the direction is fixed. It's got to be only from the informer to the informee in terms of fictive motion. You can say *He imparted the news to me*, but you can not say **I interpreted the news into him*, something like that. He imparted the news to me, the message is imparted to me. Just like in sensory path, we have the probe and stimulus that complement each other, but there is no interpretational capsule that I can send into him, in English at least. The communication path is always in one direction. This is like a final analysis that fits the old conduit metaphor stuff into the fictive motion matrix framework and particularly sets it up as an emanation path.

We've gone through five sub-types of emanation path, and it's time to see what's in common, and what we could say abstractively, that is, more theoretically. This is where I propose the principle that governs the direction something in fictive motion is going. I call it the active-determinant principle, and if one of two objects is more active and more determinative than the other one, that one would be treated as the source. The sun is brighter than my hand, that's treated as more active, so it's treated as the source of the emanation. The light comes from the sun to my hand. It's not that the sun sucks energy up from my hand.

Similarly the agent party of looking is more determinative, the agency involved in looking is more determinative in *I looked at the garbage can*. I'm more

agentive, more active than the garbage can. Therefore by the active-determinant principle whichever of the two objects is held as more active, because it's the agent, is going to be the source, and sure enough, that's what happens with *looking*, unlike *seeing*. So the source has to come from the looker.

What about the shadow paths? Well, the pole is determinative over the shadow. You can pick up a pole and move it and the shadow moves along with it. You can't pick up the shadow and get the pole to move. So the pole is determinative of the shadow-pole complex. Similarly, if it is pitch-dark or diffuse light, the shadow will disappear, but the pole will still be there. So it's the more determinative of the two. That's why it is treated as the source.

Why can it go in both directions with non-agentive sensory paths, in words like *seeing* and *showing*, and so forth? The answer would be that for a non-agentive experiencer to emit a probe, and for an experienced object to emit a stimulus, are presumably by this logic experienced as equally active, equally dynamic or equally undynamic. So neither of them wins over the other, and you are allowed to have fictive motion going in both directions.

The next question is, in the active-determinative principle, what made it be that the more active, determinative object should be a source?. I suspect that may come from a developmental phenomenon. In early development, probably in the fetal state, the individual starts sensing an experience of their own personal agency in any kind of volitional movement like moving your muscles, or kicking your legs. Typically if you want to affect something distal, away from you, (it could be anything, a baby's rattle hanging in a crib), the desire to affect it first starts in you where you are, and then is somehow has to get from where you are to it. Either you move your whole body to where it is to affect it, or you can reach out with your hand or foot or something else to affect it, or you throw something towards it or extend something else, you use an intermediary object to affect it. But in any case, it always goes from you, from the agent which is determinative and active, with this experience of self-agency, it always happens because the agent decides to make it happen. It always initiates a pattern that starts from the agent and moves out to where the distal object is. That agent-distal object pattern may be the source, the origin of the more active and determinative thing acting as source, which then gets mapped onto all these other things. That's a possibility of why it happens.

We could start looking around for parallels between this linguistic fictive emanation pattern to other cognitive systems, and it looks like we have parallels, much as in the overlapping model of language, or the overlapping system model.

Let's look at what I call folk iconography, various kinds of graphic formations that are part of folk art. For example, in cartoon books, comic books, Superman has X-ray eyes. In which direction do the X-rays move? They always

move from the eyes out onto the objects seen. You might have thought that they would come from the other direction because if you in fact get X-rays of your mouth, they come from there toward you. No, the imaging is built on what language has as the agentive *looking* pattern, in which *looking* is always from the experiencer. So Superman sends off X-ray vision.

Similarly with demonstrative paths, it's probably the model for magic coming from fingers. You often see sorcerer's movies, movies of magic, where sorcerers are dueling with each other, and laser beams come out of their fingertips. That's a pure reification of something built into language, namely, the demonstrative paths, like the arrow pointing towards the town.

Anthropology has discovered a lot of similar phenomena in various cultural traditions. Pascal Boyer is a French anthropologist who wrote a book on Ghost Physics. He studied the patterns of systems of spirits and ghosts in many different cultures, and he noticed that the ghosts have many similar physical properties, really physicalized. They obey all the laws ruling physical objects with only a couple of exceptions.

The exceptions are 1) they are invisible and 2) they pass through solid objects like walls. Except for those, they seem to behave like normal objects, for example, they only have forward causality, they don't have backward causality. You don't get any folk spirits changing things earlier in time. You have to wait for modern science fiction to get that kind of notion. But he had no explanation for why these particular exceptions, namely invisibility and passing through solid objects. Well, all we have to do is look at demonstratives path. That's what they are. If you point, if an arrow points, what emanates from this is invisible, and it passes through solid objects. In fact if you ask me to point to where downtown Beijing is, you know I will point like that. I don't point up the door, through the chamber, up the stairs, out of the front door and over there. Instead, I just go straight, because we all have this conceptualization that whatever emanates from the fingertip is invisible and can pass through all physical objects. So it originates there, it's built into language, it overlaps perhaps with visual perception, and it seems to coincide as well with the anthropological kinds of notions like ghosts. It also corresponds to the notion of evil eye, of somebody having power in the line of sight. And it's quite universal. I work, as you may know, with American Indian languages. There is an American Indian story of a fire boy who is the son of the sun, who wherever he looked, it caught on fire. So it's quite extensive and I suspect all these concepts of power emanation, the notion of mana, life force, all emanating from some object with power extending out and impinging on things, is the same emanation concept. It's a fundamental cognitive quiddity that shows up in many different domains.

That's one kind of fictive motion category: emanation. There's another one. The second one is pattern paths. In pattern paths, something does move, something has to move, but the thing that moves is not what you will see as the fictive emanation. For example, let's say, *As I painted the ceiling, drops of paint slowly spread across the floor*. When I am painting the ceiling, a drop of paint falls vertically to the floor. So the real motion, the factive motion, is the vertical downward motion of the paint drop. Another drop falls vertically and forms another spot, then the third one. Well, that's the real motion, but the fictive motion is this line of spots is seen as progressing forward across the room. To do this, you have to draw an envelope around the spots on the ground, along the line of them, so that each new spot that occurs is seen as the front of this line, extending and including it, as if the whole thing is like a fictive worm, fictively moving across the room. That's a pattern path. It depends on something actually moving in the situation. In the first type of emanation paths, nothing is moving, so you needed a theory, you needed a principle, like the active-determinative principle to account for what the fictive motion direction was going to be. Here, however, you don't need a principle, because it's the thing in the total situation that is moving which determines the direction of the fictive path. So that's a pattern path.

Next is frame relative fictive motion. In frame relative motion, there are two setups. One is where you have an observer and an observed, which move relative to each other. You can say that the global frame is under cog-factive frame. In the first case I am going to take globally, the observer is moving, and the observed is stationary. You can first of all represent something in a global factive way, so you can say *As I sat in the car, and rushed through the scenery*, or *I looked at the scenery we were passing through.* Here is *I am sitting in the car*, we're passing through the scenery, that's the phrase. So in the factive situation, the car is moving past the palm tree, but often you can reframe it.

This is the global situation, but you can take a local situation, so just the car gets its own frame of reference which excludes the arrow that went with the motion of the car, and now the scenery acquires a motion. That's the reframing, so from the global to a local observer. Now you can say things like *I drove along and watched the scenery rush past me.* So now the scenery is rushing in terms of this local frame. To him, sitting in his car, the scenery is rushing past.

Furthermore the change over is so thorough that you can use English words like *watch*. In English you only use the word *watch* if what you are watching is moving, you can watch a TV, but you can't watch a painting in a museum. You can only see a painting or look at a painting, but you can't watch it as you watch a TV. Here we can say *I watched the scenery rush past*, so thoroughgoing is the shift to the other framing, to the local frame.

Furthermore, you can express sentences that show the reframing from global to local in the middle of a sentence. You can say *I was walking through the woods*, so I am depicted as moving factively in global framing, *I was walking in the woods, and this branch that was sticking out, hit me*. Here is a tree with the branch sticking out, and I go like that, I then switch and say *the branch hit me*. Well, *I hit the branch*. But you can suddenly switch from the global to the local frame and meet something that is stationary, the branch that is hitting me. However, you can't partially allocate the fictivity to each of two objects, part global, part local. You cannot say in English **We and the scenery rushed past each other*. That's totally ludicrous. On the other hand, it is not barred from factive motion. If you are on a road and there's a logging truck, you can say *My car and the logging truck rushed past each other*. This is perfectly okay. You can't say it though about the scenery. It looks like for setting up a framing, here is a case which is impossible in English, where both are half indicated as moving objects.

All these examples I've just given here are where the observer is factively moving, and the observed is factively stationary. Now what about the case where the reverse is true, where the observer is in fact stationery and the observed is moving. You can say things like *The stream flows past my house*. I'm the observer in the house, stationary, experiencing the brook. Now you cannot say anything fictive. You can't suddenly reframe. You can not say **My house moves alongside the stream, my house advances alongside the stream*, that's impossible. Similarly, I'm going to try one of these split sentences which change in the middle. *As I sat in the stream, the water flowed past me*. Fine. I am a stationary observer, the observed is moving. You cannot now switch to the other reframing in the middle of a sentence, you cannot say **As I sat in the stream, I rushed through the water*. You are not allowed to reframe in this case.

One question is, how come? Here is the mystery, why you can go from a moving observer to a stationary one, but not from a stationary observer to a moving one. The answer may be that in this case, stationariness is basic for the observer so that if the observer is in fact moving, you are allowed to ratchet down to what's considered the basic state, namely stationariness. That is okay. But if the observer is already what is treated as its basic state, you are not allowed to ratchet up out of the basic state to something that is not basic.

Well, that's the explanation. The next question is how come stationariness is basic for the observer? One proposal is that when in the first number of months in a baby's life, it is stationary to itself. It can be carried along, you can walk around with the child. If it faces front it gets the experience of translational optic flow as its walked along, but has no sense of its own motion as far as it knows, it's as if it's in a stationary universe and the universe is moving past

it. Only months later, when the child can start crawling, it can agentively determine its own crawling, and therefore sees crawling in terms of its cognitive connections. Its own intention to direct its limbs to move along, and thereby cause translational optic flow, gives it the idea that its motion can cause the translational optic flow. From the first months of our lives we're kings sitting on our thrones, watching the world do its thing, so it may be that stationariness is basic for the observer for developmental reasons.

If so, there is a kind of test which seems to work. There are two situations, and one of them should work like this translational optic flow, and that is if you take an infant and spin it around, so it can see the whole world spinning around it, but the infant itself, as far as it knows, is not spinning, it's in a stationary universe. It is not agentively directing itself to do that. Therefore it often works in terms of the language of translational optic flow. But there is one circumstance where the infant does have agentive volitional control over motion, and that is, it's moving its eyes and its head back and forth, which causes therefore short arcs, and it has the experience of integrating its own intentional motions with what happens visually, the short-arc transverse optic flow, which therefore behaves linguistically different from the way these first two behave. And it seems to be the case.

I've already given the case where you can ratchet down to stationariness as basic for the transverse optical, for this straight line of optical flow, and you can probably do the same thing for continuous revolution. *I was on a merry-go-round and watched the world and the world spun around me*. Or *We were in a rocket ship as it turned, and we watched as space spun around us*. That's working just like the scenery rushing past us. It works just the same. It just sounds terribly plain. It sounds like pretty standard English.

If you now talk about short-arc stuff, *I quickly turned my head and I looked over all the room's decorations*. But you are not going to say in English **As I quickly turned my head, the decorations in the room sped past my eyes* or something like that. That's really weirdly poetic, something that is not natural. Whereas in the other two cases, it's relatively natural. It's a possibility, it's an idea that may work out, that something as subtle as where an infant has volitional control over optic flow, that's where in adult language you are not going to have an easy way to treat the observer as stationery if it is in fact not. So that's that one.

Another fictive category, the 'motion after' effect, which you see if you are quickly spun around and then you stop, and you can see the surroundings are moving past you as if they are still moving. That seems to be a parallel to this frame relative motion. In frame relative motion, the question is which frame is moving. It's the same effect if you have a train, one train starting, you are on a

train not moving and a train starts to move. If it's moving, sometimes you feel that the train you are on begins to move. It's the whole question of how you perceive two frames moving past each other; one is moving, the other is not moving, and that shows up linguistically, so that's the perceptual parallel.

The next category is the advent path. This is a kind of fictive motion where the static location or the position of some object is determined by or represented by some sentence indicating a path that that object might have taken to get to that position, even if it's impossible that the object could ever have taken that path. Examples are, to take active verbs: *The palm trees clustered together around the oasis*. Here is an oasis. Here are some palm trees. They're clustered around, but clearly they did not move to this static clustering from some other position, whereas you do have a factive sentence with *cluster* as *The children quickly clustered together around the ice-cream truck*. So here is the ice-cream truck moving along, and the children quickly cluster together around it. That's the original meaning of the word, it's factive use. Here it is fictively used. Here it refers to the locations of the palm trees in terms of some fictive path that they might have taken to arrive at that location. This is what I call it advent path. It's the path the objects themselves are depicted to have taken to get to their present positions. It's one way of describing the static configuration they are now occupying.

The beam slants away from the wall at a 45 degree angle. Here is the wall. Here is the beam, at a 45 degree angle. It's phrased fictively, so it tilts *away from* the wall at a 45 degree angle. Well, it may be that that beam never moves this way at all. It's just put there like that. Again we are talking about its position in terms of a path that it might have taken, a fictive path that it could have taken, based on the factive use of this word like *The rusted beam slowly tilted away from the wall*. That's the factive use. But here it needs an event, so again it's some advent path. There are passive verbs too. *Termite mounds are strewn over this savannah, distributed over this savannah, scattered over this savannah*, even though they've never moved out of their positions, they have always been where they are located. The factive use of the words is *The gopher traps were distributed, were strewn by the trapper*. That's an example of an advent path.

Then there's access paths. For this presentation, I am just presenting these as a series of unrelated things, but in the larger work, there are a number of factors that come and go. They're present in each and every one of any given category of fictive motion. Things like, is the observer factive or fictive? Does the observer move or is it stationary? There's a matrix of components that come into play in different fictive categories. Each one of these represents a particular configuration of these underlying components. But for some reason, I haven't included all that in this presentation.

Right now I am just presenting this as a kind of a list. The next on the list then is access paths, which is where the given objects are represented in terms of something other than themselves, moving in a way that encounters that object and as a way of determining where the location is. One example is here is a street, here is a bank, here is a bakery. I am talking with you over here, you ask where the bakery is, and I can say *It's across the street from the bank*. The idea is that you use the bank as a reference point and you speak as if you are to conceptually move from the bank, move your focus of attention or something, from the bank across the street to the bakery. It's a fictive access path. It's a way of something else, like your focus of attention, moving to the object of interest. Certainly it doesn't have to represent any physical motion. You are very unlikely to first cross the street, go to the bank and then cross the street again. You'll probably stay on the same side of the street to reach the bakery. It's not used to represent an actual path you should follow. It's used to represent a path that you could use to find the object, through thinking about it, through the notion of some conceptualization, focus of attention, focus of thought. What's moving is typically either focus of attention or a whole body or a body part, something like that. So the example of body part is the example I gave before, *The vacuum cleaner is down around behind the clothes hamper*. It depicts the path that you are likely to follow, down around behind the clothes hamper to get to the vacuum cleaner. This is a kind of fictive motion, the access path. Then you say *The balloon is 1000 feet up from the ground.* Again your focus of attention seems to move from the ground to 1000 feet. And factively you may know the balloon rose up to 1000 feet, that's the factive.

Finally there is one that hasn't been recognized before, which is the co-extension paths. That's where the form or location or orientation of an object is presented in terms of something moving over its extent. That's what I call a co-extension path. The fence is of course an example of that. Here is the plateau. Here is the valley. Here is the fence which is stationary. *The fence goes from the plateau down into the valley*; it's as if something is moving, your focus of attention, the motion itself, who knows what, is moving along the fence. It's important to have examples like the following: here is a granary, a silo, and here is a wheat field. You can say *The wheat fields extend out in all directions from the silo.* It's another example of fictive motion of a co-extension path. Here you are representing a planar surface with motion that is not real. I said *The fields extend out in all directions from the silo*. It's all fictive. Nothing is happening, of course. A factive counterpart would be *The oil spread out in all directions from where it spilled*. That's a factive counterpart. The reason this kind of thing is important is because it shows that fictive motion is not just the case of where your focus of attention is moving as in this case, because here your focus of attention is as

wide as possible. It's the whole of something that is moving out and extending the circumference. Whatever theories we have about how there are parallels in perception, it can't settle on fictive motion in paralleling focal points.

I realize now that I've skipped some of the conceptual counterparts, so let me just do a couple of them. With advent paths, where an object's shape or location are described in terms of itself moving to that location, there are counterparts in perceptual psychology, in fact three, in this case. For example, Alexander Pentland has a concept: if you see a doll, you perceive the torso with the head and the arms and the limbs moving onto it, so as if in perceiving a doll, part of your very perception is of things moving up to it. That would be an example of an advent path. Michael Leyton has a contrary theory which is that if you see any kind of non-regular shape, the way you perceive it is as if it came from an originally regular shape which was then subjected to various protrusions and indentations, that give rise to this complex shape. Then there is the old Gestalt notion with the original Pac-Man thing, which is where you see a Pac-Man as if some wedge was removed from the whole circle. Again it's kind of an advent path where its current shape is perceived in terms of itself moving to and from the parts of it, to and from where it is.

These are all conceptual counterparts to the advent path in a spoken language. There may be some further—I think I skipped something. For example, the pattern path where you had paint drops moving along. Probably the Marquee effect would be that. Let's say there is a row of light bulbs and when one factively lights up and goes off, the next one lights up and goes off, so that there's no factive motion, just the factive set of changes. But fictively you could see a light jumping from one to the other, to the other. That might be an example of a pattern path in visual perception. Similarly, perhaps there's a parallel with the co-extension path (this is an idea of mine, I think psychology should check it out). If you see a plus [+] sign, you could perceive it factively as if it were steadily present, but you might perceive it fictively in terms of successive strokes. In my terms what you see at the palpable level is the static plus, and you'll sense a succession of strokes, that probably is extensive much as in the manner of a co-extension path.

I will tell you a little bit more about what I mean by ception. It is a little tricky to go over verbally, but I'll just give you an idea of what I mean. I think we may need a concept of ception, which covers both perception and conception as a single unified continuum within cognitive processing. There are several reasons for this. One is that psychologists themselves do not agree on where to draw the line, in principle, between perception and conception. For example, if you look at a certain object, and you first perceive it as a knife, in ascribing the label, the identity of knife to it, have you left perception and then moved

to conception or not? Psychologists differ on this, some say 'yes', some say 'no'. If you suddenly associate it with sharpness and either toolness or weaponness, are you still perceiving it, or you are now conceiving it? Again psychologists would differ; some would say that *sharp weapon* is part of your perception. There is no principled way to draw the line between perceiving and conceiving.

Similarly, there are some processes that don't properly belong to just perception or to conception, but in fact extend across a continuum comprised of the two of them, and those get lost if you insist on the break between perception and conception. You can't allude to these other factors that seem to run across the combination of the two.

As soon as you set up the notion of ception, which combines the two, you can have everything. You don't throw out the distinction between conception and perception. You have a way of representing how one can graduate into the other, you have the means for representing those factors which in fact, span the whole line, the length of the continuum, and it would be misrepresented if you did it artificially.

I give 13 parameters which seem to benefit from the notion of ception, which run along a continued unbroken continuum, from the guiding one, the determining one: the most concrete to the most abstract, that's the main one. There's a number of phenomena that seem to cluster; we take all 13 parameters and they tend to cluster along one end of it. So that's the way I am setting it up, and it's a way of treating visual perception. It's having a concrete end that I call *seeing*, similar to factivity, and what I call a semi-abstract end, of sensing, which I consider similar to fictivity.

Anyway, it's all in Chapter 2, and you can read there if you like. By the way, I will once again say that everything that has been written is available for free at my website, just google me, that's the easiest way to get access to my website. All my books and my papers are available there. So this is Chapter 2 of the fictive motion chapter. [The fictive motion chapter is chapter 2]. Anyway, that's what ception is about. But that's just to mention it here, and go on.

So now with metaphor. In the way metaphors are set up, there are subsets with phrases like LOVE IS A JOURNEY, but those phrases should really be set up as two phrases, one of them factive and one fictive. They really should be set up as saying love *is not* a journey, that's the factive case, which one part of our cognition knows. The other part should be set up as love is a journey, that's the fictive part which another part of our cognition has. But it turns out that a third part of our cognition knows that one of those is factive, the 'not' one, and one is fictive, the positive one. And it's only because of this set-up that we call them metaphor at all. If you didn't know that there is a factive variant of this, namely, love is not a journey, you would not call LOVE IS A JOURNEY a metaphor. You

would just call it a fact. The only reason you can call it a metaphor is that some part of your cognition is aware of the fact that it's not a journey; otherwise it won't be a metaphor. So a metaphor as constructed by the source domain and target domain notion has to be understood in terms of this factive and fictive kind of situation. This is the analysis of what's going on in our cognition in the fictive situation; of the three parts of your cognition, the assessor assesses one representation as factive, and the other representation as fictive. Ultimately, metaphor theory could be extended to cover the kinds of things that fictivity covers. You would do so with a bit of terminological difficulty, because fictivity is set up so that the terminology readily covers both linguistic senses of perception, but it's hard to do that with metaphor.

Let's take the notion of closure, which is a Gestalt conceptual phenomenon. Let's say the circle has a gap in it, that's what you see concretely, and you sense something closing the gap. Metaphor theory would have to say that you perceive a metaphor, closure is a metaphor, and in particular it's a metaphor from the source domain of continuity being mapped down to the target domain of discontinuity of the gap. That might rub psychologists the wrong way. It doesn't sound right. Or its fictive terminology can also span the two systems. You could simply say the gapped perception is factive, and seeing one of the gaps as being closed is fictive in that sense, and that's how you say it's a fictive phenomenon. So that's a comparison between fictivity and metaphor.

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Handout Lecture 4

1 Introduction

Proposed is a unified account of the extensive cognitive representation of non-veridical phenomena—especially forms of motion—both as they are expressed linguistically and as they are perceived visually.

1.1 Introductory illustrations

1.1.1 Linguistic examples that depict motion with no physical occurrence

a. This fence goes from the plateau to the valley.
b. The cliff wall faces towards / away from the island.
c. I looked out past the steeple.
d. The vacuum cleaner is down around behind the clothes hamper.
e. The scenery rushed past us as we drove along.

1.1.2 Visual examples where one perceives motion with no physical occurrence:

a. the "apparent motion" perceived, e.g., in successive flashes along a row of lightbulbs, as on a marquee
b. the perceived "induced motion" of, say, a rod when only a surrounding frame is moved
c. the perception of a curved line as a straight line that has undergone processes like indentation and protrusion
d. the possible perception of an obliquely oriented rectangle (e.g., a picture frame) as having been tilted from a vertical-horizontal orientation
e. the possible perception of a "plus" figure as involving the sequence of a vertical stroke followed by a horizontal stroke.

1.2 Cognitive pattern of "general fictivity"

within the cognition of a single individual,

a discrepancy between two cognitive representations of the same entity

a. a "factive" representation, assessed by the individual as more veridical
b. a "fictive" representation, assessed by the individual as less veridical

e.g., factive stationariness and fictive motion both represented for the same target entity

1.2.1 In language:

factive representation = belief held as to "real" nature of a referent

fictive representation = literal reference of the linguistic forms making up a sentence

e.g.,: The fence goes from the plateau to the valley

factive representation: our belief that the fence is stationary

fictive representation: the literal reference of the words that the fence is moving

1.2.2 In visual perception:

factive representation = concrete palpable percept that one has of a scene = "seeing"

fictive representation = concurrent low-palpability percept that one has of the same scene = "sensing"

e.g.,: on viewing a particular line drawing

factive representation: seeing a Pac-Man configuration

fictive representation: sensing a circle with a wedge removed

1.3 What is language-specific and what is universal in linguistic fictive motion

language-specific: the particular (types of) referents for which fictive motion expressions exist

universal: the direction in which the fictive motion proceeds, where a fictive expression does exist

1.4 Phenomenology of fictive motion

1.4.1 Degree of the experience: can range from mild sense of directedness to full motion

constructional fictive motion:

the representation of stationariness by forms/constructions whose basic reference is to motion

experienced fictive motion:

where speaker/hearer experiences some sense of motion when such forms are used.

1.4.2 Compellingness of the experience: can range from suggestion to full conviction of motion

1.4.3 What one experiences as moving
the named entity / some object moving with respect to the named entity / one's focus of attention / some essence of abstracted motion

1.5 Many categories of fictive motion:
emanation, pattern paths, frame-relative motion, advent paths, access paths, coextension paths, …

2 The emanation category of fictive motion
something intangible emerges from a source, moves along a straight line, and impinges on a distal object

2.1 Orientation paths
an intangible emanation emerges from the front of an object that bears a front,
moves along a straight line, and impinges on a distal object

2.1.1 Demonstrative paths
the Source object is linear with a point-type front; the emanation is coaxial with the linear object

(1) I / The arrow on the signpost pointed toward / away from / into / past the town.

2.1.2 Prospect paths
the Source object has a planar (face-type) front; the emanation is perpendicular to this plane

(2) The cliff wall faces toward / away from / into / past the valley.

2.2 Radiation paths
radiation emanates steadily from an energy source, moves along a straight line, and impinges on a distal object

This emanation type has only one conceptual/perceptual form viable for the sun (or fire/flashlight etc.)

from the sun to an object:

(3) a. The sun is shining into the cave / onto the back wall of the cave.
b. The light is shining from the sun into the cave / onto the back wall of the cave.

*from an object onto the sun

(4) *The light is shining from my hand onto the sun.

*from some third location:

(5) *The light shone out onto the sun and my hand from a point between us.

*not moving but stationary:

(6) *The light hung between the sun and my hand.

2.3 Shadow paths

the shadow of an object moves from that object to the silhouette on a surface

(7) a. The tree threw its shadow down into / across the valley.
b. The pillar cast / projected a shadow onto / against the wall.
c. The pillar's shadow fell onto / against the wall.

2.4 Sensory paths

a sensory emanation moves in one direction or the other between an Experiencer and an Experienced:

Experiencer as Source:

a Probe emerges from the Experiencer, moves along a straight line, and impinges on the Experienced

Experienced as Source:

a Stimulus emanates from the Experienced, moves along a straight line, and impinges on the Experiencer

2.4.1 The Experiencer is non-agentive—permits both fictive directions

A. the verb is lexicalized to take the Experiencer as subject

(8) a. I can hear/smell him all the way from where I'm standing.
b. I can hear/smell him all the way from where he's standing.

(9) a. We can be seen by the enemy from where they're positioned.
b. We can be seen by the enemy from where we're standing.

B. the verb is lexicalized to take the Experienced as subject

(10) a. Even a casual passer-by can see the old wallpaper through the paint.
b. The old wallpaper shows through the paint even to a casual passer-by.

2.4.2 The Experiencer is agentive—permits only Experiencer as Source

(11) a. I looked into / toward / past / away from the valley.
b. *I looked out of the valley (into my eyes). <where I am located outside the valley>

2.4.3 Lateral motion of the sensory emanation from an agentive Experiencer

(12) I slowly looked toward the door. / around the room. / away from the window . lateral motion followed by axial motion of the line of sight

(13) I slowly looked down into the well.

2.5 Communication paths (= the "conduit metaphor") [added since the Talmy (2000) chapter]

a Message (as Figure) moves through space from an Informer (as Source) to an Informee (as Goal)

2.5.1 Basic constructions with Informer / Informee as subject

(14) Informer as subject
a. I shouted the news down into the mine shaft to the workers below.
b. She whispered (the answer) to him / into his ear.
c. He smiled / nodded (his agreement) to them.

(15) Informee as subject: I heard the bad news from her.

2.5.2 The fictively moving Figure is a Message, not a Stimulus

the Informee is the recipient of an intellective Message for interpretation, not the Experiencer of a perceptual Stimulus

(16) a. Figure = (intellective) Message
He told a bit of news to her. / She heard a bit of news from him.
b. Figure = (perceptual) Stimulus
*He told a sneeze to her. / *She heard a sneeze from him.

2.5.3 Deviations from the prototype

a sentient Informee may be lacking:

(17) I shouted the news down into the mine shaft, but no one was alive to hear it.

a sentient Informer may be lacking:

(18) a. His movements signaled / shouted / telegraphed his intentions to me.
b. The condition of the tree bark told / informed me which pest had attacked it.

2.5.4 The direction of the fictive motion is only from Informer to Informee, not the reverse

(19) a. He imparted the information to me.
b. *I interpreted the information to/into him.

cf. I read additional meaning into his words.
—which only involves content that the Informer did not intend in his Message

3 A Unifying Principle and an Explanatory Factor for Emanation Types

3.1 The Principle that Determines the Source of Emanation

= the "active-determinative principle"—for fictive emanation between two objects

The object that is taken to be the more active or determinative of the two is conceptualized as the Source of the emanation.

the sun is brighter than one's hand, thus is more active,
hence it is the Source of radiation
an Agent is more active than an inanimate object,
hence an agentive Experiencer is the Source of sensory emanation
a pole determines its shadow (if you move the pole, the shadow moves, but not vice versa),
hence it is the Source of a shadow path

either a probe or a Stimulus can be conceptualized as the more active,
hence, either can be the Source of a non-agentive sensory path
But the problem then is: what factors determine a conceptualization of activeness

3.2 The Possible Basis of Fictive Emanation and its Types
= an individual's experience of his/her own agency in the course of development

one's agency is both active and determinative,
and one's body is the source point of motion leading to distal effects

by this "Agent—distal object pattern",

An Agent that intends to affect a distal object must either move to it with her/his whole body,
reach to it with a body part, or cause (as by throwing) some intermediary object to move to it.

The model-relevant characteristics of this form of agency:
the determining event, the act of intention, takes place at the initial locus of the Agent, and the ensuing activity that finally affects the distal object progresses through space from that initial locus to the object

4 The Relation of Emanation in Language to Counterparts in Other Cognitive Systems
involves: "the Overlapping Systems Model of Cognitive Organization"

examples of probable cognitive systems:
language, perception (visual, kinesthetic, etc.), reasoning, memory,
anticipatory projection, affect, cultural structure, motor control, attention

provisional finding: each cognitive system has some structural properties that
a) are uniquely its own
b) it shares with one or a few other cognitive systems
c) it has in common with all other cognitive systems

4.1 Fictive Emanation and Folk Iconography
fictive representations, normally only sensed with low palpability in perception,
can be made explicit, as with stick-figure drawings / wire sculptures, etc.
in particular, fictive emanation can be made explicit in folk iconography

agentive sensory paths—from Experiencer to Experienced:
Superman's X-ray vision going from his eyes out to target object

demonstrative paths—emanation from point-type front of linear object:
cartoon/movie depiction of sorcerer directing force beams from fingertips

radiation paths:
when sketching the sun, one draws the lines that represent its rays outward from center

mapping of Agent—distal object model onto radiation paths: when sketching the sun, depicting a face on it

4.2 The Relation of Fictive Emanation to Anthropological Phenomena

4.2.1 In Pascal Boyer's "ghost physics"—the properties of spirits in belief systems across cultures—

spirits break only a few everyday physical laws, e.g.,: invisible / pass through walls

a demonstrative path is parallel: invisible and passes through walls

4.2.2 Concept of "evil eye":

ill feeling transmitted from one person's eyes, along line of sight, into other person
sensory path of the agentive visual type is parallel

4.2.3 Concepts of magical influence, power, fields of life force, mana emanating from entities

parallel the fictive emanations of linguistic construals:

both types: invisible and intangible; (generated and) emitted by some entity;
propagating in one or more directions away from that entity;
then contacting a second distal entity which it may affect

4.3 Fictive Emanation and Perception

Research on perception of emanation is so far insufficient. It should, e.g., test if:

a subject viewing an object with a front (e.g., an arrow) concretely sees only that object,
or also senses at a low level of palpability an intangible line emanating from its front

NB: in the next five sections on further categories of fictive motion factive-motion counterparts of the fictive motion examples are shown in brackets

5 Pattern paths

the fictive conceptualization of some configuration as moving through space

(20) As I painted the ceiling, (a line of) paint spots slowly progressed across the floor.
[cf. As I painted the ceiling, (a line of) ants slowly progressed across the floor.]

fictive emanation involved no factive motion of any object, and so needed the active-determinative principle
to determine the direction of fictive motion
a pattern path does require the motion of some object in its context, and this determines the direction of the fictive motion (not the active-determinative principle)

perceptual parallel: "apparent motion", e.g., row of light bulbs flashing in succession
factive percept: stationary row of bulbs + periodic flashing of a bulb at different locations
fictive percept: a single light progressing along the row of bulbs

6 Frame-relative motion

6.1 Where, factively, the observer is moving and the observed is stationary

(21)
A. *global frame: fictive motion absent*
I rode along in the car and looked at the scenery we were passing through.

B. *local frame: fictive motion present*
I sat in the car and watched the scenery rush past me.

[cf. I sat in the movie-set car and watched the backdrop scenery rush past me.]

C. *shift in mid-reference from global to local frame, and from factive to fictive motion*

I was walking through the woods and this branch that was sticking out hit me.

[cf. I was walking through the woods and this falling pine cone hit me.]

D. *lacking: part global—part local frame with part factive—part fictive motion*

*The scenery and I rushed past each other.

[cf. The truck driver and I rushed past each other.]

6.2 Where, factively, the observer is stationary and the observed is moving (22)

A. *global frame: fictive motion absent*

a. The stream flows past my house.

b. As I sat in the stream, its water rushed past me.

B. *local frame: blocked attempt at fictive motion*

a. *My house advances alongside the stream.

b. *As I sat in the stream, I rushed through its water.

6.3 An account for why a moving observer can be fictively stationary, but not vice versa

proposal: stationariness is basic for an observer

hence, a moving observer can be conceptually reframed as stationary, i.e., put into that basic state

but an already stationary observer cannot be conceptually removed from that basic state

6.4 Developmental account for why stationariness should be basic

a carried infant experiences translational optic flow

long before it can associate this with its own agentive forward locomotion

likewise, a spun infant experiences the transverse optic flow of extended rotation

long before it can spin itself around, hence, fictive reframing should be easy:

(23) a. As our space shuttle turned, we watched the heavens spin around us,
b. I rode on the carousel and watched the world go round.

but an infant does have immediate agentive control over the transverse optic flow of small arcs
via eye/head shifts, hence, fictive reframing for arcs should be difficult:

(24) a. As I quickly turned my head, I looked over all the room's decorations.
b. *?As I quickly turned my head, the room's decorations sped by in front of me.

6.5 Perceptual parallels

"motion after-effect" as for a subject who has been spun about and stopped, and perceives the surroundings as spinning
also, cf. the "rod and frame" genre of experiments

7 Advent paths: site arrival

depiction of a stationary object's location in terms of its arrival at the site it occupies.
the stationary state of the object is factive; its depicted motion is fictive

(25)
A. *with active verb form*
a. The palm trees clustered together around the oasis.
[cf: The children quickly clustered together around the ice cream truck.]
b. The beam leans / tilts away from the wall.
[cf: The loose beam gradually leaned / tilted away from the wall.]

B. *with passive verb form*
a. Termite mounds are scattered / strewn / spread / distributed all over the plain.
[cf. Gopher traps were scattered / strewn / spread / distributed all over the plain by a trapper.]

7.1 Perceptual parallels

Pentland (1986): perception of an articulated object in terms of a process in which a basic portion of the object has the remaining portions moved into attachment with it.

e.g., the perception of a clay human figurine as a torso to which the limbs and head have been affixed.

Leyton (1992): perception of an arbitrary curved surface as a deformed version of a simple surface

e.g., a smooth closed surface as the deformation of a sphere that has undergone forces of protrusion, indentation, squashing, resistance

Gestalt psychology: perception of a form as the result of some process of deformation applied to an unseen basic form

e.g., the perception of a Pac-Man-shaped figure as a circle with a wedge-shaped piece removed from it

8 Access paths

depiction of a stationary object's location in terms of a path that some other entity might follow to the point of encounter with the object.

though not specified, the fictively moving entity is generally conceived as a person, some body-part of a person, or the focus of one's attention,

(26)

a. The bakery is across the street from the bank.
   [cf. The ball rolled across the street from the bank.]
b. The vacuum cleaner is down around behind the clothes hamper.
   [cf. I extended my arm down around behind the clothes hamper.]
c. The cloud is 1,000 feet up from the ground.
   [cf. The balloon rose 1,000 feet up from the ground.]

perceptual parallel? consider a "plus" with an "A" at the top and a "B" at the left will a subject sense with low palpability a path from A to B , say, along the lines of the plus?

9 Coextension paths

depiction of the form, orientation, or location of a spatially extended object in terms of a path over the object's extent

(27)

a. The fence goes / zig-zags / descends from the plateau to the valley.
[cf. I went / zig-zagged / descended from the plateau to the valley.

b. The field spreads out in all directions from the granary.
[cf: The oil spread out in all directions from where it spilled.]

c. The soil reddens toward the east.
[cf: (1) The soil gradually reddened at this spot due to oxidation.
(2) The weather front advanced toward the east.]

perceptual parallel?: consider a "plus". Will a subject sense with low palpability the succession of a stroke down the vertical bar and one across the horizontal bar?

10 "Ception": Generalizing over Perception and Conception

ception: a framework that encompasses factive/fictive visual representations as an analog to factive/fictive linguistic representations

ception = union of perception and conception; advantages:
avoids problem in psychology of where to bound / subdivide perception on a principled basis allows one to observe gradient parameters that span the whole of the new larger domain allows the discrete perception/conception dichotomy to be reintroduced as a gradient

10.1 Palpability-related parameters

(1) The parameter of **palpability** is a gradient at the high end of which an entity is experienced as being concrete, manifest, explicit, tangible, and palpable. At the low end, an entity is experienced as being abstract, unmanifest, implicit, intangible, and impalpable.

(2) The parameter of **clarity** is a gradient at the high end of which an entity is experienced as being clear, distinct, and definite. At the low end, an entity is experienced as being vague, indistinct, indefinite, or murky.

(3) The parameter of **intensity** is a gradient in the upper region of which an entity is experienced as being intense or vivid. At the low end, an entity is experienced as being faint or dull.

(4) The **ostension** of an entity is our term for the overt substantive attributes that the entity has relative to any particular sensory modality. In the visual modality, the ostension of an entity includes

its "appearance" and motion—thus, more specifically, including its form, coloration, texturing, and pattern of movements. In the auditory modality, ostension amounts to an entity's overt sound qualities, and in the taste modality, its flavors. As a gradient, the parameter of ostension comprises the degree to which an entity is experienced as having such overt substantive attributes.

(5) The parameter of **objectivity** is a gradient at the high end of which an entity is experienced as being real, as having autonomous physical existence, and as having its own intrinsic characteristics. Such an entity is further experienced as being "out there", i.e., as external to oneself—specifically, to one's mind, if not also one's body. At the low end of the gradient, the entity is experienced as being subjective, a cognitive construct, a product of one's own mental activity.

(6) The gradient parameter of **localizability** is the degree to which one experiences an entity as having a specific location relative to oneself and to comparable surrounding entities within some spatial reference frame. At the high end of the gradient, one's experience is that the entity does have a location, and that this location occupies only a delimited portion of the whole spatial field, can be determined, and is in fact known. At mid-range levels of the gradient, one may experience the entity as having a location but as being unable to determine it. At the low end of the gradient, one can have the experience that the concept of location does not even apply to the ceived entity.

(7) The gradient parameter of **identifiability** is the degree to which one has the experience of recognizing the categorial or individual identity of an entity. At the high end of the gradient, one's experience is that one recognizes the ceived entity, that one can assign it to a familiar category or equate it with a familiar unique individual, and that it thus has a known identity. Progressing down the gradient, the components of this experience diminish until they are all absent at the low end.

(8) The **content/structure** parameter pertains to whether an entity is assessed for its content as against its structure. At the content end of this parameter—which correlates with the high end of other parameters—the assessments pertain to the substantive makeup of an entity. At the structure end of the parameter—which correlates with the low end of other parameters—the assessments pertain to the schematic delineations of an entity. While the content end deals with the "bulk" form of an entity, the structural end reduces or "boils down" and regularizes this form to its abstracted or idealized

lineaments. A form can be a simplex entity composed of parts or a complex entity containing smaller entities. Either way, when such a form is considered overall in its entirety, the content end can provide the comprehensive summary or Gestalt of the form's character. On the other hand, the structure end can reveal the global framework, pattern, or network of connections that binds the components of the form together and permits their integration into a unity.

(9) The "type of geometry" parameter involves the geometric characterization imputed to an entity, together with the degree of its precision and absoluteness. At the high end of this parameter, the assessments pertain to the content of an entity and are (amenable to being) geometrically Euclidean, metrically quantitative, precise as to magnitude, form, movements, etc., and absolute. At the low end of the parameter, the assessments pertain to the structure of an entity, and are (limited to being) geometrically topological or topology-like, qualitative or approximative, schematic, and relational or relativistic.

(10) Along the gradient parameter of **accessibility to consciousness**, an entity is accessible to consciousness everywhere but at the lowest end. At the high end of the parameter, the entity is in the center of consciousness or in the foreground of attention. At a lower level, the entity is in the periphery of consciousness or in the background of attention. Still lower, the entity is currently not in consciousness or attention, but could readily become so. At the lowest end, the entity is regularly inaccessible to consciousness.

(11) The parameter of **certainty** is a gradient at the high end of which one has the experience of certainty about the occurrence and attributes of an entity. At the low end, one experiences uncertainty about the entity—or, more actively, one experiences doubt about it.

(12) What we will dub the parameter of **actionability** is a gradient at the high end of which one feels able to direct oneself agentively with respect to an entity—e.g., to inspect or manipulate the entity. At the low end, one feels capable only of receptive experience of the entity.

(13) The gradient parameter of **stimulus dependence** is the degree to which a particular kind of experience of an entity requires current on-line sensory stimulation in order to occur. At the high end, stimuli must be present for the experience to occur. In the mid-range of the gradient, the experience can be evoked in conjunction with the impingement of stimuli, but it can also occur in their absence. At the low end, the experience does not require, or has no relation to, sensory stimulation for its occurrence.

10.2 Examples at different points along the gradients

10.2.1 At the fully concrete level of palpability—and at the high end of most other parameters

examples of entities experienced at the concrete level of palpability include:

most of the manifest contents of our everyday visual world, e.g., an apple or a street scene.

10.2.2 At the semi-concrete level of palpability—and at the semi-high end of most other parameters

examples: after-image, artificial scotoma, Hermann grid spots, phosphenes

10.2.3 At the semi-abstract level of palpability—and at the semi-low end of most other parameters

types and examples:

a. the sensing of object structure—e.g.,:
   the stick-figure skeletal structure of a human; the "envelope/interior" structure of a vase/dumpster
b. the sensing of reference frames—e.g.,:
   the grid of compass directions amidst surrounding scenery; a rectilinear vs. radial reference frame
c. the Sensing of Structural History and Future—e.g.,:
   a tilted picture frame; a dent in a fender
d. the sensing of projected paths—e.g.,:
   the upcoming trajectory of a ball seen sailing through the air
e. the sensing of force dynamics—e.g.,:
   a concrete slab leaning against a rickety shed; at the cusps of a "bouncing" dot

10.2.4 At the fully abstract level of palpability—and at the low end of most other parameters

examples: the awareness of relationships among concepts within one's knowledge representation; the experience of implications between sets of concepts, and the formation of inferences; assessments of veridicality; assessments of change occurring over the long term; experiences of social influence (such as permissions and requirements, expectations and pressures); a wide range of affective states; "propositional attitudes" (such as wish and intention).

11 The Relation of Metaphor to Fictivity

correspondences:
- target domain: factive representation, taken as more veridical (e.g., "love")
- source domain: fictive representation, taken as less veridical (e.g., "a journey")

thus, a Lakoff/Jonson metaphor formula is actually a cover term for two formulations, e.g.,:
- factive: love is not a journey / fictive: love is a journey

fictivity theory puts this into relief: the crucial characteristic that metaphoricity depends on is
- the fact that the speaker / hearer has somewhere within her cognition a belief about the target domain

contrary to her cognitive representation of what is being stated about it,
and has somewhere in her cognition an understanding of the discrepancy between these two representations

but metaphor theory and its terms do not now readily extend to perception.

thus, by metaphor theory, the Gestalt phenomenon of "closure" would be a metaphor
- —not an idea easy for psychologists to accept
- whereas fictivity theory covers perceptual discrepancies equally with linguistic ones

thus, consider a subject viewing a gapped circle

fictivity theory: one sees a factive representation of a "C" shape, taken as veridical,
- and senses a fictive representation of an "O" shape, taken as less veridical,
  - perhaps with an experience of some discrepancy

metaphor theory: a source domain of continuity is mapped onto a target domain of discontinuity
- hence, closure is a metaphor of continuity

12 A Cognitive Bias toward Dynamism

first, note: fictive stationariness exists beside fictive motion
- already seen for observer in frame-relative motion ; also in:

I went around the tree. / My path was a circle with the tree at its center

in perception: a waterfall

the physical material is factively moving, its configuration is stationary.

language exhibits a bias toward conceptual dynamism over conceptual staticism:

fictive motion predominates over fictive stationariness, in two ways:

1. expressions that manifest fictive motion far outnumber ones that manifest fictive stationariness
2. even stationary phenomena are often less representable as factively stationary than as fictively moving

(28) a. ??The wells' depths form a gradient that correlates with their locations on the road.

b. The wells get deeper the further down the road they are.

LECTURE 5

The Attentional System of Language

The first day was to lay out the major schematic systems that language has for structuring conceptual material, and the second day looked at one of those systems. It expanded, it elaborated one of those systems, namely, the configurational structure system. Today, both talks are going to elaborate on another of those systems, the attention system. Remember that some of the major schematic systems were configurational structure, location of perspective point, distribution of attention, that's today. There's also force dynamics which we did and some other things.

Today it's going to be attention and consciousness. The basic perspective is that in any given speech situation, there must be a hearer. A hearer hears the sounds of the speaker and can interpret from them the conceptual content that those sounds represent and the hearer can attend to the context that surrounds them. It's essentially impossible for all of that, all those domains, the phonological expression, the meaning and the context, to be uniformly in the foreground of the hearer's attention. Inevitably, some portions or aspects of these domains are going to be more salient while others are going to be less salient. Not all of this is simply due to an inherent interest value of some items over others. On the contrary, there's an extensive system in language which is devoted to allocating attention. It's a system for designating that the hearer should dedicate more attention to this and less to that in some systematic way. I've got over 50 attentional factors that language uses, which fall into some 10 different groupings. Each factor either raises or lowers or both attention on some aspects of the expression, the meaning, or the context, and directs the hearer to allocate the attention accordingly. Typically, some of these factors the speaker can use intentionally; or at least he can select, decide which aspect to foreground, which to background, and can use these factors in order to do that. In that case, what happens to the hearer? The hearer detects these

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mechanisms, these linguistic devices for allocating attention, and the hearer develops his mental image accordingly with some parts raised in attention and other parts backgrounded in attention.

That's the basic layout. One thing is the methodology used in studying attention. My methodology is always introspection, where you actually watch how language behaves within yourself. That's the nature of introspection and you catch whether there's something seems more salient than others. So it's introspection in combination with the normal forms of linguistic analysis: comparison, contrast and so forth. The second talk today will address this whole use of introspection. Many people question whether it is illegitimate to use introspection as a methodology for acquiring information about the nature of language. Instead, there is a general move towards so-called more 'objective' methodologies. But the whole second talk justifies the use of introspection, in fact says language can't exist without introspection, even among ordinary speakers. I will leave that justification until this afternoon.

Accordingly I am going to skip most of the introductory portion that's on the current handout, most of section 1. But I'll say a few things, just to orient you. First I'm concurrently addressing both attention and consciousness. To me, they are made of the same stuff. They are not two different things, they're one thing. There is consciousness and it has a number of different parameters, including strength or something, whether something is conscious or unconscious, whether something is constant or shifting—here's a range of parameters that affect the nature of the content of consciousness and its behavior. You can regard attention as simply consciousness with a certain set of qualifiers. In particular, attention is consciousness which is volitional, intentional; you can volitionally and intentionally direct your consciousness at something. That would be attention. Consciousness does not have to be focused, but attention does. There are several systematic ways in terms of these basic parameters, that qualify the domain of consciousness. Attention is just consciousness with a certain set of parameter values. Otherwise it's the same stuff.

Some psychological systems assume that attention or consciousness (consciousness is only now starting to be used as a term in psychology, usually it's been taboo and attention has been used instead) is an all-or-none phenomenon, either you have attention or you don't. But the evidence from language is that it's a gradient phenomenon. Accordingly, there is terminology which will show this gradience. You can say things like, something is in the foreground attention or the background attention or is high attention or low attention. If you use the word *consciousness* in English, you typically say the center of consciousness, or the periphery of consciousness, or that something is either more salient or less salient. Salience means some prominence that stands out. These

are all interchangeable terms; they are all particular to one of the parameters that applies across the board to attention, consciousness and salience, namely, its strength, how strong it is. And the strength is gradient.

I should say that these 50-some factors vary along certain parameters, certain characteristics, but I think it would be easier to just give you a flavor, to just dive in and start with examples. The factors are grouped into certain categories. The first category is attentional factors that pertain to the morpheme. I use the extended sense of morpheme. Not only simplex morphemes like just a word like *cat*, but also an idiom is a morpheme for me, as well as a construction that has its own minimally associated meaning and so forth.

Let me go to the very first factor, Factor AA1, and the factors I want to talk about have a little star or asterisk. We saw this factor in the very first talk, but now I am going to talk about something else. This is the relevance of a morpheme's lexical category on its salience. In general, the principle is: if a morpheme is in an open-class category, it's more salient than if it's in a closed-class category. The same concept is going to be more salient if it's expressed by an open-class morpheme than by a closed-class morpheme. The last time we saw this very example, what I was stressing was that when the concept is expressed by an open-class morpheme, its function is to represent conceptual content, whereas when it's represented by a closed-class morpheme, its function is to express conceptual structure. In this case, I am not dealing with the content versus structure distinction. I am dealing with salience. The same concept is simply more salient in the open-class form than in the closed-class form.

Here is the same example with past tense and future tense. The past tense is represented by a closed-class form like *-ed*, like *when he arrived* or the future has *when he arrives* or *when he will arrive;* tense is comparatively backgrounded in attentional value. It doesn't hit you in the face about its conceptual content, its concept that it represents. But as soon as you are represent the same concept with an open-class form, as in *on his previous arrival* for the past, or *on his upcoming arrival*, all of a sudden that concept of relative past time occurring before the present time or occurring after the present time, is now foregrounded. It's by virtue of being expressed with an open-class form that it's foregrounded. The very same concept has two different levels of salience. Salience means how much attention it attracts to itself from the hearer or from the speaker. It's built into the fabric of language. It's automatic that if it is in a closed-class form, it is going to be more backgrounded, and the open-class form more foregrounded. This is under the category of properties of morphemes that I call formal properties.

The next, within the category of formal properties of morphemes, is the degree of morphological autonomy. A morpheme can be either bound or free. If

it's bound, it's an affix of some sort. In general, the attentional factor seems to be that the same concept is more salient if it's expressed by a morpheme that is free than if it's expressed by a bound morpheme. Here are some examples; in order to see this, you have to use your introspection to find out whether you agree with it or not. You may not agree. But in any case, introspection is going to be the methodology you have to use to conceive if you do agree. First, it takes place both within closed-class forms and open-class forms. Closed-class forms can be either bound or free, and open-class forms can be either bound or free. Let's start with closed-class forms. You can say *This kind of trap cannot be set again* or *This kind of trap is unresettable*. In *cannot be set again*, *can* is a closed-class form. It's a modal. *Not* is a particle and a free form. *Again* is a closed-class form. *Be* is a closed-class form. Here we've got the concepts: *can* expresses some kind of potential notion, *not* expresses negative, *be* expressed some kind of backgrounding of the agency, makes a passive voice, and *again* is some kind of iteration concept. These same exact four concepts show up as bound closed-class forms in the word *unresettable*. But I think that they are backgrounded here relative to the situation where they're free. In *unresettable*, the *un-* means negative, the *re-* means iteration, the *–able* means both the passive and the potential. But it seems to be that the very same concepts of potential, negation and so forth are relatively backgrounded.

We find the exact same situation with open-class forms. Take the verb *to ship*. *To ship* is a verb, and so it is a free form. But there is also a bound verbal morpheme *-port* which typically does not appear by itself. It has to be prefixed. Both of them mean to move large, bulky objects over geographic distances. You can ship cargo or ship things in, out, away, across and so forth. However, with *-port,* which pretty much means the same thing, you've got forms like *import, export, deport, transport.* They mean very similar things. But to my introspection, the morpheme *-port* is relatively backgrounded by comparison to *ship*. It's in fact hard to even identify that the *-port* has the specific meaning that it does. It is hard to pull it out from the whole word. I would say that the same concept shows two different degrees of salience depending on the formal properties that it has, whether it is unbound or bound. Also we see it with a free morpheme and with a bound morpheme, the same kind of phenomenon. That's all within the category of the formal properties of morpheme.

Now let's go to another category which are the componential properties of morpheme. We go to factor AB1. The idea here is that a particular concept can sometimes be the entire content of a whole morpheme. In other cases, it's just a portion of that morpheme's meaning, and it's joined in that morpheme's meaning by other concepts. The factor here is that when a particular concept is the only concept occupying the meaning of a morpheme, when it takes up the

full share of a morpheme's meaning, iIt's more salient than when it occupies only some portion of a morpheme's whole meaning. Let's take the concept of 'parent' or the concept of 'sisterhood'. Let's stick with parent—no, let's stick with sister. Here is a phrase: *One of my parent's sisters is sick.* I am going to compare the concept of 'sister' with the morpheme *sister.* The meaning of the morpheme *sister* consists only of the concept of 'sister', the concept of 'female sibling'. That's all of it. Here is a case where the concept 'sister' occupies the entirety of the morpheme *sister*. Now, let's compare another phrase. *One of my aunts is sick. Aunt* is a parent's sister. *Aunt*, as a morpheme, includes the concept of parent's sister within it. Here is the morpheme. Here is the concept of a parent, and that parent's sister. The two concepts are inside one morpheme. The concept of 'sister' is still in the morpheme *aunt*. But it's only one of the concepts. It only occupies a portion of the morpheme's total meaning. My impression is that because of that, the concept of 'sister' is less salient as a concept than the concept 'sister' is when it's expressed by the word *sister*. So, if I said to you *one of my aunts is sick*, the concept of sisterhood might take a little longer for it to strike your consciousness than if I say *one of my parent's sisters,* where I use the word *sister* itself.

We find the same thing with *eat* and *swallow.* If you consider the concept of 'swallowing', swallowing is just the portion when the food goes down from your mouth into your throat. That's swallowing. That concept of swallowing occupies the totality of the morpheme, the verb *to swallow*. We had a kind of a noun before, now we have a verb. But in *eat* it's only a portion of it. The meaning of the verb *to eat* includes the notion of swallowing, but it includes more, it typically includes inserting into the mouth and chewing, as well as swallowing. Swallowing is just one portion of the total set of concepts within *eat*. I would say that in fact, 'swallow' as a concept is necessarily present in *eat*, you can never eat something unless you swallow it. If you take this meat and put it into your mouth, chew it and spit it out, you cannot say *I ate this meat.* You have to swallow it. But I would say the concept of 'swallowing', even though it's necessary to eat, is less salient there than when it occupies the totality of the word to *swallow*. This is now the principle of the share of morpheme's total meaning that is occupied by a concept. The principle is that a concept is more salient, it attracts more attention, if it occupies a totality than if it occupies just a portion of a morpheme's total meaning. That's one of the componential properties of morphemes. We are going to look at three here.

Let's go on to the second one. The second one is the ensemble versus the individual components of a morpheme. Now we will deal solely with verbs like *eat* or nouns like *aunt,* which intrinsically already contain several different concepts. We are just dealing with morphemes which already have a number

of concepts within them. Here is the attentional principle: more attention is on the totality, on the ensemble, on the Gestalt, on the accumulation of all those concepts together, than on the set of individual concepts that make up that ensemble. I will give you some examples of that.

Let's take the verb *to pry* in English. Not everybody knows this verb at all. I will explain it. Let's say, here is the wall and here is a board on the wall. *To pry* a board off the wall means it's nailed there, and you take the crowbar and you go… and it comes off. That's *pry the board off the wall*. The question is what are the components within *pry*. What has to be present in the total situation in order to be able to say *I pry the board off the wall?* Let's do the analysis. Let's say that a board is somehow stuck to the wall with a handle off the board. I pull the handle and get the board off the wall. In English, you cannot, in this circumstance, say *I pried the board off the wall*. All you could say is *I pulled the board off the wall*. So, what's the reason? Well, it turns out that for *pry* to work, to be usable, it demands of the mechanism for separating the figure object from the ground object that something act between them, some kind of lever pulling them apart. Now we know that that's one component within the verb to *pry*. You draw *pry* here. Component No 1: lever between the figure and ground, forcing them apart or pushing them apart.

Is that the only component necessary for *pry*? No, let's say here is the board and it's not glued to the wall, but it has a hinge. I take my crowbar, stick it between and go like that, and it just comes off. In this case I do have that component of pushing between the figure and the ground. But in English, you still cannot say *I pried the board off the wall*. Something extra is necessary, namely, it has to be stuck to the wall and offer resistance. You have to force the figure away from the ground. You wouldn't say *I pried the board off the wall*, you'd say *I flipped the board off the wall*. Is that enough? Well, no, let's now say here is the wall and here is a board. And let's say it's stuck to the wall. I take my crowbar and go in between. I have both the preceding components of place and betweenness, stuckness and I go like that, and it comes off all at once. You still cannot say *I pried the board off the wall*. Now you have to say something like *I popped the board off the wall*. So what's going on? Well, it turns out that *pry* needs in addition the concept of gradualness, progressiveness, it has to gradually come off, come off, come off, until it finally come off. It cannot come off all at once. So we've done the third component in *pry,* namely, gradual and partial separation.

Is that enough? No. Let's say instead of a board, now we have a large piece of masking tape, a piece of tape stuck to the wall. Let's say I take my lever and stick it between the tape and the wall and I go like this and I pull the masking tape down and between. It is stuck, it is gradual, but you still wouldn't say

I pried the masking tape off the board. You would say *I peeled the masking tape off the wall*. So, what's missing now? We need one more component for *pry*. That is, the figure has to be semi-rigid. It can't be flexible. A board is semi-rigid. It has to be only semi-rigid, not totally rigid. You have to have enough flexibility to come off gradually. All of that is in the verb *to pry*.

If I were talking to an English audience who knows the verb *to pry*, I would ask them 'Did you know that?' I'd ask 'Did you know everything about all those components?' And the answer is of course 'No'. Some were in their cognition. But all these components must exist because everybody knows how to use the verb *to pry*. In any of these alternative situations, they would know some part of the conditions, and would register that you can't say *pry*, you have to use some other verb. Some of that knowledge is closed, not necessarily conscious, but it's there. It is not conscious or readily conscious or easily availably conscious knowledge. The upshot is, that's where this factor of salience comes in, what is salient is how all of these components can join together as a kind of ensemble, a togetherness. That can be quite salient, and if you tell anybody the verb *to pry*, they automatically have a gestalt image of it that can be readily constructed. That part is salient, but what is backgrounded is the individual components that are part of this total gestalt conceptual complex.

That is this principle of salience. It's the whole versus the parts. The whole is more salient than the parts. I should point out that some of these components can be extremely unconscious. I've given this example to my class a number of times, then I talked about it to a colleague of mine, Karin Michelson, who came up with the masking tape example, which hadn't occurred to me. Embedded in one's unconscious expectations is the component of partial rigidity of the figure that I hadn't ferreted out, I hadn't isolated it and pulled it out. She did it. So this is an index of how inaccessible to consciousness some of these semantic components could be.

The third factor within the componential attentional properties of morphemes is that in morphemes that have multiple concepts within them, there can be a weighting among the concepts of relative features. Some can be more salient than others, even though they all belong to the same morpheme, they all have to be present, they can still be weighted. Within *pry*, for example, I would say all of the components I show are necessary. It's not dependent on the necessity of these components. There is an independent observation that they have separate weighting. It seems to be that the most salient among the components is the leverage effect: the motion of sticking something between the objects. That's the most salient. The least salient is the semi-rigidity of figure. Remember, I barely thought of it at all. So those have differences in salience.

Similarly in the case of the concepts within *eat*, the concept of swallowing is rather backgrounded in salience. In fact, it seems to be that it's less salient than *chewing*. When you say things like *eat faster* or *you should eat carefully*, it seems to be that the adverbs apply to the *chewing* component rather than to the *swallowing* component. You cannot *swallow* faster, you cannot *swallow* carefully, I suppose. But this is despite the fact that *swallowing* is criterial to *eating*. Here is what I mean by criterial. You can tell which of a set of components that are in a morpheme are criterial by what I call the almost-test. If you use *almost*, it first negates the most crucial part of the core components of a word's meaning. You are free to at least negate that and you are free to successively negate some more components beyond it, but the crucial one is also the criterial one. *Swallowing* turns out to be criterial, crucial, by that test. For example, if you say *I almost ate a piece of meat*, you could have done everything with the meat except swallowing. It means at least you did not swallow it. Maybe you also didn't chew it. Maybe it means you did not even insert it into your mouth. Maybe it means you didn't even take it off of the plate. Those are extras. But at least this means you did not swallow it. So, by the almost-test, swallowing is criterial to the meaning of *eat*. Nevertheless, curiously in fact, that does not translate into salience. It seems like another component, the chewing component, strikes me as more salient than the eating component. I don't know how to test that. I am not certain about that. But in any case, it's pretty salient. I suspect the swallowing part is less salient.

You can look for cases where two morphemes have the same set of component meanings inside them, but differ only with respect to the relative weighting, the relative salience. I think there could be an example of this. The verb I choose is *pass* as in *The diners pass the goblet of wine around the banquet table*. It has two forms, one the agentive form I gave you, and the other the intransitive form *The goblet of wine slowly passed around the banquet table*. Now in my analysis, both verbs *to pass*, the transitive one and the intransitive one, have the same components. Both have the core notion of handing something from one person's hand into the hand of another person, and they also both have agency. It's got to be done by some volitional agent doing this transfer. So, it's got both components. The difference though is this concept, this component of agency. Here is intransitive *pass*. It has got agency and hand to hand. There is the transitive *pass*; it has got agency and hand to hand, but the agency in this one is more salient. In fact, this agency is probably less salient than the hand-to-hand concept. If you say *The goblet of wine slowly passed around the banquet table*, it's lexicalized within the verb *to pass* that there is an agency, a volitional agency. It's a component of the meaning of the verb. But it is much more reduced in salience in that verb when it is intransitive.

How do we know all this is not just inferred by the context? Because you can contrast it with the first sentence in that example *The goblet of wine slowly went around the banquet table*. *Go* absolutely lacks any lexicalized concept of agency within it. It solely refers to the goblet's motion. So if you understand that sentence to refer to people agentively passing the goblet around, it's done solely by your adding in information through context. In other words, it's pragmatic, whereas if with intransitive *pass*, it's semantic. It's absolutely lexicalized in the verb. The verb itself automatically has the motion of agency within it. That's the difference of meaning between *The goblet slowly passed around* and *The goblet slowly went around*. Intransitive *pass* and *go* are as if they were the bookends around the threshold difference between semantics and pragmatics. They mark the distinction between semantics and pragmatics. The concept of agency is semantic or lexical within *pass*. And it's pragmatic, if you read it in, in *go*. I will not go over the diagram here with you. But this diagram combines the findings that we have for all three of these componential attentional factors of morpheme in one fell swoop

We can skip now to the next star factor AC1 on page 77 (handout). This pertains to frame properties of morphemes, not componential properties, but frame properties of morphemes. In this all I am going to cover is the first factor. It distinguishes what there I called the direct meaning; I now call the core meaning, versus the associated meaning of a morpheme. The basic principle is that the core meaning of a morpheme is more salient than the associated meaning of a morpheme. There are three kinds of associated meaning that are illustrated in this handout. The core meaning is essentially the difference between denotation and connotation. The first kind of associative meaning here I call the augment, it's basically incidental to the core meaning. It can be omitted. It can be altered. It could inherently have been otherwise. That's its character.

Let me give you an example of that. Consider the two morphemes in English *north* and *east*. So I say *I went north, I went east.* If I ask you to tell me what is the difference between north and east, the first thing you would say is the compass orientation. That's true. Is there anything else different? Let's see if we can figure out if anything else is different about them. Now, let's say *I flew north, I flew east*. Okay, how about *I kept flying north, I kept flying east.* It turns out that if you say *I kept flying east*, here is the planet. You can do it forever, keep flying east. But if you keep flying north, you can only fly north until you hit the North Pole. If you continue, you are now flying south. So it turns out that north has a factor that is different from east, other than the compass orientation. Namely, that it has a concept of polar terminus in it. It stops at the pole going in that direction. I would say that element its boundedness, the boundedness of north as against

the unboundedness of east, is a relatively backgrounded factor. That's part of its associative meaning. The core meaning is the compass orientation. Its associative meaning, in this case, part of what I call the augment, the incidental part, is its boundedness versus unboundedness. Why do I put this boundedness versus unboundedness in this type of associated meaning, the incidental type? Because it can be dropped, omitted, or it could have been otherwise, and still not much has been changed for the core. For example in everyday usage, if your perspective is not that global, north and east are comparable. You do not have to think about the stopping point at all, so you do drop it for local terrestrial geometry. Secondly, it's a convention built by geographers that it has to be this way. It could have been outside of global geography. We could have set up the convention differently. Here is the western hemisphere, let's say. I'm going north, going north, here is the North Pole and I'm still going north. So, we could have designated that north refers to continuous motion going that direction around the great circle which is towards the north pole in the western hemisphere and towards the south pole in the eastern hemisphere. We could define that way. Comparably, you can redefine east and west. Here is the east and west. As of now, this is always east. But you could set the zero meridian otherwise. We could say going this way is east, going this way is east, but going that way is west. We could define it that way, so that if a satellite flies around the earth, it's going east, west, east, west and so forth. It's easy to define it that way, but we didn't. Because of the contingent nature of the association that we have with the meanings of north and east, I consider it part of this sort of tangential augment, a kind of meaning.

Let's move on to another kind of associative meaning, which is what I call co-entailment. There are some linguistic traditions for dealing with this. Fillmore defines the co-entailment concept as if you have one of them, then you have all the rest of them. They co-entail each other. If we've got buying, we've also got selling, then we've also got money. You can direct your attention to any component of it, but if you get any component, you get the whole thing. So they are all co-entailed. What's in focus in any given word, like to *buy*, is only certain portions of this co-entailed situation, is in the core meaning of this verb, and all the rest, all the co-entailed things, these are the associated meanings, in this case, the co-entailment portion. Fillmore called the co-entailed set the cognitive 'frame'. He called the portion that you have your attention on 'highlighted' and Langacker used different terms for this. He uses the term 'base' for the co-entailment set, and the term 'profile' for the portion you have your attention on. One of Langacker's examples is *hypotenuse*, which here is a right triangle, here is the hypotenuse, and the word *hypotenuse* automatically brings that line to the foreground of your attention. Therefore, in my terms, in my framework,

the core meaning of this noun is *hypotenuse*, and the associated meaning, this co-entailed portion is the whole right triangle, the whole co-entailed thing.

What I can add to what Fillmore and Langacker did in this regard is to notice that you can subdivide co-entailment into three types. One is where the focused-on object, the core, must be co-present with the co-entailed parts in both space and time and particular relationship. For example in this case, the hypotenuse must be co-present with the rest of the right triangle in both space and time in order for it to be a hypotenuse. If it's not, it's not a hypotenuse any more now it is just a line segment.

In another type that focuses on a component of the co-entailment set, the core meaning must be co-present in time but not necessarily in space. Husserl, the German philosopher, actually did a lot of this kind of stuff before any of us, and his example would be his dependency relation. One of his examples is *wife and husband*, where the word *wife* is part of the co-entailment set of a married couple, and in this case, the woman of the co-entailment set is in the foreground of attention, is more salient, and therefore is the core meaning. And in the whole thing, the husband alone is backgrounded, in the associated meaning. Again, in this case, the foregrounded person has to be co-present with the remainder in time. Certainly, not in space, because husband and wife can be different parts, they do not have to be together. But they have to be co-present in time, because if a husband is dead, then the wife is no longer a wife, she is a widow. So that word requires that much in addition.

If you move on to Fillmore's commercial scene which is a co-entailment set, if you take the verb *to buy*, its components can be decoupled from the remainder of the co-entailed set of components in both space and time. Therefore, even though there is still a co-entailment, nevertheless, they don't have to be co-present. You can say things like *I bought her old banjo from her over the phone*. It's okay to use the verb *to buy*. She'll ship it to me next week, and I'll send her a check for it after it arrives. The receipt of the goods can come later, and the sending of money can come still later. That's okay. Because you still use the verb *to buy*, so the verb to *buy* is linked with these elements of to buy, with buyer and the object. It is still linked to all the components within the co-entailment set, but they do not have to be co-present in time.

Let me move on to a third kind of associated meaning, what I call the presupposition kind of associative meaning. Remember that the attentional issue of all these is that the core meaning, the direct meaning, is more salient than the associated meaning. That's the whole thing, just laying out the details of this one single attentional factor. The core is more salient than the association. Each of these cases is subdivided by further distinctions, but the same attentional principle holds across all of these. Now let's take the presupposition

type. It turns out that the meaning of any given morpheme often rests upon a set of presupposed concepts in a particular relationship. It can have a whole conceptual infrastructure which can extend as wide as the whole culture, and a set of assumptions, a sea of this mental presupposition.

So let's take the English word *heaven.* It presupposes a whole set of concepts and I'll enumerate them. Here I use the word *heaven* pretty much as it's used in the general Christian context. First of all, it presupposes every human being has an intangible spirit, an intangible essence, that comprises the sum of his or her identity. That's generalized spirit. That's the word's first presupposition. The second presupposition is that this spirit survives or continues after death and does not become a body again. Remember, for each of these presuppositions there are religions or spiritual systems in the world, so that if you change it, you got some other spiritual system. There are some spiritual systems where a human being has five elements that would be called spirit, not just one and so forth. Here we have one that says it continues after death and doesn't enter a body. We are talking about heaven; we are not going to talk about reincarnation. Here there's God, whose intentions determine everything in the universe.

This is the concept, though; a determining essential entity, God, has established certain idealized principles that he wants humans to act in accordance with. He rewards those who follow these precepts, and punishes those who don't follow these precepts. There are further particulars, presuppositions and so forth, such as that even though God is ubiquitous, that is, everywhere, in principle nevertheless, he can be imagined as located physically above the sky. These are not the whole set of presuppositions, there are certainly more. These are the crucial ones.

Now what about the noun *heaven*? It can now be defined as something like a generally luminous space surrounding or near God, when God is conceptualized as localized and as located above in the sky or beyond the sky, in which the spirits of dead human beings permanently abide, those human beings who are being rewarded for having followed the God's precepts. The reward is that they get all good worthy things. You have to have the word *worthy* here too, which means good. All of that is in the noun *heaven*, and if you look around the world spiritual systems, you'll find that to the degree that they differ from this set of presuppositions, to that degree you feel less comfortable using the word *heaven* in English. Let's take the concept of the afterlife in Greek mythology. It is often referred to as the Elysian Fields in ancient belief. It's typically not called heaven, it's not called Ancient Greek heaven. It's typically called the Elysian Fields because it differs enough from our set of presuppositions. For one thing, it's located underground, it's not in the sky. Secondly, there is no deity in there. The deities are on Mount Olympus. Third, it is not for every

good person's spirit. It's for the spirits of the heroic, of the heroes who died in battle especially. Next, they don't get good and worthy experiences that would improve their lives in accordance with some system of value. Instead, they get all pleasant experiences, so they hunt, they banquets, they don't improve their holy souls. Furthermore, they do not even have the concept of a single spirit that constitutes their identities, since Hercules was born of an immortal god and a mortal mother. Only the mortal portion of his spirit goes to the Elysian Fields. The immortal portion goes to Mount Olympus. That concept will be totally alien in the west. So, as you see, for these very reasons English speakers would feel very uncomfortable calling it *heaven*. Anyway, in terms of attention, the upshot is that once again the core meaning, the direct meaning, of the noun *heaven*, this luminous space which people live in, is more salient than all of this set of presuppositions which in fact can be rather backgrounded, but are in fact rather difficult to tease out of your presuppositions and made explicit and wholly conscious. In fact, they are so taken for granted that it's often necessary to encounter some other belief system in order to realize they even are there. That's it for the frame properties of morphemes.

Now we are shifting from a morpheme's individual components to where a single morpheme has a number of distinct senses, it's polysemous. It has a polysemous range. It has distinct senses, where each sense can arise in a particular context that calls for a particular sense. The distinct senses that a morpheme can have in a polysemous range can be weighted, ranked among themselves on their relative salience. Typically, one of the senses will be the most highly weighted one, and will be the sense that pops into mind as you refer to the morpheme unless the context makes perfectly clear that some other one is called for.

Let me take a particular concept which is in the polysemous range of three different morphemes. It doesn't exist there, but it exists in different rankings in these three morphemes. The concept that I want, the polysemous sense is the material that plants grow in. That's the particulate material plants grow in, that's the sense I want. The noun *soil* is the first, the most salient, the most heavily weighted of all its senses. But it does have other senses within this polysemous range. It has a sense of 'land'. Or else it could be used to contrast 'country' with 'urban', so *I live on the soil* means *I live in the countryside*. It has other meanings, but the first one is 'the stuff the plants grow in', whereas *dirt* also has 'the stuff the plants grow in' as one of its senses, but that's one of the less salient senses. The most salient sense of *dirt* is grime, nasty stuff, filthy stuff. That's the most salient sense. And with *earth*, the most salient sense is probably this planet. Another sense is 'land mass', like *It settled to earth*, where one of its further senses could be 'the stuff plants grow in'. If you use these words in a

non-constraining context, such as *The X is slowly turning red*, if you say *The soil is slowly turning red*, the first thing that pops into your mind is the stuff plants grow in. But if you say *The dirt is slowly turning red*, you think of the grime, and *The earth is slowly turning red*, you think of the planet. Only if you have the context *I need to put more earth in my planter, I need to put more dirt in my planter*, then the context automatically singles out the relevant sense, even if it is further down the list. The attentional point is that there is a ranking of weighting among the different senses lying in the polysemous morpheme's range.

So this is the context affecting attention. It's one of the starred factors. I pick this one next because it keeps constant within each morpheme having a polysemous range. Here, though, I am going to directly deal with the fact that the context can single out only one of the polysemous available senses in a morpheme's polysemous range. The attentional factor is that the contextually singled-out sense is more salient than the other senses within the polysemous range of a morpheme, even more salient than the most highly weighted one. I've listed a number of morphemes and a number of senses for each. We've got the morpheme *check*. *To check* is a verb and means 'to ascertain' or 'to put a checkmark beside', or 'to stop' because of its range of meanings. *Market* could be an 'open-air food vending location', it could be a 'financial institution'. *Figure* could refer to a set of numbers or to a shape or to an exalted personage. *Stock* has really a large number of meanings; it means a 'soup base', 'storage supply', 'goods on demand'. And *down* has a number of meanings. It could mean you are depressed. It could mean 'it's registered, recorded'. It could mean 'downwards'. So this is a whole range of meanings. But if you combine them with a particular context, the co-presence of a lot of other morphemes in the context, together with the surrounding physical context or the topic of conversation in general, can quickly help the hearer narrow down to the sense within the polysemous range of each morpheme that is relevant. If you have the sentence *I checked the market figures—my stock is down*, the likeliest thing you would assume that it means is that you are talking about the stock market; the monetary value of your stock holdings is reduced in amount. And *check* means 'I went and looked at'.

However, I found a way to develop a total different context which would select for a completely different sets of senses within the polysemous range. Let's say I am the manager of a supermarket, so that requires a different concept of market than stock market. The home office everyday prepares a set of diagrams, showing among other things the current inventory in my supermarket, the inventory of my stock. I check these diagrams to see if they are correct, and if they correspond to my actual inventory, I put a checkmark beside them and then my checkmark is down. This means the written record, the register.

Well, you could say the same sentence. You say *I checked the market figures—my stock is down.* So it could mean that in the correct context. If you re-contextualize something, all this zips through your awareness of all these alternative meanings of these words, a different selection from each of the relevant senses within a polysemous range. This process of the context selecting and foregrounding one of senses of a morpheme is coupled with another process of inhibiting, and therefore backgrounding. the other senses of a morpheme. It could be there are two concurrent psychological processes going on. Once, through context, your cognitive processing determines that one particular sense within the polysemous range is the relevant one and therefore needs to be foregrounded in favor of all the others, even the most highly weighted one, a comparable process then backgrounds all the rest of those concepts, inhibits them, keeps them down. Maybe that's the actual psychological circumstance. However, it may be that certain concepts within the polysemous range have a certain kind of extra energy to them, to rise to attention, perhaps because they are taboo or especially significant. Therefore they can sometimes break through the intervention that is normally part of this process.

An example of this is somebody says *Here is an ashtray*, here's a nice-looking ashtray and a nice table. The host says to a guest who is smoking *Don't put your butt on the ashtray*. Well, to an English speaker, this could be really funny, because the word *butt* has several senses. One of them is the stub end of a cigarette. Another is your rear end, your buttocks. Everything in the context should determine that the hearer would pick out just the 'stub' concept of the word *butt* as the meaning: *Don't put your cigarette stub in that ashtray*. But the 'buttocks' sense of *butt* can be so salient that it can break through the masking process, the inhibition process, and rise to attention. Therefore you get a pun and a joke. In fact I know that I am not in an English-speaking audience, because if you say this sentence to the natives, you automatically get a round of chuckles through the audience if you say *Do not put your butt in that ashtray*. There are two processes by which this inhibition system can be relaxed. One is poetry. In poetry, both the poet and the reader of the poetry deliberately, volitionally undergo an internal cognitive process whereby they relax their inhibitory systems in order to allow the other polysemous senses of the morpheme to arise in order to enrich the semantics of the given words. The same goes for puns. When jokesters make puns, they depend on this inhibition function in order to experience the subsidiary meanings of a morpheme. Somebody who doesn't get puns is typically unable or unwilling to relax this contextualizing suppression.

Many linguists are interested in phonological factors. In general, the meaning of a morpheme is typically more salient than the sound of a morpheme,

than the phonological shaping of a morpheme. That's a recurrent factor. But there is another factor, which can upset this factor. Let me give you two sentences. The first sentence is *It's no jest: I talked to a chap who feared he'd gag on a coke and die*. We've got a sentence, an odd sentence, but a sentence. Now let me shift all these words towards having the same rhyme. You can say *It's no joke: I spoke to a bloke who feared he'd choke on a coke and croak*. This means the same thing. I have kept the rhythm the same and everything else, and the words have the same register. I have made a set of words have the same phonological shape in their endings and it's called rhyme. This fact alone draws attention to the commonality of phonological shape across this set of words. This can then overcome the usual factor, which is that the meaning of a morpheme is more salient than the sound of the morpheme.

Since it's getting late, I think I am going to go directly to section 3. What we have done so far is look at individual attentional factors, but typically, although those factors do have effects by themselves—in fact, the basis for isolating these factors is because they can operate alone—nevertheless, what they typically do is cooperate with each other or compete with each other for larger attentional effects over the whole sentence or a portion of sentence. This is what I am looking at, these complementary effects. The separate factors can combine in order to give you a kind of a graduated effect of salience. Let's go back to the passing of wine around the banquet table. If you have a bunch of factors in a bunch of sentences, you actually have the gradation of the concept of agency, from strongest to weakest. Let's start with the sentence *The diners slowly passed the goblet of wine around the banquet table*. Here the concept of agency is the strongest because we get the subject expressed by a free noun as opposed to a closed-class form in the beginning of the sentence—each of these things is a factor—the use of a verb that selects for a mass subject and so forth. Then, we can reduce slightly the salience of agency by converting it to a closed-class form. You can say *They slowly passed the goblet of wine around the table*. Then you can reduce it further by turning it into the passive *The goblet of wine was slowly passed around the table by them*. With *by them* you use two factors to lower it. It's the factor that says whatever appears first in the sentence is more salient. So, it's last, it's less salient. If the subject is more salient, the non-subject is less salient, so we get both factors working here. Then, if you reduce further and say *The goblet of wine was slowly passed around the table*, you delete mention of the subject at all. That's another factor which says that if some concept is explicitly mentioned, it's present in the discourse, that concept is more salient than if it is not mentioned. That's another factor. Then, you can shift it to the non-passive and say *The goblet of wine slowly passed around*

the table instead of *was passed*. The subject is explicitly demoted, since there is no agent there. In this case, the agency is solely part of the lexical meaning of *pass*. Finally, you go to *The goblet of wine slowly went around the table*. There is no agency intrinsically expressed in the sentence at all. You have to refer to it through pragmatics

So now we go through the whole list of agency. Because of the interaction of a number of factors, we can actually get gradience. In addition, you find certain factors can co-ordinate their activities and appear together. In fact, languages are often so organized that they sort of conspire to allow certain factors to co-occur. Let's take agency, and the way English has certain facts co-occur to give an extremely foregrounded agency. Namely, it's subject for the first position, open class form, so all these things together.

By allowing this set of factors, all of which refer to the salience of the same entity, you can either make an entity highly salient or highly non-salient. Consider the concept of a person, which can show up as a noun in the phrase *a person who jogs*, or as the suffix *-er*, as in *a jogger*. Both of them mean a person, but the first is highly salient, because it represents the confluence of four different factors. One is it's an open-class form instead of closed-class form. Second, it's phonologically marked. Third, it's stressed, more highly stressed. Fourth, it's a free form instead of a bound form. All these factors that I list earlier in the handout. As a consequence, the concept of personhood is more salient in *person who jogs* than in the *-er* of *jogger*. These are ways in which different factors can reinforce each other in different degrees and give you gradience and/or extremely high degrees.

But they can also conflict with each other. In this case, if they conflict any one of them can outdo the others, or you can get competition. Let's take the concept of an airplane. The concept of airplane is highly foregrounded in the sentence *I went to Key West last month by plane*. It's highly backgrounded in the sentence *I flew to Key West last month.* But both of them mean 'I went there by plane'. The reason that the first one is highly foregrounded is again one of these confluences of factors. Here the concept of 'airplane' is emphasized because it is more highly stressed than *flew*; *flew* is unstressed. It's a noun, instead of a verb. It's at the end of the sentence instead of in the middle of the sentence. And the concept of 'plane' occupies the totality of the morpheme *plane*, while there is only a portion of the meaning of the morpheme *to fly*.

However, there is another factor which is involved, which foregrounds anything that is under extra heavy stress. So you can say *I FLEW to Key West last month*. If you stress it, you now undo the backgrounding of plane, of the concept of 'plane'. This extra heavy stress countermands the backgrounding

effected by all four of those factors together and forces the concept of 'airplane' into the foregrounded attention. So that's all.

Then the kind which is just competition, where you could say you have a little bit of attentional capacity and you have two different entities to devote it to, and you have to switch between the two factors. So for example, let's say somebody is talking while you are listening to a play, and something that is being said is unclear, and then the person goes on and says something else. One of the factors says you have to devote most attention to what is currently being said, in order to process it immediately for its content for not to be lost. But what's current is less salient than what's passed. Another factor says if something is unclear, devote enough attention to it to resolve it. Well, if something is unclear and here is the current thing, you've got two factors competing with each other, struggling for their share of your attentional resources. You may go one way or you may go the other way, or you may try to balance it too. So here are competing forces. My whole ultimate attentional system includes this kind of thing. Factors group under much larger concepts which I only mention one of here; these individual factors I have are really instances of much larger principles. One principle says the more conceptually significant, or significant to the current context, the more salient it is. There are a number of factors that fall out of one single overarching principle.

In the final analysis, I am going to have a smaller set of principles, and the individual factors will fall out of the particular instantiation. Then there is contrast with the different systems as to which has all of these different factors. Are they common to all languages, to all modalities, to all cognitive systems? The answer is no. For example, let's look at one factor which we didn't go over: topic markers. There are specialized markers which direct your attention to foregrounding some object that they are next to. Tamil has topic markers, Japanese has topic markers. English doesn't, so that particular factor goes pretty well unused by English. On the other hand, extra heavy stress to direct specialized attention to some element within a sentence is used in English enormously whereas in French very minimally. This is an example of how this listed factor is used differentially by different languages.

In addition, there are differences across language modalities between spoken languages and sign languages. Sign language has a kind of factor which has no obvious counterpart among spoken languages. I will show you how it works. What if you have a room, and you want to move the wall further out to make the room more spacious. This is the sign within the classifier system that refers to a large plane object. If you move it like this, that means the wall physically went through the space to push it to this further point. But if you indicate like this, that means the wall was disassembled and reassembled at the further

spot; either that or you're not discussing, you are not interested in, how it got to the further spot. What's involved in doing that is essentially a 'disregard' gesture. The disregard gesture says 'disregard how this hand shape first appears here and then gets to the second position'. It says 'don't worry about that'. I cannot think of a linguistic counterpart in spoken language to the disregard gesture. Another thing that sign language has is a way of maintaining through time a certain backgrounded entity. It turns out that spoken language does use this for something. Let's say that English has high expressed doubt. This doubt intonation pattern is a high constant pitch. I can say in English and I can therefore maintain over some portion of time even in the more backgrounded material, the concept of my doubt. I can say *Are you really going through with that crazy plan?* If the whole thing is in a high pitch tone, that indicates doubt. Well, that's the example. English cannot do this with the topic, whereas sign language can. In ASL this is the sign for lunch. If you say that lunch is free, but dinner you pay for, you sign for lunch with your head raised, with eyebrows up. We are going to talk about lunch as the topic. You hold it up there while with one hand, you sign the word for *free*. Then you lower your eyes to show but keep it out there, *as for dinner*, you lower your eyebrows to show you are not doing the main event for free. You must pay This is the way it differs from spoken language.

Finally, there is a contrast in attentional mechanisms between different cognitive systems. Spoken language and visual perception share certain mechanisms. If something is greater along some dimension, then it attracts more attention. In English, if a word is stressed, it indicates that you direct more attention to the concept of the word that is being stressed, so more of some physical parameter means more attention devoted to it. In visual perception, if something moves faster or is brighter or larger, it typically attracts more attention than other things that you see. So, that much is in common. But language has things which visual perception seems not to have, like this very thing I mention, the topic marker, the whole notion of something next to another word which directs attention not to itself but to something next to it.

This I suspect, I'm not a psychologist, is relatively rare in visual perception. It probably occurs, maybe if you look at somebody, themselves looking at something else, they might then take that as a sign to whatever scene they are looking at. But typically, visual arrays, maybe in visual processing, serve to direct your attention here, I don't know. But if so, there is a difference. Contrariwise, visual perception seems to have something that's missing in spoken language and that's quick orientation. If something happens quickly, abruptly, it directs attention. If there is sudden movement, you have an orienting response towards it, to look at it. There is relatively little in language that works that way,

like you suddenly raise your voice and shout, sure, some people will look at you. That seems to be almost part of the perceptual system. It doesn't seem to be a major part of the language system. To summarize, we've got, built into language, a whole attentional system with a number of factors themselves coordinated and that interact. They fall into larger groupings all of which I'm planning to work out in some greater detail to show what they are. These larger groupings should reveal the major attentional principles. This system in part is in some respects specific to spoken language and in some respects shares other features in common with perception and other attention phenomena or cognition.

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Handout Lecture 5

1. Introduction

1.1 Basics

1.1.1 Goal of this research:
to outline the fundamental attentional system of language

1.1.2 Placing attention among other major organizing systems of language
language has a certain number of extensive organizing systems
that structure conceptual content and context (my term for them: schematic systems)
Attention is one of these systems. They include:
configurational structure / perspective point / attention / force dynamics / cognitive state

1.1.3 Initial characterization of attention in language
In a speech situation, a hearer may attend to the linguistic expression produced by a speaker,
to the conceptual content represented by that expression, and to the context at hand.
But not all of this material appears uniformly in the foreground of the hearer's attention. Rather,
various portions or aspects of the expression, content, and context have different degrees of salience.
Such differences are only partly due to any intrinsically greater interest of certain elements over others.
More fundamentally, language has an extensive system that assigns different degrees of salience
to the parts of an expression or of its reference or of the context.
As for the speech participants, prototypically: the speaker employs this system in formulating an
expression; the hearer, largely on the basis of such formulations, allocates her attention
in a particular pattern over the material of these domains.

1.2 Some background assumptions about attention and consciousness in language

1.2.1 Attention and consciousness at core are both the same essential phenomenon and differ only in relatively more superficial properties such as:
voluntary vs. involuntary / focused vs. unfocused / figure vs. ground (see 1.4 below)
hence, both terms are here used interchangeably, with modifiers if needed

1.2.2 Attention/consciousness is found to be a gradient phenomenon in language —not, as held by some, to be a discrete all-or-none phenomenon

1.2.3 Consequent equivalence of terms:

a. attending to something:

attention on X = consciousness of X = salience of X

b. what is attended to

the object of attention = a content of consciousness = what is salient

my only coined term: an "obtent": whatever is or can be
an object of attention / a content of consciousness

c. gradience

X higher / lower in attention = X more foregrounded / backgrounded in attention
= X more central / peripheral in consciousness = X more / less salient

1.3 Parameters of the attention system of language: partial list of the major distinctions

1.3.1 Core parameters

1) consciousness/attention vs. an obtent (a potential or current object of consciousness/attention)

2) conscious vs. unconscious: whether a cognitive phenomenon (an obtent)
currently is or is not in attention/consciousness
3) involuntary vs. voluntary: whether an attentional process occurs spontaneously or
gets triggered in an individual involuntarily
vs. the individual consciously and intentionally directs the process

1.3.2 Quality and quantity parameters

4) selection: which one of several candidate obtents is in or enters attention/consciousness
5) strength: the degree of attention on a current obtent
or the degree of an unconscious obtent's tendency to enter attention
6) scope
e.g., proportion of one's attention that is on an obtent—much = focused / little = unfocused

1.3.3 Temporal parameters

7) duration: the length of an attentional process, from brief to extended
8) steady-state vs. changing; and if changing:
9) direction of change—e.g.,
increase / decrease in strength
an obtent entering / leaving attention (= attention extending to / retracting from an obtent)

1.3.4 Relative prominence parameter

10) the Figure vs. the Ground status of attention and of obtent
this parameter may have no actual role in cognitive processing
but only provide 2 models for how we envisage the interactions

a) an obtent as Figure enters, is in, or leaves attention, itself a stationary Ground

everyday expressions based on this model:
Figure = subject: The new tune was in my attention. / The new tune soon came to my attention.
Figure = object: I put that thought out of my mind.

b) attention as Figure extends to, is connected with, or retracts from an obtent as Ground

or, if pictured as a beam, swings over to, is on, or swings away from an obtent as Ground

everyday expressions based on this model:

Figure = subject: My attention was on the music. / My attention wandered away from the music.

Figure = object: The music attracted my attention. / I turned my attention to the music.

1.4 Support from these parameters for coalescing consciousness and attention

some support for the move to treat attention and consciousness as the same phenomenon:

these 2 terms are in partial complementary distribution with respect to certain parameters above

which thus represent relatively superficial differences atop their essential sameness

1.4.1 Voluntary vs. involuntary

"attention" can be treated as involuntary or voluntary, but "consciousness" only as involuntary

The idea entered my attention / consciousness.
I turned my attention to it. / *I turned my consciousness to it.

1.4.2 Scope

"attention" can be focused or unfocused, but "consciousness" only unfocused

The music took up a bit | some | more of my attention / consciousness.
My attention / *consciousness was focused on the music.

1.4.3 Figure vs. Ground

"attention" can be treated as Figure or Ground, but "consciousness" only as Ground:

The music is in my attention / consciousness.
My attention is on the music. / *My consciousness is on the music.

1.5 Methodologies used in this investigation of Attention in Language

1.5.1 These are the same as already standard in the field of linguistics overall:

1) introspection, 2) semantic and syntactic analysis
both in conjunction with analytic thought—itself introspective in character,
(and including the systematic manipulation of ideas, abstraction, comparison, reasoning, etc.)

1.5.2 Basic structural characteristics of linguistic introspection

a. two levels of consciousness

generally, linguistic introspection = conscious attention directed by a language user
to particular aspects of language as manifest in his own cognition.

specifically, certain aspects of language can appear
—whether through perception of speech, by internal evocation, or spontaneously,
in a language user's consciousness = "level-1 consciousness"
a second level of consciousness can also occur in the same individual at the same time
that has as its object (part of) the contents of the first level of consciousness

this "level-2 consciousness" can be volitionally evoked
and directed at a selected linguistic target on the first level
if all these components are engaged, this cognitive pattern = introspection

b. accessibility to introspection

has two main components:

1) "readiness":

the numerous distinct aspects of language differ in their readiness
to appear in first-level consciousness

2) "amenability":

if present in level-1 consciousness, such aspects of language
differ in their amenability to attention directed at them from level'2 consciousness

an aspect of language is more amenable
if it has greater strength and clarity in level-1 consciousness
and can remain more stably present there while attention is directed at it

it is less amenable if it is fainter, vaguer, or more elusive under such attempted scrutiny

3) the "accessibility" of an aspect of language
to introspection
= a cover term for its readiness + its amenability

NB: arguments for the use of linguistic introspection appear in Part 2

2. Linguistic factors that set the object and strength of Attention involuntarily

a. basic properties of these factors

1) voluntariness for hearer and speaker
over 50 linguistic factors at work in the utterances of a speaker
affect the attention of a hearer involuntarily
and a few factors (Ga and Gb) affect the attention of the speaker involuntarily
in the production of utterances
a speaker can voluntarily control the remaining factors
some directly, but others typically only indirectly

2) mechanisms and obtents of the factors
Each factor involves a particular linguistic mechanism that increases or decreases attention on a certain type of linguistic entity.
The mechanisms fall into some 10 categories.
= the basis for their cataloging below

The entities whose attentional level is being set—the objects of attention, i.e., obtents—
are of some dozen types.

b. formulation of the factors

1) greater vs. lesser attention
The factors are all formulated as a contrast between greater and lesser attention
—more readily agreed on than single rankings along an absolute scale
thus, each factor can be used either to raise or lower attention on something

2) mention of obtent and mechanism
the attentional object whose salience the factor governs (the obtent) is mentioned first
the mechanism (if present) is mentioned last

3) contrast types
The factors are of 3 main "contrast types":
a polar or "whether" factor:
entity A is more salient in circumstance X than not
a circumstantial or "where" factor:
entity A is more salient in circumstance X than in circumstance Y
an alternant or "which" factor:
entity A is more salient than entity B (when cooccurring in a particular venue)

4) degrees of dividedness
these contrast types can further be of 3 degrees of dividedness:
gradient / dichotomous / hierarchical

a gradient "whether" factor = a scalar or "how much" factor
entity A is more salient in proportion to the amount of circumstance X it is in

c. differences across the factors

The factors differ from each other along some 20 parameters, some already seen; a sample:

type of mechanism in the factor that causes its attentional effects
type of object whose salience is governed
strength of absolute or relative attention
contrast type and degree of dividedness
attention for whom? (speaker, hearer, bystander)
speaker's means for controlling a factor
the cognitive basis of a mechanism's capacity to govern attention
the time course of a factor's applicability

d. in the presentation that follows:

the included factors are selected from a larger set
the factors are grouped by their type of mechanism,
and the mechanisms are roughly sequenced by the size of their scope
asterisks mark the factors to be discussed, generally the less familiar ones

2.1 Factors involving properties of the morpheme (A)

"morpheme" here = any minimal linguistic form with an associated meaning,
including: a simplex morpheme / a complex morpheme (collocation or idiom) /
a construction (e.g., the English auxiliary-subject inversion meaning 'if')

2.1.1 Formal Properties of the Morpheme (Aa)

* *Factor Aa1: expression in one or another lexical category.*
a dichotomous where factor: a concept represented by a morpheme is more salient
when that morpheme is open-class than when it is closed-class; and within those:
more when a noun than a verb, / more when phonological than aphonological

(1) open-class (N > V) > closed-class (phonological > aphonological)

(2) A. a. When he arriv*ed*, … b. When he arrive*s* / *will* arrive, …
B. a. On his *previous* arrival, … b. On his *upcoming* arrival, …

* *Factor Aa2: degree of morphological autonomy*.
a dichotomous where factor: a concept represented by a morpheme is more salient
when that morpheme is free than when it is bound

across closed-class forms-- the concepts 'potential' / 'negative' / 'iteration' / 'Agent backgrounding (passive)'

(3) a. Once triggered, this kind of trap can not be set again.
b. Once triggered, this kind of trap is unresettable.

across open-class forms:
V: *ship / -port*: 'convey bulky objects by vehicle over geographic distances'

(4) a. ship in / out / across / away b. import / export / transport / deport

2.1.2 Componential Properties of the Morpheme (Ab)

* *Factor Ab1: Solo vs. Joint Expression of a Component in a Morpheme*
a dichotomous where factor: a concept in the reference of a morpheme is more salient
when it is the whole of that reference than when it is only part of the reference

(5) the concepts 'parent' and 'sister' in: a. one of my parents' sisters b. one of my aunts

(6) the concept 'swallow' in: a. swallow b. eat

* *factor Ab2: the ensemble vs. the individual components of a morpheme's meaning*
a dichotomous which factor: the ensemble of the components of the concept expressed by a morpheme
is more salient than the individual components

(7) a. I pried the board off the wall.
b. I pulled the board off the wall.
c. I flipped the board off the wall.
d. I popped the board off the wall.
e. I peeled the masking tape off the wall.

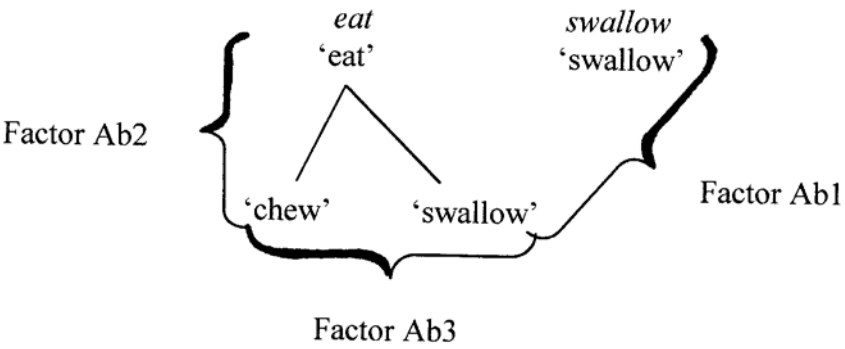
* *Factor Ab3: weighting among the components of a morpheme's meaning*
a dichotomous which factor: one component of the concept represented by a morpheme
can be more salient than another component as an intrinsic characteristic of the morpheme

(8) *pry*: 'levering' > 'attached' > 'gradual' > 'rigid'

(9) *eat*: 'chew' > 'swallow' You should eat carefully / faster.

(10) a. They slowly passed the goblet of wine around the banquet table.
b. The goblet of wine slowly passed around the banquet table.
c. The goblet of wine slowly went around the banquet table.

* *Relating Factors Abl through Ab3*



Factor Ab4: Degree of Category Membership
a dichotomous which factor: the prototype within the concept expressed by a morpheme
is more salient than the rest of the concept

(11) *bird*: a. 'robin' > 'ostrich' b. 'robin' > all bird types

2.1.3 Frame properties of the morpheme (Ac)

* *Factor Ac1: a plenary frame: a morpheme's direct reference vs. supplementary concepts*

a. a dichotomous which factor: the set of concepts directly expressed by a morpheme
is more salient than concepts only associated with that direct reference
b. a whether factor: the concepts associated with the set of concepts directly expressed by a morpheme are more salient when that morpheme
occurs in speech than when it does not

A. the associated concepts are *incidental* to the direct reference
in that they could be dropped, replaced by alternative concepts, or uninstantiated

(12) east vs. north, as in: I kept flying east / north.
direct (foregrounded): compass orientation
associated (backgrounded): path indefinitely extendable vs. only as far as polar terminus

incidentality of the associated concepts:
—they are absent for local geographic use / missing before concept of global earth
—based on geographic conventions that could have been otherwise, e.g., great circle path toward north pole starting in western hemisphere continues as "north" in eastern hemisphere

B. the associated concepts are *coentailed* with the direct reference
reference to any component of the coentailed set foregrounds that component
and raises the rest of the set into the "midground" of attention

coentailed set = Fillmore's "frame" / Langacker's "base"
foregrounding of a component = Filmore's "highlighting" / Langacker's "profiling"

a. the associated concepts must be copresent with the direct referent both in time and in space (in a certain arrangement with it there)
e.g., Langacker's "hypotenuse" which would otherwise only be a "line segment"

b. the associated concepts must be copresent with the direct referent only in time
e.g., Husserl's "wife" coentails a concurrent husband, would otherwise be a "widow"

c. the associated concepts can be separated from the direct referent in both time and space
e.g., Fillmore's "buy" in a commercial scene

(13) I bought her old banjo from her over the phone—
she'll mail it to me next week, and I'll send her a check for it after it arrives.

C. the associated concepts are *presupposed* by the direct reference, itself not entailed by them
e.g., "heaven" (in its use at least in the general U.S. Christian context)

(14) a. A human being has an intangible essence—her/his "spirit"—that comprises the sum of his/her identity.
b. This spirit continues on after / despite the person's physical death.
and has no further physical embodiment
c. There exists a single sentient entity—"God"—whose intentions determine everything in the universe.
d. God has established certain ideal principles in accordance with which
he wants people to conduct their thoughts, feelings, and behavior.
e. After a person's death, God punishes the spirit of the person who has not followed
these principles and rewards the spirit of the person who has followed them.
f. The reward consists of being granted all good and worthy experiences
g. Though ubiquitous, God can be imagined as localized and as located above in / beyond the sky.

'heaven': a generally luminous space near or surrounding God
—when imagined as located above in the sky—
in which the spirits of dead people who followed God's precepts permanently abide,
receiving good and worthy experiences as their reward

Factor Ac2: a contrast frame: the occurrent reference vs. competing concepts
a. a dichotomous which factor: when it is a member of a category, the concept

expressed by a morpheme is more salient than the other concepts in its category

b. a whether factor: the other concepts in the same category as the concept represented by a morpheme are more salient when that morpheme occurs in speech than when it does not

green evokes the category of 'color' and such other members as 'red' and 'blue'

tepid evokes the structured category of 'temperature' and such ranked member concepts as 'cool' / 'cold' below it and 'warm' / 'hot' above it

Factor Ac3: a collocation frame: the occurrent morpheme by itself vs. with other morphemes

a. a dichotomous which factor: the phrase a morpheme is appearing in is more salient than the (other) conventional phrases that morpheme occurs in

b. a whether factor: the (other) conventional phrases that a current morpheme also occurs in are more salient when that morpheme occurs in speech than when it does not

= "intertextual activation"

(15) Where are we going and why am I in this handbasket? (bumper strip)

handbasket here evokes its occurrence in the conventional collocation: "going to hell in a handbasket"

2.1.4 Polysemic Properties of the Morpheme (Ad)

Factor Ad1: size of the polysemous range of a morpheme

a gradient where factor: a particular sense in the polysemous range of a morpheme is more salient in proportion to the smallness of that range

e.g., the sense 'vertically aligned with and further from earth's center than' is one among fewer other senses in *above* than in *over*

(16) a. There is a light above/over the chair. b. There is a poster above/ over the hole in the wall.

* *Factor Ad2: weighting among the senses of a polysemous morpheme*
a hierarchical which factor: some senses in the polysemous range of a morpheme can be more salient
than others, and others more than further ones in a hierarchy
due to an intrinsic weighting in the morpheme

(17) a. soil 'particulate material that plants grow in'
'land, country' (my native soil)
'farmland (vs. urban setting) (I live on the soil)
b. dirt 'grime'
'particulate material that plants grow in'
c. earth 'this planet'
'the surface land mass', (It settled to earth) 'particulate material that plants grow in'

(18) a. I need to put more soil / dirt / earth in the planter.
b. The soil / ?dirt / ?earth is slowly changing color.

2.2 Factors involving Morphology and Syntax (B)

preceding section: morphemes (simplex or complex) considered one at a time.
Here: relations across 2 or more morphemes / constructions

2.2.1 Constructional Properties (Ba)

Factor Ba1: Positioning at Certain Sentence Locations vs. Other Locations
a hierarchical where factor: the concept expressed by a constituent is more salient
when that constituent is in certain sentence positions than when in others,
in a hierarchy (language-dependent)

(19) a. I can't stand this kind of music right now.
b. Right now I can't stand this kind of music.
c. This kind of music I can't stand right now.

Factor Ba2: Expression in One or Another Grammatical Relation.
a hierarchical where factor: the concept expressed by a nominal is more salient
when the nominal is subject than object, and more salient when object than oblique.

(20) a. The landlord rented the apartment to the tenant.
b. The tenant rented the apartment from the landlord.

Factor Ba3: expression in one or another dependency relation
a dichotomous where factor: the concept expressed by a nominal is more salient
when the nominal is the head constituent of a construction than when in the dependent constituent

(21) a. The pyramid of bricks came crashing down
b. The bricks in the pyramid came crashing down.

2.2.2 Compositional Properties (Bb)

Factor Bb1: The Composition vs. its Components
a dichotomous which factor: the meaning of the whole of a composition is more salient
than the meanings of the linguistic constituents that make it up

meaning of a word > meanings of its component morphemes
(22) The uneventfulness / calm in our household that morning was in stark contrast with the commotion of the night before.

meaning of a sentence > meanings of its component words
(23) Everyone there gathers in the yard to start the school day.

2.3 Factors involving Forms that Affect Attention Outside Themselves (C)

other sections: the mechanisms set attention for an entity coextensive with the mechanisms
here: the mechanisms set attention for an entity outside themselves

2.3.1 specific linguistic forms with an attentional effect outside themselves (Ca)

Fa ctor Ca1: a form affecting attention on an outside referent
a whether factor: the concept expressed by a constituent is more salient
when a morpheme intrinsically stipulating greater attention on it
is in construction with the constituent than when one is not

the Tamil particle *-ee*
(24) avan kaaley-iley-ee va-nt-aan
he morning-LOC-EMPH come-PAST-MASC
"He came in the **morning** (and not at some other time of day)."

Factor Ca2: a form affecting attention on part of an outside referent
a whether factor: a specific part of the concept expressed by a constituent is more salient
when a morpheme intrinsically singling it out and stipulating greater attention on it
is present in the sentence and in construction with the constituent than when one is not

from the extended reference of the verb phrase *drink my morning orange juice*
be -ing singles out and foregrounds: its ongoing steady progression through time
up does so for: the point at the temporal end of the VP referent,

(25) a. I was drinking my morning orange juice while I sat petting the cat.
b. I drank up my morning orange juice while I sat petting the cat.

Factor Ca3: a form affecting attention on a concomitant of an outside referent
a whether factor: an attribute of a constituent (other than its referent) is more salient
when a morpheme intrinsically stipulating greater attention on it
is in construction with the constituent than when one is not

(26) morpheme's phonological shape and its shape-meaning linkage: *be called* / GMn *heissen*

This gadget is called a pie segmenter. (vs. Please hand me that pie segmenter.)

(27) exact wording (specific morphemes in their particular sequence): *quote*
So she said to him, quote: You need to take a bath.
(vs. So she said to him that he needed to take a bath.)

(28) style of delivery and affective state inferrable from that style: *be like*
So then I'm like: Wow, I don't believe this!

factor Ca4: a form affecting attention on an outside entity or phenomenon
a whether factor: a feature of the current context is more salient
when a morpheme intrinsically stipulating greater attention
in conjunction with a device for indicating the feature is present than when one is not

A: function: to single out one feature from an array of others copresent in space

a. device: temporal proximity of the feature's occurrence to the moment of speaking,
combined with its intrinsic perceptual salience relative to the remainder of the field.

(29) That's a cruise ship / a fog horn / diesel fuel / the east wind.
<said by speaker to hearer as both stand on pier with vessels sailing by>

b. device: bodily movement of the speaker (e.g., pointing finger, eye fixation)

(30) a. object: That's my horse. b. activity: That's a gallop.
c. region: My horse was over there. d. direction: My horse went thataway.

B. function: identifying one instantiation from among alternative possibilities

c. device: bodily movement of the speaker

(31) a. path contour: The fish swam like this. <tracing path through air with finger>

b. object's shape: The fish was shaped like this. <tracing outline through air with fingers
or holding hands so as to form the outline>
c. object's size: The fish was yay big. <holding two hands a certain distance apart>
d. pattern of activity: You row a boat like this. <squatting and moving back and arms to and fro>

C. function: specifying the current deictic center

d. device: location of speaker's body in space / utterance in time (for coarse-grained localizations)

(32) a. Pull your wagon over here. b. There are plenty of restaurants around here.
<without bodily movements>
(33) a. The telephone is available now. b. I was sick, but I'm fine now.

e. device: certain vocal dynamics (for fine-grained localization in time)

(34) a. You can save my life if you push the green button ... riiiiight ... NOW!
(adapted from Fillmore 1997a)
b. The time is exactly ... 3 ... o'CLOCK!

2.3.2 Context with an attentional effect outside itself (Cb)

factor Cb1: context affecting attention on part of an outside referent
a dichotomous which factor: a part of the extended reference of a morpheme that is more relevant
to the context of the morpheme than other parts is more salient than those other parts

Fillmore's frame semantics:
(35) I wrote—a. with a quill. b. in Russian. c. about daffodils.
Bierwisch:
(36) a. The university collapsed in the earthquake.
b. He got his Ph.D. from that university.
Langacker's active zones:
(37) The dog bit the cat.

** factor Cb2: context affecting attention on one of the senses of an outside morpheme*

a dichotomous which factor: a sense of a polysemous or homophonous morpheme that is more relevant
to the context of the morpheme than other senses is more salient than those other senses

(38) *check*, V: a. 'ascertain' b. 'write a checkmark beside'
c. 'inscribe with a checkerboard pattern' d. 'deposit for safekeeping'
e. 'stop'
market, N: a. 'outdoor area of vendors selling food'
b. 'store for selling food' c. 'institution for financial exchange'

figure, N: a. 'shape' b. 'diagram' c. 'personage' d. 'number'
stock, N: a. 'soup base' b. 'stored supply' c. 'rifle part' d. 'line of descendants',
e. 'farm animals' f. 'fragrant flowered plant species' g. 'financial instrument'
down, A: a. 'closer to earth's center' b. 'reduced' c. 'recorded' d. 'glum'

(39) I checked the market figures—my stock is down.

likeliest sense selections: check: (a); market: (c); figure: (d); stock: (g); down: (b)

alternative: I manage a food store (*market*, b). Each day, the home office
prepares diagrammatic sketches (*figures*, b) of the store showing various updated factors,
including its current inventory (*stock*, b). I place a checkmark (*check*, b) on each sketch
to show I've reviewed it, making sure that the current inventory has been recorded (*down*, c).

leakage of an otherwise masked sense: Don't put your butt in that ashtray.

2.4 Phonological Factors (D)

includes phonological properties of a morpheme, abstracted away from the first section

2.4.1 Intrinsic phonological properties of a constituent (Da)

Factor Da1: constituent length.
a gradient where factor: the concept expressed by a morpheme is more salient
in proportion to the phonological length of the morpheme

(40) They promised they would contact me. Nevertheless / But they never called back.

factor Da2:shape similarity to other morphemes in the lexicon
a whether factor: a morpheme in one's lexicon and the concept it expresses are more salient
when that morpheme is similar in phonological shape to a morpheme now in use than when it is not

(41) a. Nyquil (a sleep medication): night / tranquil
b. motivation for stress shift?: urAnus --> Uranus / harAss --> hArass

2.4.2 Extrinsic phonological properties on a constituent (Db)

Factor Db1: degree of stress on a constituent.
a whether factor: the concept expressed by a constituent is more / less salient
where the stress on the constituent is above / below the unmarked amount than where it is not

(42) My parents are also going to PARIS,
(in addition to other European capitols) / (in addition to / not just Rome and Vienna).

Factor Db2: length change in a constituent
a whether factor: the concept expressed by a morpheme is more salient
when the length of a segment in the morpheme is increased from the unmarked length than when it is not

Kutenai lengthens the first vowel of a word with an intrinsically short vowel
to put the word in focus (Matthew Dryer, personal communication).

2.4.3 Intrinsic phonological properties over an expression (Dc)

** factor Dc1: shape similarity over an expression*
a whether factor: the phonological shapes of forms in an expression (and the forms bearing them)
are more salient when those shapes contain a similarity recurring over the expression
than when they do not

(43) a. It's no jest: I talked to a chap who feared he'd gag on a coke and die.
b. It's no joke: I spoke to a bloke who feared he'd choke on a coke and croak.

2.4.4 Extrinsic phonological properties over an expression (Dd)

factor Dd1: stress similarity over an expression
a whether factor: the stress patterns on the forms in an expression (and the forms bearing them)
are more salient when those patterns have a similarity recurring across the expression
than when they do not

(44)
original from the movie *The Court Jester*:
a. The pellet with the poison's in the flagon with the dragon,
the chalice from the palace has the brew that is true. with rhyme removed:
b. The capsule with the poison's in the tankard with the dragon,
the goblet from the palace has the brew that is safe with rhythm removed:
c. The poison capsule's in the tankard with the dragon on it,
the goblet coming from the palace has the safe brew.

Factor Dd2: other vocal dynamic patterns over an expression
(pitch, volume, rate, timbre, clarity, unit separation, etc.)
a gradient where factor: e.g., the concept expressed by an utterance is more salient
in proportion to the amount by which the volume of the utterance is above the norm

(45) Don't … forget … to lock … the door … when you leave.

Factor Dd3: unmarked stress pattern over an expression
a hierarchical where factor: the concept expressed by a constituent in an expression
is more salient when the constituent receives greater stress
due to the unmarked stress pattern over the expression than when it receives less stress

English unmarked stress pattern over sentence: heaviest stress on last open-class constituent

(46)
a. The auto mechanic pounded on the taxi driver's fender with a rubber mallet.
b. The auto mechanic pounded on the taxi driver's fender with a mallet of rubber.
c. The auto mechanic pounded with a rubber mallet on the taxi driver's fender.
d. The auto mechanic pounded with a rubber mallet on the fender of the taxi driver.

unmarked stress pattern for Germanic stratum in English:
open-class morphemes stressed, closed-class morphemes unstressed

(47) Ân ûnfriendlŷ joggêr wâs runnĵng pâst thê churchês.

2.4.5 Phonological properties with different access to consciousness (De)

factor De1: phoneme vs. allophone / first vs. nth phoneme
a hierarchical which factor: certain aspects of phonology are more salient than others
perhaps in a hierarchy, perhaps universally

a person generally has more access to words with, say, /r/ as the first phoneme
than ones with /r/ as the third phoneme
or to the phoneme /t/ than to the allophones of /t/

2.5 Factors involving Properties of Concepts (E)

other sections: the mechanisms set attention for an entity regardless of its conceptual content
here: the mechanisms set attention for an entity because of its conceptual content

Factor E1: referential divergence from norms
a gradient where factor: a concept is more salient in proportion to its divergence from norms

(48) a. He hopped / walked to the store.—unusual > ordinary
b. She screamed / shouted to him.—affectively intense > affectively mild
c. He drowned / died.—specific > general

Factor E2: Direct reference to attention in the Addressee
a dichotomous where factor: an entity is more / less salient where there are explicit directions
to the hearer to attend more / less to that entity than without such directions

(49) a. Pay attention to the movie! / You should note their sincerity.
b. Never mind what I said! / Disregard their appearance.

2.6 Factors involving Relations among Subsystems of Language

general attentional bias: (intended) content over form

2.6.1 Comparison of language subsystems (Fa)

Factor Fa1: Salience hierarchy of language subsystems
a hierarchical which factor: some subsystems of language may tend to be more salient than others
in a hierarchy

perhaps: speech context (interlocutors, surroundings) > general topic of current discourse
> meanings of particular phrases/words > vocal dynamics (speed, loudness, pitch, timbre, etc.)
> phonology > syntactic rules/patterns

Factor Fa2: Reference vs. its representation
a dichotomous which factor: the concept expressed by a linguistic form is more salient
than the phonological shape of that form

(50) on hearing *sick*: more hearer attention on semantic content 'sick' than on phonetic shape [s] -[I]-[k]

(51) more attention on same general reference of these 3 sentences than on their different wordings
a. My sister called and said she was very sick this morning.
b. My sister called this morning to tell me that she was feeling really sick.
c. Judy said she was very ill when she called today.

Factor Fa3: Reference vs. syntactic structure
a dichotomous which factor: the conceptual content represented by a linguistic expression
is more salient than the syntactic rules governing or patterns present in the expression

(52) a. Whose dog bit our cat? b. Whose dog did our cat bite?

2.6.2 Discrepancy between language subsystems (Fb)

Factor Fb1: Idiomatic vs. compositional meaning
a dichotomous which factor: the concept represented by an expression being used as an idiom
is more salient than any concept represented compositionally by that expression

(53) a. I turned the offer down. b. I turned the propeller blade down.

Factor Fb2: Figurative vs. literal meaning
a dichotomous which factor: in a trope, the nonliteral concept that the hearer is to derive

is more salient in a "background trope" and less salient in a "foreground trope"

than the literally represented concept and its conflict with the derived concept

a "foreground trope"—e.g., sarcasm or humor—requires hearer attention on the fact of its being a trope for its very existence as a trope

(54) Here comes Mr. Sure-footed!

a metaphor can range from being a foreground trope to a background trope:

(55) A: How is your brother doing with his term project? B:
a. unlexicalized foreground metaphor / high processing effort for hearer
He's lurching along in it. / He's striding along in it.
b. partially lexicalized midground metaphor / middle processing effort for hearer
He's skating through it. / He's staggering through it.
c. lexicalized background metaphor / low processing effort for hearer
He's sailing through it. / He's racing through it. / He's slogging through it.

Factor Fb3: Actual vs. "ideal" representation and reference
a dichotomous which factor: the speaker's inferrably intended reference and its presumed well-formed representation is more salient than the actual representation and its literal reference.

the referent incorrect for the physical context (constructed examples):
specific (56) a. How can you stand there and tell me you have no time?! <said to someone sitting>
b. Here, hand this to the baby. <passing spoon of applesauce to spouse to feed to baby>

two correct referents interchanged into incorrect locations (overheard example):
(57) Students believe that every solution has a problem.

poorly constructed referent (example heard on radio):

(58) Haven't those negotiations [pause] sort of passed by events, [pause] —aren't they outdated?

(inferrable target: Haven't those negotiations been overtaken by events?)

deviations from well-formed expression like incomplete constructions, pauses,

inclusion of "uh" / "oh", restarts, interruptions by other speakers, overlaps with other speakers.

(59) adapted transcription by Charles Goodwin of 3 couples discussing prior day's car racing event

Phyllis: Mike says there was a big fight down there last night, / Curt: Oh really? / (0.5)
Phyl: With Keegan and, what. Paul [de Wa::ld?
Mike: [Paul de Wald. Guy out of, =
Curt: =De Wald yeah I [know him.
Mike: [Tiffen.=
Mike: =Do you know him?
Curt: Uh huh I know who he _i:s_, / (1.8)
Mike: Evidently Keegan must have bumped him in the, / (0.6)
Gary: (Wasn't) it la:st week something like that h[appened too?
Mike: [Ohno:, thi[s:
Gary: [Somebody _bump_ed somebody else and [they spun around the tra[ck
Mike: [I don't kno:w. [Oh that was / uh a week be[fore last in the late ( ).
Phyl: [He wasn really fueling) end then they go down and they throw their helmets off an then th(h)ey [l:ook at each other.
Mike: [But, / Mike: This=
Curt: =Ye::ah ((laughter)) / Phyl: ((laughter)) / [
Mike: This:: uh:::. / Gary: (They know),

Factor Fb4: degree of divergence by the actual from the "ideal" representation and reference

a gradient where factor: beyond a grace amount, the infelicity of an expression as well as
its form (and meaning) are more salient in proportion to the deviation of the expression

from the inferrably intended reference and its well-formed representation

(60) excerpted transcription from Sachs, Schegloff, and Jefferson (1974)

... But I: I wouldn' uh I wouldn': I won—I say I wouldn' uh
((pause)) I don' know of anybody—that—'cause anybody that I really
didn't *di:g* I wouldn't have the *time*, uh: a:n: to waste I
would say, unh if I didn' ( )

2.7 Factors involving the occurrence of representation (G)

covers: attentional effects on the speaker (availability / colloquiality / obligatoriness of representation) and on the hearer (inclusion / density of representation)

2.7.1 Speaker attention due to availability of representation in the lexicon (Ga)

* *Factor Ga1: existence of representation in a lexicon*
a which factor: a concept expressed by a morpheme that occurs in a lexicon is more salient
to a speaker than a concept without such representation

(61) English: a warm glow of pleasure from innocent pride in the accomplishment
toward whom one has parental-type feelings
Yiddish: nakhes

Factor Ga2: privilegedness of a representation in a lexicon
a gradient where factor: a concept represented by a morpheme is more salient to a speaker
in proportion to the weighted privilege of occurrence of that morpheme
(relative to a particular register) in the lexicon of a language

the concept represented by *industriousness / industry* in English and by *Fleiss* in German
may tend to occur to the mind of an English speaker less than to that of a German speaker
because the English morphemes have lower privilege of occurrence than the German morpheme

Factor Ga3: extent of representation in a lexicon
a gradient where factor: a conceptual category and its member concepts are more salient to a speaker
in proportion to the size of the set of morphemes in the lexicon that represent the category
and to the number of member concepts they distinguish

e.g., the category of 'color' and particular color concepts may come more readily to the mind of
a speaker of a language with a large class of basic and nonbasic color terms in its lexicon
than where the language has a small class

2.7.2 speaker attention due to includability of representation in an utterance (Gb)

factor Gb1: obligatoriness of inclusion
a dichotomous where factor: a category within (the conception of) a situation
is more salient to a speaker when its representation is obligatory than when it is not

most Atsugewi verb roots require a prefix—one out of a set of some two dozen—
that specifies the event that caused the main action indicated by the verb root
e.g., -y'at' 'squash a bug' must be preceded by one of:
uh- 'by swinging a linear object onto it' / cu- 'by poking a linear object into it' /
ra- 'by scraping a linear object's end across it' ma- 'by acting on it with one's foot', etc.

Factor Gb2: weighted optionality of inclusion
a dichotomous which factor: a conception represented by a morpheme or morpheme class that,
as an option, is easier to include in a sentence is more salient to a speaker
than one more difficult to include

(62) a. The man ran to the storeroom.
b. The man ran way back down into the storeroom.

c. The man ran a long distance downwards in return to the inside of the storeroom.

2.7.3 Hearer attention due to inclusion of representation in discourse (Gc)

* *Factor Gc1: presence vs. absence of Explicit representation.*
a whether factor: a concept is more salient when explicit representation of it is present than when not

(63) a. The pen kept rolling off the uneven table.
b. Could you please close the window?

* *Factor Gc2: The occurrent reference instead of alternatives*
a whether factor: a concept within a set of alternatives one of which needs expression
is more salient when it is selected for overt representation than when it is not

(64) a. The pen kept rolling off the uneven table.
b. I kept putting the pen back on the uneven table.
(65) a. Could you please close the window? b. It's a bit chilly in here.

Factor Gc3: concealment vs. open availability of unrepresented concepts
a dichotomous where factor: nonexplicit conceptual content sensed by a hearer as
being hidden by a speaker is more salient than the same content when felt as openly available

some concepts depend on hiddenness for their very character:
terms for the stimuli: menace / eeriness / mystery
terms for the experiences: foreboding / disquiet / wonder

2.8 Factors involving temporal progression (H)

2.8.1 Recency of representation (Ha)

factor Ha1: current vs. prior forms
a dichotomous which factor: the forms currently being uttered by a speaker
are more salient to the hearer than previously uttered forms

in this excerpt from Santa Barbara corpus "a book about death": when the speaker
came to the part about the shark, the hearer's attention may have been more on that
than, say, on the earlier "standard line" concept

I used to have this sort of standard line that there were two things I got out of my marriage.
One was a name that was easy to spell, and one was a child. That really got me grounded.
But the fact of the matter is that the marriage itself—I mean as hellish as it was—
it's like it pulled me under, like a giant octopus, or a giant shark. And it pulled me
all the way under. And then, there I was, it was like the silent scream, and then,
I found that I was on my own two feet again.

factor Ha2: recency of last reference or occurrence
a gradient where factor: a phenomenon is more salient in proportion to the recency of its last reference or occurrence

situation: You visit my office. A man enters, says a few words to me, and leaves.
if only moments later, I to you: He's the director of our lab.
if much later, I to you: That man who came in and spoke to me was the director of our lab.

if similar event is within scope of "lookback" envelope,
the concept of 'additionality' must be included
to waiter: diner 1: I'll have the blue plate special and a lemonade.
diner 2: I'll *also* have the blue plate special and a lemonade.
to same waiter later: diner 2: I'll have the blue plate special and a lemonade *again*.

2.8.2 Quantity of representation (Hb)

Factor Hb1: Density of reference
a gradient where factor: a concept is more salient in proportion to the density
of representation of it (of reference to it)

e.g., a stretch of discourse containing 20 references to dogs and only one to cats
(need not be 20 recurrences of same lexical item; could be 20 references to same category)

Factor Hb2: repetition
a gradient whether factor: a concept is more salient in proportion to the degree
to which its representation is repeated

(66) I just can't understand why … I just can't understand why …

2.9 Factors involving properties of the speech context (I)

2.9.1 The production of speech (Ia)

factor Ia1: presence vs. absence of speech
a dichotomous which factor: speech and its content are more salient than silence

Factor Ia2: a speaking vs. a silent participant
a dichotomous which factor: a participant producing speech is more salient than one who is not

3. Attentional effects involving two or more factors

3.1 Attentional Effects resulting from Combining Factors

Although able to act alone, the basic factors also regularly combine and interact in systematic patterns—
whether in a single constituent, over a sentence, or through a discourse—to produce further attentional effects.

3.1.1 Gradation in strength of Attention through Factor Combination

Factors can be incrementally added / removed—or factor values shifted—
to produce a gradation in the degree of attention directed to a target entity.
here, the attentionally adjusted entity: 'agency'

(67) a. The diners slowly passed the goblet around the banquet table.
b. They slowly passed the goblet around the banquet table. [by factor Aa1]
c. The goblet was slowly passed around the banquet table by them. [by factors Ba1/Ba2]
c. The goblet was slowly passed around the banquet table. [by factor Gc1]
d. The goblet slowly passed around the banquet table. [by factors Ab3/Gc1]
e. The goblet slowly went around the banquet table. [by factor Gc1]

3.1.2 Reinforcement of an attentional pattern through Factor Convergence

Several factors can converge on the same target to reinforce a particular level of salience,
making it especially high or especially low.
The grammar of a language is often so organized as to facilitate certain convergences.

example 1: as in sentence (a) of the preceding series
English regularly reinforces agency foregrounding through this convergence of factors:
explicit representation (Gd1) by an open-class nominal (Aa1) in initial sentence position (Ba1)
as grammatical subject (Ba2) of a verb lexicalized to apply to an Agent subject (Ab2)

example 2: *person* (as in: person who jogs) is more salient than *-er* (as in: jogger)
open-class vs. closed-class (factor Aa1)
morphologically autonomous vs. bound (factor Aa2)
of greater vs. lesser phonological length (factor Da1)
more vs. less strongly stressed (factor Dc4)

3.1.3 Attentional Resultants of Factor Conflict

A. override: one factor supersedes another
the two factors were in conflict,
assigning different degrees of strength to the same obtent

(68) a. I went to Key West last month by plane. b. I flew to Key West last month.

the concept 'aircraft' is foregrounded in *plane* in (a), backgrounded in *flew* in(b)
through the convergence of 4 factors:
in a noun vs. in a verb (factor Aa1)
as the whole vs. only part of the morpheme's reference (factor ab1)
in prominent sentence-final position vs. in second position (factor Ba1)
strongly stressed vs. moderately stressed Dc4

(b) can be heard as mainly conveyng the journey per se, with air transit as incidental information

(69) I FLEW to Key West last month.

here, the further application of extra heavy stress (factor Db1) to the verb undoes the backgrounding of the 4 convergent factors,
forcing the foregrounding of the 'aircraft' concept.

B. competition: one factor vies with another for limited capacity of attention
—that is to be directed at two different obtents

e.g., if a speaker had just uttered an ill-formed sentence, but goes on to a new sentence

factor Ha1: calls on hearer to allocate enough attention to speaker's currently uttered forms
for them to be processed in working memory
factor F3: calls on hearer to allocate enough attention to the discrepancy to puzzle out what the speaker might have intended to say.

hearer may not have enough attentional capacity to act on both factors adequately at same time.

3.2 Groups of factors under broader attentional principles

the factors above were set up partly on the basis of
the type of mechanism they use to trigger attention

but several such factors can arise from a more general principle
principle 1: significance = salience
what is communicatively more significant (ideationally / emotively)
is proportionally more salient than what is less significant

factors falling under this principle:

Factor Aa1: a concept represented by a morpheme is more salient
when that morpheme is open-class than when it is closed-class
factor Db1: open-class morphemes are more salient than closed-class morphemes
due to their stressed vs. unstressed pattern in some languages
Factor Fa2: the concept expressed by a linguistic form is more salient
than the phonological shape of that form
factor Fb2: any trope (metaphor, sarcasm, etc.) understood as present
in an expression is more salient than any literal interpretation of the expression
Factor Fb3: the speaker's inferrably intended reference and its presumed well-formed representation
is more salient than the actual representation and its literal reference.
factor not included above: the overall conceptual complex a hearer forms
from both the explicit and implicit in a discourse is more salient
than the explicit reference alone

4. Comparison of attention across languages / language modalities / cognitive systems

4.1 Across languages

a. factor Ca1, a form affecting attention on an outside constituent, e.g., a topic marker,
is operative in some languages, e.g., Tamil, and not in others, e.g., English
—at least, in the form of simplex morphemes to mark topic

b. factor Db1, degree of stress on a constituent,
functions extensively in some languages, e.g., English, but only modestly
in others, e.g., French

4.2 Across modalities

a. American Sign Language (ASL) has a certain 'disregard' gesture
with no obvious counterpart in spoken languages

as in signing: "We moved the wall progressively further out"
vs. "We moved the wall from a closer location to a further location"

b. sustained midground attention on X in parallel with foregrounded attention on Y

English has this e.g., for doubt intonation:
Are you really sure you want to go through with this crazy plan?
<with sustained high pitch from "really" on>
ASL, but not English, has it for topic:
LUNCH FREE, DINNER PAY (Paul Dudis)
<with LUNCH and DINNER sign held in place during FREE and PAY>

4.3 Across cognitive systems

a. common across language and perception:
greater magnitude along a parameter attracts greater attention to the entity manifesting it
e.g., in language: stronger stress on a linguistic constituent
in visual perception: large size or bright color of a viewed object

b. much in language, little in perception
one entity (devoted to) directing attention to a neighboring entity
e.g., in language: topic / focus markers
in visual perception: perhaps only cases like noting what someone is looking at

c. much in perception, little in language
abruptness of change in a parameter attracts attention to the entity manifesting it
e.g., in visual perception: sudden movement
in language: perhaps only in vocal dynamics, e.g., sudden rise in loudness

LECTURE 6

Introspection as a Methodology in Linguistics

This continues the series we've been having. I laid out the main schematic systems that language has for structuring conceptual content, which includes configurational structure, location of perspective point, distribution of attention, force dynamics and so forth. Today is dedicated to attention and consciousness, and the first talk this morning laid out the elaborate system that language has for raising attention on one thing over another thing. But the issue arose regarding the methodology used for determining whether something was more salient or less salient, whether more attention was on it or less. This methodology is introspection. In other words, the linguist himself looks inside his own mind for his own assessments of what was the case as far as salience goes. There is increasing challenge to that methodology raised by what are often called more objective methodologies, such as psycholinguistic probes and neural scientific scanning mechanisms and all those techniques. Even though introspection is still the main methodology used in linguistics, increasingly objections are raised that it's not empirical or objective, that it can't be faulted or repeated—these are the hallmarks of so-called objective sciences—that it's inaccurate. There is a school of thought that it's impossible to introspect on an ongoing interaction in the middle of discourse because it would distort the very process as it goes on. The task that I have set myself here is to assess introspection and in fact to defend it.

The main approach to answering these challenges that I am going to take is first, instead of simply dismissing introspection on these grounds, to take an analytical look at the process of introspection itself. It after all does exist. It's a cognitive faculty. It's something that we as humans have evolved to have. What are its properties? The main thing that I have discovered is that introspection has a profile, those things it is better or worse at. In fact it's great at some things, in fact perhaps it's indispensable, but it's very bad in other respects.

All original audio-recordings and other supplementary material, such as any hand-outs and powerpoint presentations for the lecture series, have been made available online and are referenced via unique DOI numbers on the website www.figshare.com. They may be accessed via this QR code and the following dynamic link: https://doi.org/10.6084/m9.figshare.5554924.

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The problem with those faulting introspection is that they've indiscriminately mixed together the bad parts and the good parts without distinguishing where it's good and where it's bad, without looking at its profile. Other methodologies will prove to be supplementary to it or complementary to it, or much better than it. If you look at them, every methodology has its own profile, and it's better or worse at some things. Each might be indispensable for certain aspects of getting at language. No methodology by itself should be considered the gold standard overall for language, although I think there is a tendency in particular on the part of experimental psychology to regard itself as the gold standard, but it's not. There are things it can't do, it too has a profile. I've listed there a number of methodologies, eleven of them. I won't go through them, but they include things like introspection, comparative analysis of semantics and grammar and so forth, noting differences between different languages, and different language modalities such as spoken language and sign language. It includes all the other usual kinds of allegedly more objective methodologies, such as gathering long term data (as in child language acquisition), corpus research (often computer aided, accumulated bodies of text whether written or spoken), the experimental methods of psycholinguistics, the scanning techniques of neuroscience, the simulative techniques of artificial intelligence.

That's the basic approach, and now it's time to give an introduction to what I think introspection is. To characterize it you need to process two levels of consciousness within the single individual. The first level of consciousness is the level in which various aspects of language can register in someone's the consciousness, and they'll do so, to a greater or lesser degree. Various aspects of language will register quite strongly in the first level; let's say the meaning of something. Some things will register hardly at all at the first level of consciousness, say some grammatical patterns. It's noteworthy how readily some aspects of language can register there on the first level. In addition, there is the second level of consciousness which has as its object parts of the first level of consciousness. At the second level you are able to volitionally direct your consciousness at some selected portion of the first level. The elements of the first level will vary as to how stably they can stay present under such scrutiny from the second level. Some will be more intense and stable, and those will have greater amenability to such inspection from the second level. Others will be elusive, frail, difficult, murky and so forth. I am using the term 'accessibility' as the combined term to indicate just how strongly some second level of introspection can access some aspect of language. That will be accessibility: something will have either greater or less access to some aspect of language, or some aspect of language will have greater or less accessibility to the second level of attention. This second level of consciousness then, given that it's volitionally

driven, is selective as to which things it is focused on. I use the word tension for that, and when it occurs in this particular set up, I will call it linguistic introspection. All this immediately involves one whole issue of consciousness and attention, and I think it would be better if I just go over lightly that whole issue and not go into great detail in our limited time, which fills up the rest of this introduction.

The basic idea is that attention and consciousness are of a same piece, they are the same basic stuff. I list in the introduction a set of parameters that can relate to consciousness. Something can be conscious or unconscious. You can be interested in the consciousness itself or the object of the consciousness. There are differences of strength. There are differences of quantity and quality. There are temporal differences. Is the object of consciousness steady state or shifting? And if it's shifting, is it an increase or a decrease? It's a whole set of parameters. Attention, as the word is used in Standard English, is simply consciousness with a particular selection of these parameters. It's attention when it's focused and volitionally directed and stronger and so forth. Otherwise, it's simply a kind of consciousness. It's consciousness with certain properties selected. Just to make sure that I am clear about this, I regard consciousness as well as attention as a gradient. So the same set of terms will be used. Something can be in the center of consciousness or in its periphery. Equivalent to that would be that something can be at the foreground of attention or at the background, of higher attention or lower attention; or something can be of high salience or low salience. All those terms are equivalent.

I think that will suffice. Let me just give a quick example to orient people to introspection at work. Let's say in the course of discourse one person is talking and another person says *I do not understand*. What is involved there? Here we have an actual online discourse. The person that says *I do not understand* has probably been all along monitoring the incoming discourse from the speaker, interpreting it and trying to make some kind of coherent whole out of it. He monitors the quality of this coherence. If at a certain point he feels that it's not so coherent, he might then say *I do not understand*. This is an example of introspection. The hearer is monitoring his own experience of coherence of his interpretation of what the speaker is saying, finding it insufficient and then there arises the wish to get it more coherent, so he says *I do not understand*. When the speaker hears this, the speaker in turn has to immediately review online. This is online, this is all introspective. This is in the middle of an actual ongoing discourse. The speaker has to review what he has just said and how he said it, and has to go back to the larger ideational complex that he wants to convey, and find some other form to use to convey the same ideational complex. Or

else he will work at the same thing and the hearer will once again not understand. All of this is self-monitoring. It's a perfect example of introspection at work in the middle of discourse.

Let's go on to section two: four factors that affect attention of language. The first factor is that there are some attentional phenomena which seem to run across individuals, that seem to hold across individuals, either because they're innately present, built into the human acquiring a language system, or because humans have some kind of common experience in development. They will include things like that in hearing something, its meaning is typically more salient than its grammatical characteristics. There will be a kind of gradient across a range of aspects of language, and it will be easier to introspect on the meaning of something than on its grammatical properties. That may be wired in, and this difference will be pretty consistent across individuals.

The next factor is that there will also be individual variation. Some individuals will deviate from this standard ranking of accessibility to consciousness, either because they have training or because their individual wiring is just different. I gave this example earlier in the sequence of talks, but I will give it again because some new people are here. I worked on an American Indian language in northern California called Atsugewi. This language is polysynthetic. It has many verbs and many prefixes and suffixes and many different words. The first woman I worked with could give me one whole word beautifully for the situation I asked for, but was unable to identify any piece within it. As it happens, this particular language has what's in the literature called an instrumental prefix; I call it a clause prefix. It has to be present. It tells you how you cause the action of the main verb. For example, to squash a bug is *y'at'*. But you can't say it by itself; you have to say how you squash it. If you squash it by acting on it with your hands centripetally, you say *t'u-y'at'*. If you do it this way, with hands manipulating it, it's *c'wi-y'at'*. If you do it with your foot, *n'a-y'at'*. If you do it with your buttocks, if you squash it by sitting on it, *t'wi-y'at'*. If you poke it with a linear object in this way, *c'u-y'at'*, if you scrape it *w'ra-y'at'*. If you swat it like a swinging object, *w'uh-y'at'*. Well, it goes on and on. It took me a long time to figure these out. But the first day I went to work, I asked the second woman 'How do you say *I shoved him away*?' and she said, 'Well, if you do it with your hands, you would say *s-c'wi-q'warúw*. If you do it with your shoulder, you would say *s-h-eq'warúw*. Now if you do it with your feet, you would say *s-n'a-q'warúw'*. She immediately gave me an analysis of this prefix in this language which I had to figure out by myself with the first woman. This woman presumably had in her innate wiring, due to individual variation, a conscious access to a certain aspect of her language, the grammatical

structure of this gigantic polysynthetic verb. All her life she had been aware of this analysis—she found it out right away. That's an example of individual difference.

The third thing that impinges on attention is the hearer's current interest. If you're interested in food, you will hear references to food. The example I had is if you are talking to your lawyer, you are likelier to attend to all the aspects of speech; you are likelier to attend to the exact wording of the lawyer. If you are talking to an intimate, you are likelier to pick up the tone of voice. That's current interest value that will shift as things change.

Finally what is most important for this talk is conditions of attending. I set up two conditions of attending, online and offline. 'Online' is my term for when you are in the middle of an actual ongoing discourse. It has three aspects of attending to it. One is a preview, so you might be thinking of what you are going to say next. There is a concurrent one, which is attending to what you are saying now or what the other person is saying. There's review, where the speaker has to think what he has just said, and also consider the totality of the ideational complex that he wants to convey in order to figure out what to say next, which we are doing right now. So, that is a kind of review process. Then the offline condition of attending can be discursive, when you are sort of rehearsing something resembling full blown forms of language in your mind by yourself. Again you can have a preview, like thinking of how you can ask for a raise from your boss, or review thinking of how the job interview went, or concurrent, just ongoing thinking that you have. The other one is what I call the excerptive or autonomous form. That's the thing that is most objected to by what could be called contextualists. It's what linguists often do when they think of an example in abstract or in isolation. It is often objected to by contextualists, and yet it's the mainstay of much linguistic analysis. I am going to justify it, by saying that it too is part of our innate wired-in linguistic ability that we have for evolutionary reasons, the ability to introspect on isolated, excerpted bits of language by themselves in isolation. Those are the conditions of attending.

Let me start this profile of things that introspection is better or worse at. I will begin with and concentrate on this last thing of offline excerptive introspection. There are lots of things that it's really good at. I'll list some things it's really good at, some things it's medium good at, some it's poor at, and some that it can't do. Something I think introspection is uniquely capable of is ascertaining the meaning of something. You can't get at meaning without introspection, you can't get at meaning through corpus work, and you cannot get at meaning through neural imaging. You can image your brain, perhaps in the process of experiencing meaning. But how would you know that's what

it's doing? You have to ask the subject of the MRI, 'What is going on in your mind?' He says, 'Well, I am thinking of the meaning of 'goldfish'. Only then can you correlate what the scan is picking up with something that the individual was reporting introspectively. So you have to have introspection of meaning, even to do some of the (in quotes) 'objective, scientific approach'. So it's best at meaning. If somebody says a whole phrase, for example, *My father built a log cabin*, introspection enables you to think about the meaning of that phrase. You can introspectively think about it. If somebody should ask you something, or if you should initiate in your own head an examination of what you think about that, you can say, 'Let me consider the phrase *my father built a log cabin*', and think of the meaning. You can do the same as if somebody says to you the word *bucket*, an isolated word. You can think of the meaning you experience by hearing the word *bucket*. The same with the verb *to plummet*, same with the adjective *happy*. These are the meanings of open-class forms. I will show you later that closed-class forms are what I've considered introspection less good at accessing.

Another thing that introspection is really good at accessing is register. For example, if you can translate the words *stomach, belly* and *tummy*, you are very good at saying they mean the same thing, but that *stomach* is a formal word which we use normally. *Belly* is informal, casual, and *tummy* is what you would say to kids. That's very accessible to introspection. You are very good at noticing what I call privileged occurrence or colloquiality. For example, you can tell that the difference in register between the words *buy* and *purchase*. *Buy* is more colloquial than *purchase*. It's what writers do all the time. They are able to introspect on filling in a particular slot in the sentence with exactly the right word. They are able to run through their minds what are the perfect words to put in. That's something introspection is good at.

It's because we are good at grammaticality that all of Chomsky's grammar is built on this assumption that we have good introspective access to grammaticality. Without that, there is no Chomsky. For example, if you say **Last year you go there*. It's no good, but *Last year you went there* is fine. Then conversely *Last year did you go there?* is okay, but **Last year did you went there?* is ungrammatical. To any native speaker it's instantly obvious that the first and the last are ungrammatical and the middle two are grammatical. Those are grammaticality judgments; they are easily accessible to consciousness.

Most morphemes are polysemous, and it's easy to quickly get some but not all of the polysemous senses of a given morpheme. If somebody uses the word *stock*, you can quickly come up with a few senses of *stock*, such as 'cattle' or 'soup base' or 'the stored inventory in a store', but you are unlikely to get all of them. But you can very easily get some of them.

If you, as a writer, want to express the word *annoy* but want to use some other word, you might very easily come up with a few such words like *irk* and *bother* and *irritate*; there's a number of them. The members of a category, for example, given the word *tool* you can readily come up with *hammer, screwdriver* and so forth.

For conjunction of concept, if somebody should ask you 'What is the word that represents a young female cow?', you can easily come up with the word *heifer*. Again it's readily accessible to introspection. I'll just include a couple more of the things we are good at that I can remember. If somebody points at something, and says, 'What is that?' (Let's say it's a stork), speakers of the language can easily say, 'That is a stork.' That whole cognitive process is easily accessible to introspection. Furthermore, the same is true for working with another language. If I ask you in some other language, 'How do you say *stork*?', for example, if I ask an Atsugewi speaker, she can easily say *pʰl'aq'is'*. It's 'stork' in Atsugewi. She has no trouble accessing that fact in her language, knowing both languages.

Now let's go on to things which are of medium ease of access for the offline exerptive introspection. One is going to be closed-class forms. For example, the meanings of a free form like *with*. What's the meaning of *with*? You can do it, but it's a little harder. Or the meanings of these bound closed-class forms such as *unretestable*, the *un-*, the *-re-*, the *-able*. It takes longer and more effort. It's not such a snap, like with *bucket*. With *re-,* you are not quite so sure, it takes longer, but you can do it. The lexical category of a word, such as hearing the word *shallow* and knowing that it's an adjective. Clearly it's very tricky, but even so it's not arcane. It's not incredibly difficult for many people. Then salience, it's this one that I have to have in good working order in order to write a paper or a book on the attention system of language. I have to be able to introspect on just how salient something is in language, like on the fact that the word *scurrilous* in a sentence attracts more attention than the word *everyday* in the same sentence. I have to be able to discern that the concept of futurity is more salient in the phrase *on his upcoming arrival*, with the word *upcoming*, then it is in the *-s* of *when he arrives*, or in the *will* of *when he will arrive*. The concept of futurity is simply more salient in the open-class form of *upcoming*. It's introspective access to that difference of salience that I will need to be able to write a linguistic treatise on comparative salience in the attention system. It's not impossible, but it's not as easy as getting the meaning of *bucket*.

Rather inaccessible, but not impossible, are the semantic components that made up my talk this morning. I took some time trying to show the different semantic components in the verb *to pry* as in *Use a crowbar to pry a board from the wall*. It turns out that there are four crucial semantic components.

One of them is that you have something in between the figure and the ground; you can't just pull it off. Another is that it has to be stuck; you can't just flip it off. It has to come off gradually, or else it would be *popping it off*, so there are various components that are present in the verb *to pry*. I consider that to be of low access in introspection. It's not totally inaccessible but you really have to work at it.

In each of these low access cases, other methodologies come into play to complement or supplement the difficult time that introspection is having. In this case, it's supplemented with comparative semantic analysis. You can compare and contrast *pry* with other words, or *pry* in different situations. Consider the situation: What if you have a wall and here is the board attached to the wall, but here is a handle, and you just pull it off. Can you now say *I pried the board off the wall*? The answer is no. You can only say *I pulled it off*. That is comparative semantic analysis. You have to controlledly alter different components in the situation and see whether you can now say *pry* or if you have to shift to other verb like *pull*, so you have to use your introspection in conjunction with semantic analysis.

With polysemy, we found an easy access in getting a few of the senses of a morpheme, but you are unlikely to get all of the senses. That is already of low access to introspection. You might be able to try hard, but in this case it's abetted by corpus work, another methodology. You can use your introspective ability in combination with going through corpora to see what are various uses of, let's say, the word *stock*, and ultimately, with asymptotic closure, you are going to start getting fewer and fewer new meanings as you go through various usages of *stock*, and you can pretty much conclude that you've now gotten all the meanings of *stock*. It turns out that dictionaries, which are in fact a form of corpus work, do exactly that. They cull through many records to see what the various meanings are. In this case, you abet your own abilities in introspection with coming up with different polysemous senses with corpus work, in order to get them all. The same goes for other areas that have low access. You have only low access to all the different words that mean something alike, like I gave the word *annoy*. You can easily come up with a few words that mean roughly the same thing. You will never get them all, but a thesaurus will give you them all, it's a kind of compilation.

We have, for whatever reason of wiring, rather low introspective access to syntactic principles. For example, you have the two sentences *Whose dog bit our cat?*, side by side with **Whose dog did our cat bite?* No native speaker is going to have any immediate intuition to understand why the first sentence has the word *did* and the second one doesn't. Why the second sentence has the present tense form of the verb *bite*, whereas the first one has the past tense form

bit. Why the second one has the verb *bite* at the end of the sentence, whereas the first one has it in the middle of the sentence. It's not all that accessible. I suspect that there are various low level forms of grammatical access. I'm sure there are, for example, the second speaker of Atsugewi did have a relatively low level of access to some of the syntax of her polysynthetic verbs or for its morphology. But in any case, it's relatively low and in this case it's complemented by another methodology, namely comparative syntactic analysis for which you need to use different aspects of your cognition. In all these other methodologies, you still use your brain, but different aspects of it. They don't use the introspective portion of the language system of your brain; they use other methodologies, but probably other parts also accessible to consciousness. In their own way, they are also introspection, but not linguistic introspection per se. Those are things of low accessibility, and each of them is supplemented by some other methodology, such as dictionaries, neural imaging and so forth.

Then there are things which are completely inaccessible to introspection. Let's for example say that somebody says *I am staggering through my homework assignment*. *Staggering* is a kind of gait like when you are walking when you are drunk. It's not typically used in talking about working on your homework assignment. It's some kind of metaphor, and it's not a standard metaphor, it would have been made up on the spot. I think everybody will have an easy time understanding what it means. But it's not so clear a metaphor that you will instantly figure out what the person is talking about. You have to do a little bit of work to get the metaphor. Quite possibly, somebody who is introspective by nature and attuned to their language might be able to get a few bits of how things had happened in their cognitive processing of it. They might be able to become aware of or remember their introspections, in first experiencing a kind of puzzlement of what it means *to stagger through a homework assignment*, next realizing that the basic concept of *staggering* is having difficulty in jolting through the different portions of a homework assignment; and finally realize that they understand the full import of this metaphor. Possibly that much might be accessible introspectively to somebody hearing this metaphor, but they will never be able to get the actual processes that led to those realizations or the timing of the method there. Let's just take the timing right now. They will never be able to figure out how many milliseconds it took. Anything below a second in timing is going to be inaccessible to introspection. This is then supplemented by things like psycholinguistic methodologies, which are best at subsecond timing on cognitive processes. So these are things that would be inaccessible to introspection.

I think in the interest of time, I'll skip the next section. The next section goes through the same thing about online. All the preceding was what offline

excerptive introspection is good at or bad at. Good at, okay, poor at or unable to do. You can see the profile for that particular condition of attending, namely, offline, not in the course of discourse, just thinking by yourself, thinking of single words let's say. You have to go through the same thing for all the different conditions of attending, and so the next section does that, it looks at online and in the middle of discourse and what introspection is bad at or worse at. One thing that it's good at is knowing what the general topic or the theme is of the conversation; in the middle of discourse you know what you are talking about. As a speaker, you are probably good at introspecting on what should cue up, what you should say next. You are probably good as a hearer at cueing up to think what you should say next. There are various things you'll be good at in introspection that relate to this on-line, in the middle of discourse kind of interchange. There are other things that are low or medium in access, and other things that are completely impossible.

I think now I should skip to section 4 to give examples of a number of them I've actually caught in progress, or that others have constructed, which demonstrate the presence of introspection as a necessity. In particular, I focus on online discourse because this is the one often in question: Is there introspection during heated discourse?. There are people I call contextualists who would deny it. They would simply say that you can't introspect on discourse. I, on the contrary, adopt the opposite position, that you can't even maintain a conversation unless you introspect. I'll try to give some demonstration of that, so that introspection is built into the very language system, just to enable discourse to happen. You have to have a meta-level of attention to what happens linguistically, to direct your attention to see if things are going okay, to maintain them stable and so forth.

The first example is going to be a review type of online thing. Let's just say somebody is talking along, then he says *the former and the latter* or *the first thing I said* and *the second thing I said*. It's a metalinguistic example, and in order for he himself to understand it means, or for the hearer to understand what is meant, all of a sudden the hearer hears the word *the former* and has to put into consciousness, into working memory. This working memory, of listening to the discourse at work, has registered what came earlier and what came later on the first level of consciousness. Then from a second level of consciousness, he can direct the attention to the contents in this registry of what came earlier, which corresponds to the speaker saying *the former*. He can then re-cognize the contents of that earlier register, and can keep that in another short term memory, and compare it with the content of the later thing, which is called *the latter*. It's ipso facto an example of introspection taking place in the middle of discourse.

Another example of this is still the review type. I caught on the street a husband and a wife talking to each other, and I heard her say *You said never mind, did you mean to say something else?* I hung around a bit to see what they might mean, and it seemed to me as I pieced it together that the husband has previously told the wife that she did not have to bother to do something because it was not important, and later he was complaining to her that she had not done it even though he said she didn't have to. So she says to him *You said never mind* (meaning it didn't matter), *did you mean to say something else?* She is being rather polite about this.

What kind of work has to go on just for these two people to understand what is being said, for her to generate it and for him to understand it? Or are they are inconsistent? They cannot be true at the same time that he has apparently forgotten he had said *never mind*, or that he changed his mind. She is now showing him that politely by saying, instead of *What did you change your mind for*? or *Are you inconsistent?, You said never mind, did you mean to say something else?* like *this in fact matters to me*. All this is done by elements that are kept in working memory at what you call the first level of consciousness, where they are maintained long enough to undertake this comparative process. She is using a higher level of attention to look at this, and forcing the husband to do the same thing, to look at the content of each part and to compare and contrast them. All this was going on in the middle of the conversation, and is so natural and so automatic that maybe the contextualists lose the factual introspection that is going on right then and there. It will have to go on, I think. And the concurrent thing it might as well be included. For example, if two guys are talking, and one holds up a tool and says *This is a mattock*, most English speakers don't know what a *mattock* is. In fact, I didn't until I figured it out. He holds something up and says *This is a mattock*. The hearer might undertake a certain introspective act. He might take the introspective act to look at this conjunction of the sound *mattock*, the sound shape, the phonological shape, and an actual object before him, and make a mental note that the two go together and constitute a morpheme, and try to make a mental note to add this morpheme to his lexicon. All this is going on metalinguistically with introspection. Some part of the person's mind, some part of the hearer's cognition, is acting upon an otherwise unnoticed level of linguistic phenomenon taking place, hearing the word *mattock*, and seeing something and deciding to do something about it.

Another example is *My father and my son-in-law met for the first time and he told him how young he looks*. Well, you don't know which one says it to the other. You get *he* and *he*. They are both men. You, the hearer, at this point,

might become aware that the processing had hit a snag and leap to a meta-level of introspection, and notice that he is puzzled. He can't tell which *he* goes with which person, the father or the son-in-law. So that's another example of introspection at work.

I heard on the radio a BBC reporter try to say *These things were overtaken by events*, which is an idiom, a standard phrase in English vocabulary. She couldn't find her way to that expression; she kept trying to find the word, kept trying, and instead kept talking around it to come up with other locutions that capture the same idea, but was clearly looking to find that expression. Well, that's introspection. She is looking for a particular word as introspection; she's got an idea in her mind, she's looking for the phrase which captures that meaning. She comes up with something in order to not have silence, to have everybody wait while she looks. She comes up with something, finds it inadequate, which is introspective, because she keeps the idea in her mind that she wants, finds this locution inadequate to the idea, discards it, looks for another, a stopgap of the locution that might fit it, and finally she just is done with it. She gives up trying to find the perfect locution. All this is governed and guided by a second level monitoring, assessing, manipulating the first level. All this is the introspective level taking place in the online form of discourse. This is the concurrent case, where it's taking place as the person is talking. It's concurrent review. Previous cases words were reviews. This one is taking place as the person is talking.

In Berkeley where I live, there are a number of schizophrenics in the neighborhood who often stand in the street and speak. You know presumably they are schizophrenic because each fragment of speech seems to be unrelated to the preceding fragment of speech. But I was walking towards one schizophrenic I could hear talking in the distance, he sounded schizophrenic. I can hear the guy (you can tell the direction from the voice) look away, look towards me, see me, look away again. And all of a sudden the word *blind* is incorporated in the next thing he said. It seems like for some kinds of schizophrenic speech, whatever perception currently pops into somebody's line of sight, whatever idea pops into their mind, it seems to determine the subject matter of a very local fragment of speech. Then some other one immediately gives rise to the next fragment of speech. Well, that's my conjecture that that is what is happening.

This kind of thing does not happen when normal people speak. My conjecture is that the reason that we are able to maintain a single theme through a whole discourse or sentence or paragraph is because some part of our mind is presumably monitoring what is being said, it's keeping it on a single track, maintaining a uniform theme. If this is all true about this aspect of schizophrenia, it means that that particular introspective monitoring capacity is probably

impaired in schizophrenics. Therefore you can use shcizophrenic behavior as an index for reverse engineering, for saying there must be some capacity which maintains the normal kind of conversation.

Then for the preview type. If somebody came in to a party of people in their fifties or sixties, and the host introduced him to someone else and said *He is my last high school ... friend* and he paused before the word *friend*. My interpretation is, and it turns out to be so, that the host and the newcomer were never intimate, they were never chums. What probably happened is that he started off the sentence, he starts and he pauses. It's a natural pause there. He looks for the right word to correspond to the idea that he has in his mind. *Friend* seems too close for the actuality that they were good acquaintances but that's all, however *acquaintance* seems too distant. There is no immediate word comes to mind. If he took more time at it, he might come up with the word *classmate* or he might reformulate the whole sentence by saying *He is the last person I knew in high school who I still know*, which is what he means. What this clause shows is that he just goes ahead and selects the nicer of the possibilities, none of which fit. It shows that he's introspecting, looking ahead to use the right word and pausing while doing that. That's an example of preview with introspection involved.

A Danish linguist I know told me that when she first became a graduate student, her status increased partially from low status, but didn't go all the way to high status. Whenever she talked to her adviser, they had a problem to use Danish. Danish is one of those languages that has an informal form and a formal form for *you*. The informal form seemed to both of them to be too intimate, and the formal form seemed to be too distant; after all she was now halfway towards him in status. So what they did was they reformulated their sentences so that they never have to use the word *you* in it. Instead of saying something like *Do you have to go to class now?* She would say *Is there a class to go to now?* eliminating the whole problem. In order to do this, each of them had to have forethought. Before uttering a sentence, they have to get in their mind what they were going to say and introspect to find the formulation that lacked the *you* in it so as to avoid the problem. This is another example of preview with introspection.

I think that gives you an idea of how introspection is a necessary part of language. Let me go on to a series of objections raised which should be in section 5. Let me go to 5.2 immediately. We've got a lot of examples of introspection at work, and we've got a profile of things that introspection is better and worse at. We are in a position to address some of the objections raised by objectivists and empiricists who, I suspect, are misperceiving the nature of introspection. For each objection, I am now in the position to give a counter to it. The first

objection simply pertains to consciousness. They say consciousness probably doesn't exist at all. That is one position maintained by some empiricists. Your claim about introspection not only assumes consciousness, but assumes it has two levels; therefore, it's quite problematic. I think the right answer to that objection is that it's really beyond the issue of introspection or no introspection. If you don't believe in consciousness at all, you do not believe in a whole lot more than just the lack of introspection. If you do accept it, you are accepting a whole lot more than just introspection. It's really a ground setting issue which introspection simply fits into. It's a relatively small part of it, and it should not be raised against introspection per se by itself.

On the other hand, with that said, it turns out that performing a fine analysis of introspection can be turned around and used as some kind of evidence for the existence of consciousness. Objectivists might say there is no consistency within the individual; at different times for the same thing he can give different answers. The answer to that is that it depends on whether what you are asking is within one of the things that introspection is good at or within one of the things that introspection is bad at. If it's good, you are likely to get clear consistency. If you ask, for example, the same person on different occasions what is the meaning of *bucket*, you are very likely to get a consistent answer. It's because the meaning of open-class forms is one of those things that introspection is really good at. However, if you ask something about some syntactic phenomenon, you are likely to get mixed answers because it's one of the things that introspection is bad at.

The same goes for another objection which says there is no consistency across individuals, to which the introspectionist would say, 'Well, but there is, as long as you ask about something that's within one of the realms that introspection is good at'. If you ask many different people what does *bucket* mean, you are very likely to get the same answer. On the contrary, if you ask about some grammatical thing, you are very likely to get very different answers. The objectivists' problem is that they keep mixing together what introspection is good at with what it's bad at. They are not doing a fine enough analysis to keep the two separated with relation to the neural infrastructure. The objectivists might say, 'All this conscious stuff, all this introspective stuff with the contents of consciousness, that's all very good, but it bears no relationship to the neural infrastructures, to neurons in a given subsystem of the brain, which, when active, you claim give rise to some conscious experience. There is no consistency, no pattern there, to which the answer is, on the contrary, the burden of proof is on you to show there is no regularity across the two. You have to consider that if there were no relationship between a neural infrastructure and some contents of consciousness, then the burden would be on the objectivists to

explain how it comes about that the contents of consciousness are themselves so regular, so elaborated, so consistent internally within themselves. Where does it come from? Is it a new emergent property? You might as well just say that those properties of conscious contents derive simply from a consistent form of neural pattern present in the neural infrastructure.

Otherwise, for those who posit a radical split between them, it's for them to explain why there is any kind of consistency present in the conscious level. The objectivists might say 'Let's say that consciousness does exist, that's granted. But why bother with introspection if you can get similar results with the other methodologies, and you can get better ones and more consistent ones with them?' To which the objection is, that's fine, except there are some things that only introspection can get at. You don't get it anywhere else. So it's indispensable. You can't do without it. There is no basis to say you might as well use some other methodology. You might as well use it as a corroboration; you definitely have to use it where introspection is bad, but you can't use it where introspection is best.

As for faultability and repeatability, those properties are often cited to show that something is a science. It's faultable if it's in one of those realms where introspection is especially bad. Let's say somebody says something about syntax which is really kind of wrong. It's readily faultable by comparative syntactic analysis, by one of the other methodologies. So it's readily faultable, but it's one of the bad things that's faultable. As for repeatability, again, one of the good things is repeatable. Every time you ask people what *bucket* means, you get the same answer, so it's fully repeatable. This brings up something that is often said. I come from a linguistics department which did a lot of field work, especially on American Indian languages. Often there was a phrase used which was 'never trust the native speaker'. But it has to be understood correctly. It only referred to something like syntax. In other words, things where introspection is especially bad. You could ask a native speaker 'Why did you say it that way?' and the native speaker will come up with some reason, but it will be pretty poor. You should not trust the native speaker for those syntactic judgments. On the contrary, you have to trust the native speaker for grammaticality judgments and for the meanings of things in the first place. In fact, the only way to get those concepts is from the native speakers themselves. So when you say something is not faultable, the poor things are faultable, and in fact, field work regularly faults the grammatical pronouncements of the native speakers after doing lots of analysis internal to the language.

The final card in the objectivists' arsenal is to say 'Introspection is just subjective'. That's the usual way they put, it's just subjective. It's a first person thing, and it can't be accessed by third person things. The challenge to that

is 'Yes, that's true, introspection is a first person thing'. It's necessarily a first person thing, or it wouldn't be introspection. There is no third person way to check on someone's introspection. It can't exist. Like consciousness, there is no instrument to determine if someone is conscious or what contents of consciousness are currently there. But you can turn right around and say to the objectivists 'So are you a first person subjectivist', because every objective scientific enterprise, no matter how objective it is, no matter how empirical it is, must use subjectivity, must use introspection, because the researcher has to observe the data and assess it, has to figure out observed patterns in it, and on the basis of those patterns propose theories about it, has to then check out those theories, has to patch the theory until he develops new theories. All of this is introspective. All of this is subjective. There may be parts out there that involve tangible concrete instruments and so forth, which themselves in turn produce data. They may produce printouts. They may produce meters with readings on them, but still it's they that have to read what's on those meters or read all those printouts, and in the quiet of their minds make sense of it. It's intrinsically introspective. It's intrinsically subjective. There is no science without subjectivity, whether it's acknowledged or not. Ultimately, that is the last riposte on the part of the introspectionists, to say 'You did it yourself, so the task is, instead of opposing each other, let's join forces and develop a science of introspection, because even if introspection were not necessary, it still exists. It's an actual cognitive phenomenon'. It should at least be the target of scientific linguistic investigation, not simply dismissed, in order to find out how our cognition is working. From everything that I've shown you here, it's not merely another cognitive phenomenon, it's an indispensable cognitive phenomenon.

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Handout Lecture 6

1. Introduction

1.1 Structure of this presentation

1.1.1 Faulting and justifying introspection

Introspection is the main methodology used in linguistics.

But objections to it are often raised on such grounds as:
It is not "objective" or "empirical". / It is not faultable or repeatable.
It is not accurate or consistent. / It cannot access ongoing interactive discourse.

The procedure here:
First make linguistic introspection itself a TARGET of investigation, to determine its actual characteristics.
With that as a basis, then find any justifications for using linguistic introspection
as a MEANS for investigating other linguistic phenomena.

1.1.2 What is found

a. Linguistic introspection has a profile: it is better or worse at different aspects of language.
Much objection to linguistic introspection results from blurring the distinctions
between its better aspects and its worse aspects without discrimination.

Certain other methodologies corroborate introspection where it is better, and complement it where it is worse.
In fact, every methodology for investigating language has its own profile for what it
is better or worse at.
They all partly corroborate / complement each other.
None is the gold standard for investigating language overall.

Methodologies for language investigation include the following:

1) introspection into the meaning and structure of linguistic forms and expressions
2) comparison of one's own introspections with those reported by others
3) analytic techniques in semantics, morphosyntax, and phonology within a language,
   such as comparing linguistic forms or expressions for their similarities and differences
   and for patterns therein
4) comparison of linguistic characteristics across typologically distinct languages
   as well as across modalities (e.g., spoken and signed language)
5) examination of how speech events interact with context,
   e.g., the physical surroundings, the participants' background knowledge, the cultural pattern
6) audio- and videographic analysis of recorded speech events
7) (computer-aided) examination of collated corpora, often annotated
8) examination of cumulatively recorded observations of linguistic behavior,
   as of children acquiring language
9) experimental techniques of psycholinguistics
10) instrumental probes of the brain's linguistic functioning in neuroscience
11) simulations of human linguistic behavior in artificial intelligence

b. Introspection is an ordinary and necessary component of normal interactive discourse
   as well as of offline thought.

Linguists merely employ systematically a cognitive faculty that is already in place for
everyday linguistic functioning.

1.2 Basic structural characteristics of linguistic introspection

1.2.1 Two levels of consciousness

a. broadly:

Linguistic introspection = conscious attention volitionally directed by a language user
to particular aspects of language as they manifest in his cognition.

b. specifically:
Certain aspects of language can appear
—whether through perception of speech, by internal evocation, or spontaneously,
in a language user's consciousness = "first-level consciousness".

A second level of consciousness can also occur in the same individual at the same time
that has as its object (part of) the contents of the first level of consciousness.

This "second-level consciousness" can be volitionally generated and directed at
a selected linguistic target on the first level.

Such second-level consciousness then = linguistic introspection.

1.2.2 *Accessibility to introspection*

The accessibility of an aspect of language to introspection has two main components.
a. "readiness":
The numerous distinct aspects of language range in their readiness to appear in
first-level consciousness, from appearing there readily to
never appearing there (= permanently unconscious aspects)

b. "amenability":
If present in first-level consciousness, such aspects of language
differ in their amenability to attention directed at them from second-level consciousness.

An aspect of language is more amenable
if it has greater strength and clarity in first-level consciousness
and can remain more stably present there while attention is directed at it.

It is less amenable if it is fainter, vaguer, or more elusive under such attempted scrutiny.

c. The "accessibility" of an aspect of language to consciousness / attention / introspection
= an inclusive term for its readiness + its amenability.

1.3 Immediate examples of linguistic introspection at work

1.3.1 In a linguist using the "offline excerptive" condition of attending

A linguist might internally generate the expression *I dragged away the boxes from the door.*, and
direct second-level attention to her experience of the expression in first-level consciousness
to observe if the expression sounds grammatical, or "right".
She might then internally generate another expression *I dragged the boxes away from the door.*,
to observe how grammatical or right IT sounds.
She might then compare this observation with the preceding one
—directing her attention to these two impressions in working memory—
to determine which one sounds more grammatical, or better.

1.3.2 In language users using the "online" condition of attending during discourse

Consider a hearer who interrupts a speaker to say: *I don't understand*.

The hearer, in his processes for constructing a conceptual complex to correspond to the speaker's
utterances, may have been monitoring his own experience of its degree of coherence,
and now finds it to be low.
Such monitoring = second-level attention introspectively directed at a first-level
linguistic experience.

In turn, the speaker must now first review
both the conceptual complex she was trying to convey and how it had been represented,
and then seek an alternative representation of the same conceptual complex to utter next.

Such a review and search = second-level attention introspectively directed at
first-level linguistic experience.

1.4 Parameters of the attention system of language: partial list of the major distinctions

a. conscious vs. unconscious: whether occurrent activity in a particular neural ensemble
currently is or is not in consciousness
b. consciousness vs. its content (which includes: attention vs. its object)
NB: an "obtent" (my only coined term) = a current or potential content of consciousness
—"potential" because a particular neural ensemble would yield this content
if it were active and its activity were in consciousness
c. involuntary vs. voluntary: whether an attentional process
occurs spontaneously or is involuntarily triggered in an individual
vs. the individual consciously and intentionally directs the process
d. strength: the degree of a current obtent's salience in consciousness
or the degree of an unconscious obtent's tendency to enter consciousness (= its "potentiation")
NB: consciousness is found to be a gradient phenomenon in language
—not, as held by some, to be a discrete all-or-none phenomenon.
e. quantity: the amount of content currently in consciousness
f. selection: which one of several candidate obtents is in or enters consciousness
g. steady-state vs. changing; and if changing:
h. positive vs. negative directionality of change—e.g.,
increase vs. decrease in strength
an obtent's entering vs. leaving consciousness
(or attention extending to vs. retracting from an obtent)
i. force dynamics: the action of cognitive processes to
(positively) sustain or activate an obtent, or (negatively) attenuate or inhibit an obtent

1.5 Terminology for these concepts

1.5.1 The word "attention" has two main everyday senses

a. "attention" as a gradient, essentially equivalent to "consciousness"
Everyday expressions based on this sense:
The music took up little | some | more | most of my attention / consciousness.

b. "attention" as volitionally directed focus = the type present in introspection
Everyday expressions based on this sense:
I turned my attention away from the book I was reading to the music playing on the radio.

Attention in this sense is simply consciousness with certain choices of parameter values:
(1.4c) voluntary: the individual intentionally orchestrates her consciousness
(1.4f) selection: the individual volitionally chooses which one of several candidate obtents is in or enters consciousness
(1.4i) force dynamics: obtents not already in consciousness are blocked from entering consciousness, so that:
(1.4e) quantity: a lesser amount of content is maintained in consciousness

1.5.2 The English words "attention" and "consciousness" together cover the actual full range of consciousness

The word "attention" in its 'focused' sense can be used where the word "consciousness" cannot
to represent the same phenomenon of consciousness under certain parameter values.

a. voluntary vs. involuntary and directed vs. undirected
"Attention" can be treated as voluntary and directed or as involuntary, and undirected,
but "consciousness" can be treated only as involuntary and undirected:
The idea entered my attention / consciousness.
I turned my attention to it. / *I turned my consciousness to it.

b. focused vs. unfocused (involving parameters 1.4 b, c, d)
"Attention" can be focused or unfocused, but "consciousness" only unfocused:
The music took up a bit of my attention / consciousness.
My attention / *consciousness was focused on the music.

c. Figure vs. Ground
"Attention" can be treated as Figure or Ground, but "consciousness" only as Ground:
The music is in my attention / consciousness.
My attention is on the music. / *My consciousness is on the music.

1.5.3 The assignment of Figure vs. Ground status to consciousness vs. obtent

This parameter may not represent one of the major distinctions in the cognitive consciousness
system, but it does capture two models that we use to envisage certain consciousness events
and that are represented in everyday expressions.
As just seen, when consciousness is the Figure, the word "attention" can be used in English,
but the word "consciousness" cannot.

a. an obtent as Figure enters, is in, or leaves attention, itself a stationary Ground
everyday expressions based on this model:
Figure = subject: The new tune was in my attention. / The new tune soon came to my attention.
Figure = object: I put that thought out of my mind.

b. attention as Figure extends to, is connected with, or retracts from an obtent as Ground
or, if pictured as a beam, swings over to, is on, or swings away from an obtent as Ground
everyday expressions based on this model:
Figure = subject: My attention was on the music. / My attention wandered away from the music.
Figure = object: The music attracted my attention. / I turned my attention to the music.

1.5.4 Correspondence of terms:

a. for one's experiencing:
Y's consciousness of X =/includes Y's attention on X = salience of X for Y

b. for what is experienced:
a content of consciousness =/includes the object of attention = what is salient

c. for gradience
X more central / peripheral in consciousness = X more / less salient
= X higher / lower in attention = X more foregrounded / backgrounded in attention

2. Four factors that affect the accessibility of an aspect of language to introspection
—i.e., to attention directed at them from a second level of consciousness

These need to be distinguished first, to help organize the assessment of introspection's profile next.

2.1 Cognitive organization in common across individuals

Certain cognitive patterns seemingly common across individuals -- whether because they
are innate or the result of some pervasive developmental conditions—apparently tend to privilege
certain aspects of language over others along the gradient of accessibility to introspection.

E.g., the meaning of a sentence is generally more accessible than its syntactic structure, as in:
My dog likes your cat more than she likes him back.

Thus, there may tend to be a quite general ranking of accessibility to consciousness
among many aspects of language, such as among:
meaning of a discourse / meaning of a sentence / meaning of a word / meaning of an affix /

sentence structure / morphological structure / grammatical regularities /
the sound of a word or phrase / intonation pattern / vocal dynamics /
phonological structure

2.2 Particulars of an individual's cognition due to individual variation

Due to individual cognitive differences—
whether innate in the individual or the result of training/practice—
some aspects of language can be above or below average in accessibility to introspection,
in a particular language user, diverging within limits from their usual ranking.
= individual variation across a populace

E.g., of two speakers of Atsugewi, a polysynthetic American Indian language that I worked with,
one but not the other had meta-cognition of the Cause prefixes within the multi-affixal verb.

2.3 An individual's current concerns / circumstances

Introspective access to various aspects of language can vary
even within a single individual at different times
due to the individual's current concerns / circumstances.

e.g., typically greater in a hearer's attention:
the exact wording of the speaker when listening to one's lawyer
the tonality of the speaker when listening to an inntimate

2.4 An individual's conditions of attending

Different "conditions of attending" manifested by an individual can affect the
accessibility of various aspects of language to introspection.

2.4.1 The "online" condition of attending

= attention on an aspect of an ongoing discourse that the attender is participating in

This condition includes three subconditions:

A. concurrent
includes, e.g., the speaker or hearer attending to the meaning of an utterance
in the process of its being produced

B. preview
1) for the speaker, includes, e.g.,:
attending to what one will say next and to how to say it
2) for the hearer, includes, e.g.,:
attending to one's projection of what the speaker will be saying next

C. review
1) for the speaker, includes, e.g.,:
attending to what one has already said to determine what else,
out of one's current whole ideational complex, one still needs to express
2) for the hearer, includes, e.g.:
attending to what the speaker has just said, so as to derive further significance from it,
or to resolve unclear aspects of it in the light of his present utterance, etc.

2.4.2 The "offline" condition of attending
= attention on an aspect of language occurring in the attender's thought apart from any ongoing external discourse

This condition includes two subconditions:

A. discursive
attending to portions of or the whole of relatively well-formed linguistic expressions
that come to mind in the course of thought outside any ongoing conversation, including:
1) in concurrence as one thinks along about a topic
2) in preview as one imagines a conversation one might have in the future
3) in review as one recalls a conversation one has had in the past

B. excerptive / autonomous
attention on an aspect, item, or portion of language or of discourse
that is considered by itself, in isolation from any larger amount of discourse

2.4.3 Gradients between conditions of attending

Though the various conditions of attending were just presented as discrete,
continuities can exist between many of them.

A. online <-> offline
a speaker in the heat of an active verbal exchange
<-> a speaker in a quiet interim between exchanges with interlocutors still co-present
<-> an individual in a vividly imagined or recalled exchange

B. online review <-> offline review
a speaker reviewing her last utterance to guide where to go with her immediate next utterance
<-> a speaker reviewing her last turn during a pause in the exchange
<-> a speaker reviewing her contributions to a conversation right after it has ended

3. What linguistic introspection is better / worse at
= the aspects of language to which introspection has greater / lesser access
under the different conditions of attending
= a profile of introspection's higher / lower capacities

Non-introspective methodologies can serve to:
corroborate introspection where it has high accessibility.
supplement introspection where it has medium to low accessibility.
compensate for introspection where it has no accessibility.

3.1 Under the offline excerptive condition of attending
(i.e., attending to a form or aspect of language in isolation)

If one considers it internally or is asked for it, one might come up with the following
1) readily, 2) with a certain effort, 3) with difficulty, 4) not at all

3.1.1 Aspects of language with high accessibility to introspection

a. the meaning of a linguistic form = the conceptual content associated with the form, e.g.,—
   1. of a single whole expression, e.g,: *My father built a log cabin.*
   2. of a single open-class morpheme / word, e.g., N: *bucket* / V: *plummet* / A: *happy*
   3. of an idiom (as distinguished from a compositional reading) e.g.: *kick the bucket*
   4. of a figure of speech (as distinguished from a literal reading) e.g.: *I'm staggering through my homework assignment.* (metaphor)

b. the register of a linguistic form
   = speaker's attitude or social context associated with it apart from its basic direct reference
   e.g., formal: stomach / informal: belly / child-oriented: tummy

c. the colloquiality or privilege of occurrence of a linguistic form
   e.g., the sense that *buy* exceeds *purchase* in colloquiality / privilege of occurrence in a sentence
   in referring to roughly the same concept
   NB: the unconscious cognitive registration of a form's statistical frequency yields
   a consciously accessible weighting associated with the form, its privilege of occurrence

d. the appropriateness / good fit of a linguistic form's meaning/register in a particular context
   e.g., what a writer introspects on in a word for its potential inclusion in a sentence

e. the grammaticality of a phrase / sentence
   = its degree of conformity to the standard patterns of syntax / morphology in one's language
   (may vary across individuals especially as a consequence of training)
   e.g., one's awareness that the starred forms sound wrong in:
   *Last year you go there? / Last year you went there?
   Last year did you go there? / *Last year did you went there?
   NB: Generative syntax rests on an assumption of the reliability of such grammaticality judgments.

f. some of the distinct senses of a polysemous morpheme
   e.g., for *stock*, perhaps: 'soup base' / 'a store's supply' / 'financial share in a company'

g. some words or expressions that could express roughly the same concept (approximate synonyms)
   e.g., for 'annoy', perhaps: *bother / irritate / disturb / irk*

h. some words for the members of a category
e.g., for 'tool', perhaps: *hammer / pliers / screwdriver*

i. a word expressing a certain conjunction of concepts
e.g., for 'young', 'female', and 'cow', perhaps: *heifer*
or for 'dry hot sandy region', perhaps: *desert*

j. a word for the opposite of a quality named by another word
e.g., for *deep: shallow*

k. some fixed expressions that a particular word occurs in
e.g., for *road*, perhaps: *on the road / hit the road / road rage / roadshow*

l. some words with certain phonological characteristics
e.g., words that begin with "p" / words that rhyme with *bent*

m. the word for a concept indicated by a gesture
e.g., if someone points to a stork and says *What's that?*

n. the word for a concept indicated by a word in another language
e.g., an Atsugewi speaker saying *ph?la?q'i?s*
when a questioner asks for the Atsugewi word for *stork*
NB: This introspective capacity enables much of
inter-language elicitation, interpreting, translation

3.1.2 Aspects of language with medium accessibility to introspection

a. the meaning of a closed-class morpheme
   1. of a free morpheme, e.g.: *with*
   2. of a bound morpheme (affix / clitic), e.g., those in: *unretestable*, the *un-* 'negative', *re-* 'iterated', *-able* 'passive potential'

b. the lexical category of a word, e.g., noun, verb, adjective, preposition
(varies by individual endowment and training)
e.g., for *shallow*, perhaps: adjective

c. the salience of a linguistic form or of a component / aspect of a form
= introspective second-level attention on the strength of a form in first-level consciousness
e.g., noting that the concept expressed by the adjective in *their scurrilous behavior*
is more salient than that of the adjective in *their everyday behavior*
or noting that the concept of `futurity' is more salient in *on his upcoming arrival*
and less salient in *When he arrives*
NB: This capacity enables the study of attention in language
using the standard linguistic methodology of introspection

3.1.3 Aspects of language with low accessibility to introspection

a. semantic components within a morpheme's meaning e.g., those within 'pry' or 'across'
   as in: *There was a board across the road*
   as against: *There was a board along / on / in / above / beside the road.*
   NB: the methodology of comparative semantic analysis supplements this

b. ALL the senses of a polysemous morpheme
   (low in introspective access even though they are all represented in cognition)
   e.g., the full set of (not just several of) the senses of *stock* as a noun
   a. 'soup base' b. 'stored supply' c. 'rifle butt' d. 'line of descendants',
   e. 'farm animals' f. 'financial company shares' g. 'personal reputation' h. 'plant species'
   comparably: all/most of the synonyms of a word, e.g., of *annoy*
   all the words that rhyme with a target word, e.g., with *bent*
   NB: the methodology of corpus analysis supplements this
   (dictionaries / thesauruses / rhyming lists result from corpus work)

c. syntactic principles and patterns
   e.g., given the 2 sentences: a) Whose dog did our cat bite? / b) Whose dog bit our cat?
   a hearer has little introspective access to why
   (a) includes the word *did*, while (b) lacks the word *did*
   (a) has the verb *bite* in the present tense, while (b) has *bit* in the past
   (a) has the verb at sentence end, while (b) has the verb within the sentence
   NB: the methodology of syntactic analysis supplements this

d. forms or constructions that strike one as incorrect or ungrammatical and that one is sure one would not use in speaking
   but that in fact regularly occur in one's own fluent colloquial speech
   common example: resumptive pronouns, e.g., overheard:
   It has a theater that they can hold Broadway productions in it.
   NB: this type illustrates the case of low amenability of an object in first-level consciousness
   to scrutiny from second-level attention (see introduction):
   it is less stably present there, more elusive, must observationally be caught "on the fly"
   (this phenomenon might be an early phase in a form's becoming a solid part of one's grammar,
   later consciously accessible as such)

NB: the methodology of audio- and videographic analysis of speech events supplements this

e. some words with certain phonological characteristics other than the earlier high-access ones
e.g., words with [r] as their third sound

3.1.4 Aspects of language with no accessibility to introspection

a. the sequencing and duration at the sub-second time scale of cognitive processes,
even conscious processes
e.g., on hearing *I'm staggering through my homework assignment*, one can perhaps monitor that:
a literal interpretation was attempted and found unviable
the meaning of *stagger* was manipulated to accommodate it to the remaining conception
and a novel overall (metaphoric) meaning was constructed for the expression
but one cannot attend to the relative timing and duration of these processes
NB: The instrumental techniques of experimental psycholinguistics may compensate for this lack.

b. the cognitive processing that places a content in consciousness, that yields a linguistic form, etc.
e.g., we can attend to the fact that we get a sense of the meaning of *bucket* on hearing it
but cannot attend to the mental processing that led to that meaning coming to mind
or, we can attend to the word *heifer*'s coming to mind when thinking of the concepts
'young', 'female', and 'cow', but cannot attend to the mental processing
that led to that word coming to mind
NB: Neuroscientific instrumental probes of the brain may compensate for this lack.

3.2 Under the online condition of attending (i.e., attending to discourse while in progress)

3.2.1 Aspects of language with high accessibility to introspection

a. the overall topic or subject matter of some portion of discourse
   e.g., knowing that breakdowns and repair of one's car is being talked about
b. some sense for the degree of thematic and logical coherence present in the discourse
   e.g., thinking that one's colocutor is wanderingoff the topic or is not making sense
c. for a hearer: the specific conceptual content being expressed by a speaker while speaking
   e.g., understanding the specific content of the current utterance, say, *So they towed my car to the body shop.*
d. for a speaker: some sense of the conceptual content one has in mind to express as one speaks
   e.g., focusing on the idea of one's car getting towed to a body shop as one expresses it
e. for a speaker: portions of the intended content not yet expressed to cue up for expression next
   e.g., thinking ahead to how the auto mechanics botched the repair job for one's upcoming utterance
f. for a hearer about to be speaker: the conceptual content one cues up for one's next turn at speaking
   e.g., thinking of a bad experience with auto repair of one's own to match that of the speaker
g. for a hearer: speaker deviations from well-formedness that exceed their "grace allowance"
   e.g., excessive uhs and ohs or long pauses or false starts in the speaker's utterances
   or the speaker's using a wholly incorrect word or calling the hearer by the wrong name

3.2.2 Aspects of language with medium to low accessibility to introspection

a. paralanguage—perhaps more accessible to hearer than to speaker; in possible descending order:

vocal dynamics (pitch, loudness, speed, precision, etc.)
gestures (both their forms and timing relative to the utterance)
facial expressions, body language

b. for a hearer: speaker's deviations from well-formedness *within* their "grace allowance"
e.g., modest degrees of: uhs and ohs; pauses; false starts; self-corrections; nonoptimal choice of words/constructions; incomplete constructions; grammatical/referential conflict across a sentence; interruptions by other speakers; overlaps with other speakers
NB: the relatively low level of our attention to such disfluencies during discourse
may explain the surprise many feel on first seeing a close transcription of actual discourse

3.2.3 Aspects of language with no accessibility to introspection

a. cognitive operations and processes going on that yield the production or comprehension of speech.

3.3 Under the offline immediate-review condition of attending
(i.e., to a memory trace of recent discourse)
= attention on an aspect of discourse remaining in short-term memory right after its original occurrence and before fading away

3.3.1 Aspects of language with high accessibility to introspection

a. the thematic topic and conceptual content of a just-prior discourse
e.g., knowing that one had just chatted about car problems and repair

3.3.2 Aspects of language with medium to low accessibility to introspection

a. the exact wording and phrasing that had just been used to represent such conceptual content
e.g., even right after hearing it, a hearer might well remember the idea but not which of these or other wordings were used:
a) My sister called and said she was very sick this morning.
b) My sister called this morning to tell me that she was feeling really sick.
c) Judy said she was very ill when she called today.

3.3.3 Aspects of language with no accessibility to introspection

a. processes by which certain aspects of a just-prior discourse were or were not retained in memory

4. Examples and situations of high-access linguistic introspection at work

—demonstrating that introspection is a natural and necessary part of normal language use

4.1 examples of online introspection at work

4.1.1 Review type

a. If a speaker refers to two entities and subsequently says something like *the first one / the former* followed later by *the second one / the latter*
then the hearer must review his memory trace of what the speaker had recently said
—and the speaker had to do so when using those terms—
to identify which referent came first and which second.
This is attention volitionally directed from consciousness at one level
to the contents of consciousness at another level—contents in working memory—
in an ongoing discourse that the attender is participating in

b. overheard on the street, a woman said to a man:
You said "never mind". Did you mean to say something else?
apparently: A wife was here objecting to her husband that he had previously said that
her doing a certain task was not important, but that he was now contradictorily
complaining that she hadn't done the task.
Here, both the speaker and the hearer must review and contrast the content and
exact wording of a certain prior discourse with the content of some just-preceding utterance.

4.1.2 Concurrent type

a. If a speaker lifts a certain tool and says: *This is a mattock*,
the hearer may then "make a mental note", linking the unfamiliar object and word
with the intention of adding the morpheme to his vocabulary.

b. If a speaker says: *My father and my son-in-law met for the first time, and he told him*
how young he looked then, due to pronoun ambiguity, the hearer might try to puzzle out who spoke to whom.

This involves directing second-level attention to a first-level experience of a sentence's form and meaning.

c. heard on radio: The speaker cited below was inferrably aiming—and failing—
to retrieve a certain expression from her lexicon (*overtaken by events*).

Through both her overtly produced clauses, she found other ways to convey roughly the same idea.

Haven't those negotiations [*pause*] *sort of passed by events,* [*pause*]—*aren't they outdated?*

Inferrable target: *Haven't those negotiations been overtaken by events?*

This is a speaker who, while speaking, introspectively directs attention to her lexicon
to search for a certain form with a certain meaning that she knows is there.

d. conjecture: A speaker must meta-cognitively attend to his current conceptual complex
to keep it stable / unshifting during the period needed
to proceed through his utterance expressing that complex.

proposal: Some forms of schizophrenia might involve an impairment in this capacity.

E.g., an apparently schizophrenic man on the street was heard talking aloud in
seemingly disconnected phrases.
He then turned his head and saw a man with a white cane approaching.
He then incorporated the word *blind* in his next phrase.

Such behavior might indicate this cognitive impairment:

Whatever random thought or perception that now occurs in the speaker's cognition
determines the topic of the current fragment of speech.

This impairment then puts in relief what is presumably occurring cognitively in normal speech:

A speaker attends to maintaining a single conception in place through its expression,
and otherwise monitors its production for linguistic and communicative adequacy.

e. A language-imparting adult as a speaker and a language-acquiring child as a hearer
may both employ the capacity to attend meta-cognitively to individual words.

Such high-access introspection to individual words may have been a part of language evolution
in part because it facilitates aspects of language acquisition, especially vocabulary acquisition.

4.1.3 Preview type

a. heard at party of people in their 50's and 60's:
The host introduces a newcomer, who was never an intimate, to another guest, saying:
He's my last high school ... friend.

The speaker probably paused to look for an ending to his sentence that seemed appropriate;
"friend" may have seemed too close and "acquaintance" may have seemed too distant.
Maybe further thought would have yielded "classmate", or a reformulation:
He's the last person I knew in high school that I still know.

This is the speaker's second-level introspection examining his first-level conception
of the factual situation to find the right words to use to capture that.

b. reported by a Danish linguist:
In the 1960s when she became a graduate student, hence of intermediate status,
she and her advisor, in talking together, both avoided use of 2nd person pronouns,
with their obligatory formal/informal distinction
since the one felt too intimate and the other too distant.

They thus had to plan their expressions before uttering them so as to exclude such pronouns,

e.g., by reformulating "Do you have a class to go to now?" as: "Is there a class to go to now?"

c. the Introduction's example of a hearer interrupting a speaker to say: *I don't understand.*

4.2 Examples of offline introspection at work

4.2.1 Discursive review type

a. E.g. a person who had just been through a job interview might afterwards
go over in his mind what had been said in it:
what the interviewer could have intended by certain questions,
what the likely effects of one's own remarks were,
how one could have answered differently.

4.2.2 Discursive preview type

a. E.g., a person might rehearse different ways to break some sad news to someone.

4.2.3 Excerptive concurrent type

a. A language-acquiring child can play "word games" by herself / himself, perhaps as an innate form of play evolved to facilitate language acquisition and improvement.

b. A poet or other writer can consider alternative ways of phrasing a concept.

5. Arguments against and for introspection as a methodology in linguistics

5.1 "Contextualism" vs. introspection

5.1.1 Contextualist arguments against linguistic introspection

A view that can be called "contextualism" holds that:

a. Linguistic meaning exists truly or at all only in the midst of an ongoing discourse.

b. Any introspection directed at meaning—
whether during a discourse or offline, where it is "decontextualized"—
is not reliable, because either it distorts true meaning or it confabulates new meaning.

Challenged in particular is offline excerptive introspection
especially the sentences made up by some linguists to demonstrate syntactic or semantic points.

5.1.2 Introspectivist arguments against contextualism

a. Linguistic introspection is natural, necessary, and functionally adapted

As counterarguments, the earlier evidence shows that linguistic introspection is:
1) a natural part of language cognition, occurring densely during discourse as well as offline.
2) an indispensible part of language cognition, performing certain necessary functions—
normal discourse and perhaps language acquisition would not be possible without it.
3) in approximate correspondence with these functions that it performs.
This correspondence appears in its specific profile of better and worse capacities.

This introspectional profile itself may have coevolved as language evolved,
becoming suited to speaker and hearer cognitive processing needs.

b. Offline linguistic introspection in particular is necessary.

Offline linguistic introspection is not a curiosity to be avoided
in the study of "true" online discourse.
Rather, it is an available cognitive capacity, evolved as such, at least because
it performs necessary functions, e.g.,
1) the discursive type:
a) rehearsing discourse in preview

b) evaluating discourse in review
c) abetting ongoing thought

2) the excerptive type:
a) adult language-imparting and child language-acquisition
b) child language-improvement through a child's own private word play
c) adult solving specific language problems -- see next:

c. elaboration of the cognitive capacity for offline linguistic introspection

Language specialists use the same offline introspective capacity as in normal use,
though sometimes extended and refined, e.g.,
artistically by poets and other writers
with systematicity and rigor by linguists
Perhaps analogous: any skilled or creative elaboration of a natural capacity
e.g., from natural motor control: skilled labor and dance

5.2 "Empiricism" vs. introspection

5.2.1 A point-by-point empiricist challenge and introspectionist justification

matchup between 1) reasons often cited for not relying on introspection as a scientific methodology
and 2) corresponding reasons supporting linguistic introspection as a methodology

a. the existence of consciousness

1) It is not clear that consciousness as a cognitive phenomenon exists.
Since introspection is here understood to invo lve consciousness—in fact, at two levels—
it may have no actual cognitive basis.

2) The existence of consciousness, much debated elsewhere, is not appropriate for debate here,
since that issue is more fundamental than the present one.

Accepting the existence of consciousness, as done here, licenses more than the specific
investigation of introspection, while denying it forecloses much more than just introspection.

However, findings about the properties of introspection might in turn be adduced
for arguments for the existence of consciousness.

b. consistency within an individual

1) Introspective reports are poor because they are inconsistent
across different reports about the same phenomenon made by the same person at different times.

2) Consistency across the same individual's introspective reports is actually higher or lower
depending on where the linguistic aspect in question ranks on the profile.

Thus, in the offline excerptive condition of attending, an individual is highly consistent
in judgments about the meaning of an open-class form, e.g., *bucket*
or the well-formedness of a sentence, e.g., of *I didn't go there. / *I didn't went there.*

c. consistency across individuals

1) Introspective reports are poor because they are inconsistent
across reports about the same phenomenon made by different individuals

2) Consistency across different individuals' introspective reports is actually higher or lower
depending on where the linguistic aspect in question ranks on the profile.

Thus, in the offline excerptive condition of attending, different individuals are highly consistent
again in judgments about the meaning of an open-class form or the well-formedness of a sentence.

NB: There is a comparable agreement across introspective reports of different individuals
as to what they perceive on viewing optical illusions.

NB: relevant to both b. and c.: introspection vs. report of introspection
Experiencing the result of introspection in consciousness and reporting that experience
involve different cognitive processes and capacities.
An individual can have large facility in one and not in the other (innately or from practice).
Analogy: perceiving what is in a visual scene vs. describing what one perceives.
Introspection is best used as a scientific methodology by individuals with both facilities.

d. relation to neural infrastructure
1) If the existence of consciousness is granted, the content appearing in consciousness
—and hence, in introspection—
may actually be independent of or not regularly correspond to
the unconscious cognitive processing assumed to underlie it—
i.e., the organization and functioning of the neural infrastructure assumed to underpin it.

2) As just seen, the conscious content yielded by introspection is:
a) largely consistent in an individual through time for higher-access aspects of language
b) largely consistent across individuals for higher-access aspects of language.
Further, it appears to be:
c) largely coherent within any act of introspection
d) extensive in quantity within many acts of introspection.
Accordingly, it likely relates in a principled lawful way to unconscious neural infrastructure

If not so, a theorist must conclude—and then the burden is on her to explain why it is—that:
a) introspective and other conscious content, in all its extensiveness, is fully

confabulated, random, or otherwise decoupled from the neural substrate

b) the consistency and coherence of introspective content are independent emergents.

Since this seems barely tenable, the conclusion here is that a principled relationship does exist.

In turn, given such a lawful relation, introspective or other conscious content should
be usable to propose properties of unconscious neural organization.

e. correlation with other methodologies

1) Introspective reports disagree with the properties of language ascertained through other, more empirical methodologies.

2) Actually, findings from the higher-access aspects of the introspection profile
seemingly do correlate well with findings from other methodologies.
E.g., one's introspection on the meaning of an open-class morpheme might correlate well with
one's responses as a subject in a psycholinguistic experimental procedure on semantics.
Or, one's introspection on some of the distinct senses of a polysemous morpheme
might correlate well with some of the senses found through a corpus search.

It is lower-access aspects of the introspection profile—
e.g., to syntactic principles and patterns, or to sub-second time processes—
that may tend to disagree with findings from other methodologies.

Thus, the familiar field worker's adage "Never trust a native speaker" typically refers only to
asking a speaker questions like where and why a certain syntactic pattern occurs.
But this is an introspectiively low-access aspect of language
readily outdone by the methodology of comparitive syntactic analysis.

The adage certainly does not refer to asking, say, about the meaning and well-formedness of a form,
for which in fact the field worker depends on the native speaker's judgments,
and which is an introspectiively high-access aspect of language—
one that may correspond well with findings from other methodologies.

f. faultability and repeatability

1) Reports of introspective findings are not faultable or experimentally repeatable.

2) On the contrary, introspective reports ARE indeed--
a) faultable, e.g.,
a native speaker's characterization of some grammatical point faulted by syntactic analysis
b) repeatable, e.g.,
in asking a native speaker at different times for the meaning of the same open-class morpheme
and getting the same response
Both results again rest on introspection's profile of better and worse capabilities—
here, a low-access aspect and a high-access aspect, respectively.

g. utility

1) Even if introspection exists as a cognitive phenomenon, it is unnecessary as a methodology
because objective methodologies do the job better.

2) On the contrary, linguistic introspection may be the only direct means for accessing
certain aspects of language, such as the meaning and connotation of forms and expressions.

Even if, say, neuroscientific brain imaging some day purports to detect the neural activity
that correlates with a word having a certain meaning for a hearer,

the hearer's report of experiencing that meaning would still be indispensible
to determine if what the imaging has picked up is indeed word meaning, not something else.

In any science, a researcher must go to where the relevant data under study are to be found.
E.g., a geologist must go examine the earth = physical travel to terrestrial sites.
Likewise, a semanticist must go to where meaning is located, namely, in consciousness experience.
Here, "going to" = introspection.

h. subjectivity vs. objectivity

1) Introspection is a purely subjective process and cannot be checked by external probes.
The other methodologies are objective and do not exhibit this drawback.

2) True, introspection, like consciousness in general, is subjective—
a first-person experience that cannot be probed by third-person means.
But all so-called "objective" methodologies necessarily also have such a subjective component.
Thus, ultimately, any reservation held with regard to introspection on account of subjectivity
must also be held with regard to the so-called objective methodologies.

Specifically, introspective processes used in observing language—whether as a user
or as an analyst—are of a piece with the cognitive processes used by "objective" scientists assessing their empirical findings.
The latter are the cognitive processes involved in:
deciding where and how to collect data, observing and assessing the data,
weighing results, making generalizations, forming theories, etc.

Since introspection is an integral part of such cognitive processes in "objective" investigation,

accepting it there should mean accepting it as well in the cognitive processes used
in investigating language.

6. Conclusions

a. The rejection of linguistic introspection as a methodology may in part stem from an
insufficient analysis of its better and worse capacities that allows its drawbacks
to be overgeneralized to the whole.
Such drawbacks are here seen only as the troughs in its overall profile.

b. Each methodology has a different profile of what it is better or worse at.
Some are uniquely capable in some regard.
Introspection, in fact, has unique access to meaning.

c. Introspection is normal and necessary to discourse, as well as to offline linguistic cognition.
Its profile of better and worse capacities may well have selectively evolved as such
in accommodation to these functions.

d. In any case, any rejection of linguistic introspection as a METHOD of scientific investigation
must not translate into a disregard of introspection as an OBJECT of scientific investigation.

Introspection does exist as a cognitive capacity,
and investigation must account for its specific profile of properties.

LECTURE 7

Relating Language to Other Cognitive Systems

This talk is going to focus on the relationship between language and other cognitive systems. The overarching conception in all of this is that we have one cognition. In effect, it's a challenge to the previous model of Fodor and Chomsky, which was that there are water-tight compartments, called modules, and for example, there is a language organ which is an autonomous module in cognition which just does language. It seems to be that very little in cognition, indeed, is independent. I suspect there is a large amount of interaction and overlap. In particular there is a large amount of structural similarity across them, so my whole object is what I call the overlapping systems model of cognitive organization. It's to identify a set of large scale, roughly distinct cognitive systems that we have, and then see what kind of major structural properties they have in common.

Let me just list a few of the major cognitive systems. I called them 'systems' instead of 'modules' in order to choose a different word than the one that suggests total autonomy. They would include the language system, with a much fuzzier boundary than the language module of Fodor; they would include perception, either as a whole or in its various modalities, so in particular visual perception, auditory perception, kinesthetic perception, feeling and so forth. They would include motor control as a system; I propose that there is also an affect system for emotions and feelings; there is what I call a culture system, a part of the brain dedicated to structuring our cultural patterns; and there are what I propose as an understanding or reasoning cognitive system.

In the overlapping systems model, the concept is that each one of these approximate large-scale cognitive systems might have a few organizing characteristics that are uniquely its own. There will be other organizing or structuring characteristics that are shared across several of these cognitive systems; and there will be some which are so general and so fundamental that they run

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across all the different cognitive systems. An immediate example of that would be hierarchical embedding, so one thing embedded within another, within another. I think some of them we find as structuring phenomena in virtually every cognitive system.

I just listed some of what I think are the main substantive cognitive systems. Listed in 1.2 are some of the structural features, I'm going to call them organizing factors, that run through some or all of these different cognitive systems. They run through language; they run through different modalities of perception; they run through motor control, and so forth. I only mention a few, but there is a number of them that you can look at at your leisure.

Among the main ones, the first one would simply be schematic structure, some kind of abstractive delineations that exist within any given cognitive system. Language certainly has a schematic system. It's in fact embodied by the closed-class forms, which I'll describe in a second. In visual perception there is schematic structuring in terms of the delineation that you see, for example, in dividing a room into its parts, and so forth. In motor control, it would be the distinct movements that you make as they need distinguishing from each other.

Another cognitive organizing factor would be the temporal structure. This again cuts across all the different cognitive systems. It would include things like phase, so the start or stop or continuation or absence of some process going on in one or another of these cognitive systems. It would include things like speeding up and slowing down, or coming to a stop, or starting up. It would include coordination of such things as alternating things or coordinating processes across systems. It would include things like putting something on hold until some trigger starts it up again. All these would be aspects of temporal structure that presumably runs through all of the different cognitive systems. A third organizing feature would be causality, any way in which some phenomenon or process within any of the systems causes another one, or is caused by something outside itself.

Now let's switch to the cognizing factors. We have attentional structure. Within every cognitive system, you can direct different patterns of attention over the phenomenon. You can direct different patterns of attention over what you see, or if you are moving, over different parts of your movement; over different parts of what you are saying. This is all the attentional system. There is the perspectival organizing factor, which is something like which perspective point you are looking at the other elements of the system from. There is the memory system: which elements of the current system can be easily held in working memory, which ones cannot, which ones can be readily maintained in

long term memory and so forth. The difference between familiarity and novelty is built on whether you remember or not, and that distinction can probably show up in any of the cognitive systems.

This gives you an idea of what I mean by the distinction between the substantive cognitive systems, things like the language system, perception, motor control, affect or emotion, the understanding system. Those are the substantive cognitive systems. These organizing factors are the structural aspects that either show up in just one of the substantive systems, or across several, or running across all.

That's the rough idea of how I am seeing this. I call that the overlapping systems model of cognitive organization. It's, as I said, in direct challenge to the Fodorian notion of autonomous modules. If we have comparable organizing factors across different cognitive systems, what are the ways in which that could happen? I can picture three main ways that you can have this kind of commonality of structuring organization. They all have implications for evolution.

The evolutionary idea is that some cognitive systems are more ancient than others. For example, vision and motor control were in place in our cognitive organization much longer than what in humans are the last two cognitive systems to have evolved, namely language and culture. Again I propose that there is a substantive cognitive system dedicated to acquiring and manifesting culture patterns. You see it, to some degree, in chimpanzees, it's known that now there are cultural differences across different chimpanzee groups, but it's really elaborated in humans. Since those are the last two to have evolved, how is that they could have certain commonalities of structuring with those previously existing? Let's say this large circle is the totality of one's cognition, and here is some structuring factor. One way that you can have commonality is that there is some independent, separate, neural system that is responsible for a certain kind of structuring. Let's just pick one out: hierarchical embedding, the capacity to embed or nest hierarchically. Let's say within this total circle there is some separate neural system whose function is to enable hierarchical embedding, one thing set in another, set in another. What if several cognitive systems exhibit that? Here is the visual substantive system. It would have to establish neural connections to that organizational factor in the neural system in order to manifest hierarchical embedding within vision.

The same would happen with motor control over here. It would have to establish connections to it. Let's say language evolves last. If it exhibits hierarchical embedding, which it does, then presumably, by this account, it would have to develop connections to this neural system that handles hierarchical embedding.

There is another way that you can account for commonality of structural organization, namely that it's located at the outset within a single substantive cognitive system. Let's say the structural capacity to embed hierarchically first evolved in visual perception, just to pick something. Then here is all of cognition. Here is the visual system. And within the visual system, long ago evolved, there is a portion of that system, a neural sub-system, which is responsible for hierarchical embedding.

The brain now has a system, say in the visual system, which is capable of orchestrating hierarchical embedding. If language then comes along later and evolves a new distinct cognitive system, it might develop connections to that sub-system already within vision. In this respect, the evolution of language depends on tapping into, making connections with a sub-system already present, long since evolved as part of some already existing cognitive system, let's say, visual perception. That's the second model.

The third possibility that accounts for common structure is that each separate cognitive system, like vision, motor control and language, has its own copy of this sub-system. So language has a little sub-system for multiple embedding, so does vision have one, and motor control has another one. Then the question is how those separate copies arise. There are several evolutionary accounts. It apparently often happens that the previous structure came through some mutation. At first it's a mistake, but once it's there, it can be utilized. The mutation might be just a gross physical one, for example, some people are born with a sixth finger. In time, if it does not hurt anything, it might stay in place and get used for a specialized function. Let's say that vision already had a subsystem for multiple embedding. Maybe some neural tissue copy by mutation was made. Let's say some language system evolved around that, and included it automatically. That's one way. Another way is convergent evolution. It can just be that certain structuring characteristics fall out so readily, that they independently evolve in each of many cognitive systems. (A fourth possibility is that it's just pure accident, coincidence.)

These are the three main models by which you can account for commonality of structuring across different cognitive systems, and there are evolutionary implications for each. If you look at the structural characteristics of the various substantive cognitive systems, it turns out that language has certain possibly unique ones or ones that are most elaborated in language. The last talk, on the evolution of language, will address this directly.

One of the rarer or unique structural properties of language is that it has two co-systems that are integrated or correlated with each other. One is essentially the basic Saussure type of observation of language. There is a linkage

between meaning and form, a form-meaning association, so you have some phonological shape, like 'bucket', and associated with that is a certain concept, this object. You have the relationship between two co-systems, the expression co-system, which is the overt form that you use, and the conceptual co-system, which is correlated with it, which is the concept that is associated with it.

Now you look over various other cognitive systems, let's say vision, and you are hard to put to see anything comparable: I mean, an expression co-system and a conceptual co-system in vision doesn't make sense. What about motor control? Similarly, it doesn't quite fit. Maybe language or any kind of communication system, it could be a gestural system as well, is perhaps unique in having that kind of correlation. Within the expressional system of any communication type system, like language, there are two sub-systems. Languages have two subsystems, namely the open-class sub-system and the closed-class sub-system.

In a second, I will expand on what I mean by open vs. closed-class. First, there is the issue of how we can undertake this comparison across cognitive systems. Let's say between language and something else. How is it even possible to do so? We have to have some points of correspondence, and this is in fact a problem. For example, if the whole point of my comparison is to compare what is structural or organizational across different cognitive systems, how do we know what is organizational and structural?

Within language luckily, as I'll expand on in a second, the closed-class system, which is overtly detectable, is a sub-system of language which is dedicated to conceptual structure. The open-class system is dedicated to conceptual content. There is a fundamental division of labor between content and structure. To use an English idiom, language as a cognitive system hands you structure on a silver platter. It has an overt, distinct system, fairly easily identifiable, which is dedicated to representing conceptual structure. Possibly no other cognitive systems has this.

Within visual perception, most of what perception psychologists deal with they would probably say is structural. But there is no determinative way for them to say that this is structural and that's not. For example, you can ask of a perception psychologist 'Is color structural?' A perception psychologist might easily say 'Well, the perceived delineations, outlines of things are structural.' But then you can ask the psychologist 'What about color, is color structural?' They will have no principled way to answer that. Unlike in language, you do have a principled way to answer 'Is X structural?' You can just say, well, is it expressed by a closed-class form? If it is, it's structural. If it isn't, it's not. And that's not the end of the story. That's too simple. But at least, it's a first kind of distinction you can make.

There is nothing like that in vision. Similarly, another problem within visual perception is that there is no principled way to say at what stage of visual processing that structure would appear. In fact, it seems to appear all the way from the retina back to the optical cortex and all the successive processing that goes on, at each stage something structural takes place, but no single stage seems to be privileged to be called the structuring sub-system of visual processing. Whereas in language, nothing like that occurs, you have a given closed-class system, which is its own stage, it's a simple stage. There is no issue.

So there are real problems in trying to even open the question of how to compare structure across cognitive systems. My methodology is to say, since the nature of structure as such is given most explicitly, most definitively by language, language is a good cognitive system to start such an investigation from. You can look at language first, and see what aspects of processing are structural in character, and see if something like that corresponds in other cognitive systems or doesn't correspond. That's my methodology for carrying on this cross-system comparison within cognition.

Now I'm going to switch to section 2. This was the content of my first talk. I don't want to repeat the whole thing, because a number of people here have heard my first talk, but I'll just summarize it quickly. To define them quickly, open-class forms in any language are those classes which have a large number of members, and you can add many members very easily. For example, nouns in English, simplex nouns, we have hundreds of thousands of them. And it's very easy to add new nouns. In one day we can add a bunch of new nouns. The same with verbs, the same with adjectives. But everything else is a closed-class. Closed-class forms can be bound, such as inflections or the derivations and so forth, or they can be free forms, like prepositions, classifiers, or conjunctions. English has several dozen propositions like *in, on, around, above, below, through* and so forth. But it has only several dozen, it doesn't have hundreds. And it's really hard to add a new proposition. You can't just go to a class, and learn ten new propositions and go away using them. Closed-classes are ones which have relatively few members, and it's very hard to add new ones. The rest I'll leave off, I'll just say that the open-class forms in any given sentence or portion of discourse contribute the majority of the conceptual content that's expressed by the sentence, whereas the closed-class forms express the majority of its conceptual structure. This is content-structure distinction.

Since this whole comparison is over structure, not over content—structure is the organizational features of these different systems—I'm automatically going to just stick to the closed-class forms within language. That's all I'll stick with here in all these comparisons. So that's my summary for section 2. Then we can go on to section 3, page 124 (handout).

What I'm going to do is run a set of comparisons between language and one another cognitive system. In three, I'm going to compare language with the visual perception. Compare them and contrast them. We'll find that it's partially overlapping. It's one of these partial overlaps. Some things only vision has, they are absent from language. Next we can look at structuring properties that language has that are absent from vision. Then we can look at things they have in common, which are, in the case of language and vision, quite extensive, and which I think attest to the theory that as language evolved, it borrowed from other systems. In fact, I suspect, language borrowed most from visual perception, kinesthetic perception and from the reasoning and understanding systems. It borrowed very little from other cognitive systems, like affect or the culture system. In fact, after we get through with this language-vision comparison, we'll go on to the comparison between the structuring systems of language and the affect system, then to language and the culture system, and then between language and the understanding system. We'll see that there is a difference in how much overlap there is. So first then between language and vision.

Let's first look at the cases of non-overlap, aspects of structuring that vision has that are pretty minimal in language structure. There are listed five. The first one is bilateral symmetry. I understand from perception psychologists that a strong aspect of structuring within vision is bilateral symmetry, seeing that the two halves of something are reflections of each other. Like for example, humans down their midline axis show a bilateral symmetry. It's not clear to me why that's so important, but I understand it that it is. Language has very little in its closed-class forms that express bilateral symmetry. The closest I can get is maybe *each other*, which is a closed-class form. In English it's a free closed-class from. For example, you say that they kissed each other, and maybe you can imagine an image of a pair of faces with lips meeting and so forth, it shows bilateral symmetry.

Maybe one other example: in classical Greek, there are two closed-class particles, which are *men* and *de*, which mean 'on the one hand', 'on the other hand'. They are closed-class particles, so we know that the language is treating them as part of the closed-class structural system. Maybe that kind of an 'even balance' thing is another example. But beyond that, it's pretty minimal.

Let's try another one. Vision also has, what I suspect is a collaborate system for scenes, for parsing out kinds of rotation, whereas language is absolutely minimal with respect to that in its closed-class system. English and its closed-class system has, for example, only two distinctions, 'over' and 'around'. These are closed-class, preposition-y things; I call them satellites. They distinguish the orientation of the spin axis of something that's rotating. For example, 'around'

is where the spin axis is vertical, so this is around. If you say *They turned the pail around*, they are turning it this way. 'Over' is where the spin axis is horizontal. With *I turned the pail over*, you take the pail and you go like that. English has this distinction, but that's all, just that distinction. Everything else is absent.

Now let's see what could be distinguished visually. By the way, for those who were there for my sign language talk, sign language also distinguishes many of these distinctions, because sign language in general is closer to the fine-grained character of visual parsing. For example, vision and sign language will distinguish different degrees of a circuit around something. What I'm going to show is in fact the way you do it in American Sign Language.

If you say *I ran around the house for 20 seconds*, you go like that. *I ran around the house in one minute*, with a sharp gesture. *I ran around the house for a few minutes. I run around the house for hours.* All that you both sign and can see in visual perception. But in English, all you've got is, around, around, around, around. The word 'around' doesn't change. There are no further distinctions marked.

Similarly, you can visually distinguish different geometric arrangements with rotation. For example, the spin axis can be at the center of the object, like a rotating CD disk, or a pencil spinning on its axis or a propeller spinning around. These are all different geometric things, which you can easily see. None of this is distinguished in the closed-class forms of language. Again, it is just around, around: *The propeller is spinning around, I spun the pencil around* and so forth. Similarly, there will be a distinction if the spin axis is at the edge of the object. For example, if you are shutting a door, here's the edge of the door, the door goes like that. Or you swing your cape, pulling it at the edge, all these is 'around'. Visually you'll know all these geometric distinctions. Linguistically, they are bypassed in the closed-class system. Finally, where the axis of spin is outside the object itself, for example, the earth revolving around the sun, or the hoop which is spinning. Again, the earth revolves around the sun; the hoop spins around, it's still 'around'. But visually we see a difference, perceptually we see the difference. Finally, whether there is consistency in rotation. If we've got a hanging rope and spin it around, if it all spins uniformly, you'll say it's spinning around. If it's stuck to the ground and just keeps spinning, then you'll say it twists around. So it's not uniform, but it's still 'around', 'around', 'around'. Yet visually you are going to parse that differently into different kinds of structure.

Here again is a case where vision has a much finer-grained kind of structuring system for the domain of rotation, let's say, than language does. Again, when I say 'language', I always refer to what the closed-class system does. The open-class system can indicate many more things, such as the word *twist*,

which automatically refers to this non-uniform kind of turning. The open-class sub-system of language, I suspect, is more correlated with other cognitive systems, with the distinctions available through visual and kinesthetic and motor control and perception, whereas the closed-class sub-system of language is much more restricted. Another comparison between vision and language is the distribution. Vision has a much more extensive structuring system for the patterns of distribution. If you look at the foam on a beer; the folds in a robe or curtain; at the grain in a piece of wood, you can see many kinds of patterns of distribution, and vision is supreme at that kind of structural delineation, patterns of distribution. Whereas in the closed-class system of language, it's absolutely minimal.

> For example, all that we have in English—I'll just pick the case where it's static—is either it's neutral to whether it's discussing distribution, or it shows scarce distribution or dense distribution. For example, we have distinctions like *There are peas on the knife*. This is a knife, these are the peas on it. *There are peas on the table*. *There are peas in the jello*. That's neutral as to whether they are dispersed or not, it doesn't indicate it. Then you've got forms which indicate sparse dispersion. For example, *There are peas here and there on the knife; There are peas here and there on the table; There are peas here and there in the jello*. Then you've got closed-class forms that indicate dense distribution. *There are peas all along the knife. There are peas all over the table. There are peas throughout the jello*. 'Throughout' is specifically three-dimensional. So it distinguishes one, two and three dimensional; it distinguishes sparse from dense distribution; it distinguishes between presence of distribution versus neutrality to it. It also, as it happens, distinguishes between static, stationary and moving. But that's all. That's it. That's the extent of it. Vision distinguishes much more than that.

For example, nowhere in the linguistic distinctions made by closed-class forms is there anything about whether, let's say, the peas all over the table are evenly distributed or unevenly distributed. Nothing in language in closed-class forms tells you that, will make that distinction. But if you look, you'll instantly know if it's even or uneven. Are there clumps of peas on the table? Whether it's even or uneven, it doesn't matter, you could also have clumps. Are the peas completely dense, leaving no space between, or are they spaced with some interval between them? Nothing in English *all over* will tell you that, but again visually you can tell instantly. If it's not peas but spaghetti noodles, are they arrayed evenly or are they criss-crossing or are they scattered? Nothing in *all over*

will tell you that, but visually you'll instantly know. These are ways that visual parsing—parsing, in this case, means determining the structure of what you are looking at—gets you much more, much finer kinds of information than language, which is relatively minimal. We can draw two circles of what's overlapping; we've been looking at things in vision that are either absent from language or minimal.

Now let's do the complementary thing. Let's look at things which are big in language and minimal in vision, or absent from vision. That's the next section. The first thing that's big in language is reality status. Languages have all sorts of forms like negative, potential, conditional, counterfactual, and indicative, factual; in fact, probably every language has closed-class forms that indicate distinctions like these. Maybe not all of these by closed-class forms, but at least some of these are going to be by closed-class forms, and hence are structural in character. But nothing in the visual perception marks these distinctions. What you look at is simply there.

There is nothing in visual perception which even recognizes this category of distinctions, the concept of its not being there or the concept of its being potentially there, or conditional on something else or in fact it wouldn't be there. Nothing, it's just there. This whole category of structural distinction is present in language, absent in vision. The same can be said for mood or modality. A lot of languages have modals as closed-class forms. English has a closed-class system of modals, which are things like *can, should, must, need, dare* and so forth. (The microphone is so sensitive.) These modals represent forces towards or against the occurrence of some event. For example, *He should lock the doors in evenings*. There is somebody who experiences trying to exert pressure on someone else to perform certain action. There is some kind of distinctive notion of whether your inferencing system is constrained to come to just one conclusion. But nothing of the sort takes place in vision. Again, what you are looking at is simply what has occurred. It is there. There is nothing within the parsing of the visual scene, the perception of the scene, which indicates something that has caused it, or made it inevitable or made it impossible or something like that. It's just there.

Okay, third. Structural things within language is the addressee's inferred knowledge status. In other words, the speaker infers something about the knowledge status of the hearer that he is talking to. That's my term for it. The conventional term for it is 'definiteness', because that's what I think definiteness is. For example—there are differences in English—if I say to you *I fed the cat* versus *I fed a cat*, the first, *I fed the cat* means I inferred that you can readily identify the particular cat I'm talking about, the particular referent of the noun. But if I say to you *I fed a cat*, it means I infer that you can't readily infer

the particular identity of the object, that you in fact don't know which one it is. That's another structural feature of language. But again, it's essentially absent in visual parsing; when you look at something, very little of your visual perception is involved with whether or not somebody else can identify the object as well.

Finally, there is the reality status of the speaker. There is a conventional term for that in linguistics: evidentials. There are some languages that are enormously rich in evidential distinctions, including an American Indian language I worked on, Atsugewi, which marks a certain number of distinctions. Languages like this with inflections on the verb will mark certain distinctions. For example, if you put on a certain inflection, it means 'I tell you this as a fact', like *John is chopping wood in the forest*. I know it because I saw it. You put on a different inflection, and it means 'I inferred it through non-visual sensory input'. For example, if you say *John must be chopping wood* and you put on this suffix, the idea is that it's because you can hear the sounds of the axe chops coming out of the wood, so you can infer that he is chopping wood. If you put on the suffix which is based on evidentiary evidence and say *John is chopping wood*, it's because, for example, you look where the axe usually hangs on the wall and it's not there, so you can say *John must be chopping wood*, and you put on the third suffix, a different one. And one more, let's say John usually chops wood at three o'clock in the afternoon. It's three o'clock, so you say *John must be chopping wood*. That's a fourth different, distinct suffix based on temporal periodicity. All of these distinctions are named, and they refer to the speaker's knowledge status. None of that appears in visual perception. Again, what you see is what you get. That's an English expression. What you see is What's there. There is no question about whether or not you are inferring it, or deducing it or simply taking it for granted. It's just seen to be actual.

In this case we can bring in a third kind of cognitive system, just briefly the understanding system or reasoning system. It seems to me that this kind of knowledge status, especially this last one of evidentials, is very similar to this another of the cognitive systems, the reasoning or understanding system. If it is, then it turns out that if you draw circles—here is a circle for visual perception—it doesn't have this particular phenomenon of knowledge status, let's say. Criss-crossing it is a circle for language partially intersecting it. Language does have it, but it has it over here. It doesn't have it within the part that intersects the circle, because it's not in vision. But yes, intersecting it is the reasoning/understanding system. It shows up there as well as in language. You can start drawing certain kind of diagrams with partial overlaps to show that some structuring feature is common to a couple of cognitive systems, but not to others. That's the general case. This is an instance, therefore, where

something, namely, knowledge status, shows up across the understanding system and in the language system, but doesn't show up in vision.

These were cases where we found structural features that are in language but not in vision, or in vision but not in language. Now we can look at the overlap where, in fact, the structural phenomenon is common to both systems. It turns out that this is really extensive, and again I suspect that language, when it evolved, borrowed some features from the visual perception system. The first thing that might be in common would be configurational structure. A lot of languages but not all languages, often have closed-class forms for representing configurations of paths that something takes in moving. Or the site that it occupies, some kind of geometric delineation. For example, English *in*, such as *There is water in the vase, There is a radio in the dumpster*. The *in* involves the concept of two objects, related to each other spatially in a certain way. What I call the ground object consists of a plane so curved as to constitute a volume of space. The other object, the figure object, is located at some point or points of that volume of space. So you can say, therefore, that the radio is in the dumpster.

I suspect that something like that is visually perceivable. There is a general perception of inclusion or surrounding that might be perceived the way that's quite comparable to what the preposition *in* means in English. The same for maybe *along*, like *The ball rolled along the ledge*, or *The hunter walked along the trail*. It's a notion of a moving point describing a path which is parallel and alongside another path. That is perhaps also readily perceived; this is just a guess. A lot of what I have proposed for other cognitive systems is offered as a suggestion for further research among the specialists in those fields, in this case perception psychologists. I suspect that some of the geometric delineations that show up in language, in preposition-type forms, might well be perceived as such visually.

A second kind of overlap is structure within bulk, within a volume. Again, this shows up in linguistic spatial forms, for example, the word *along*. We just saw *along*. *Along* doesn't care about the bulk of the ground object. It's neutral to the bulk, therefore you can use the same word *along* if you are talking about a caterpillar crawling up a thread, or a caterpillar crawling up a tree track. It doesn't care, it's still *along*. All that *along* cares about is that this ground object can be idealized or whittled down to a linear abstraction. Again I suspect that visual perception may well have a similar kind of bulk abstraction; you may well perceive something in common across those two spatial relationships.

This correlated with something that Marr, who is one of the perception psychologists, described as axes of elongation. He thought that as you look, for example, at a body form, you might well perceive in a sub-linear way—my

term for it is 'sense it as an event'—certain axes of elongation, like a stick figure drawing. I am especially impressed by the fact that children very early can draw what's called in English 'stick figures'. They go through a progression. The earliest form of stick figure of a human listed in America is typically something like a circle with four thin sticks out of it, and that eventually develops into something like circle for the head, a line for the body, two lines for the arms, two lines for the legs. This is cultural; it turns out that Australian aboriginal children do different sets of abstractions which are used by the adults. They nevertheless set off connections to that, until the whole closed-class subsystem of English, of language for space at least, may well tap into that subsystem that vision has evolved.

Let me do the third one, which is the topological thing. One thing I mentioned in the first talk was that closed-class forms are topological in character. For example, the word *through* in English. It doesn't care about the shape of the line. You can say *I went straight through the woods*, or you can say *I zigzag through the woods*; you still say *through.* Or *I circle through the woods*; you still say *through*. *Through* doesn't care about shape. It abstracts away from Euclidian geometry, and just does topogeometry. I suspect the same is true for vision. It may well be that there is an aspect of vision which is topological in character, so that you might be able to perceive a structural abstraction of inclusion, something inside something else, regardless of many other variables, like whether this is big or this is small or this is curved or straight or whatever you can abstract away. I suspect your visual processing will abstract away certain schema of inclusion, form a visual schematic abstraction, in the same way as is done in the closed-class forms of language. That would be another commonality.

What I'll do in these next ones is almost a recapitulation of some of the talks I gave earlier, where I was already in those pointing out similarities, parallels, between spoken language structure and other forms of structure, such as visual structure.

Let me just skip to one that I know I didn't present. Let's go to perspective point, where I give this example of a lunchroom. I think for this I will go to the blackboard. Here are two sentences. Here is a lunchroom. It's a restaurant. People lunch there. That's the door. My first sentence is *The door slowly opened and two men walked in*. This is a test of your English. Where do I use it? In the room, right. If we say, instead, *Two men slowly opened the lunchroom door and walked in*, where instead? Where do you use it? Outside, that's right. Why is that? It's because of the first principle in English. It's a structural principle of closed-class forms in English. English has a general principle that if an agent is visible, if the initiator of an action is visible, you must mention it as subject,

whereas if it's not visible, you must not mention it as subject. It is a general rule but it's often broken. For example, if you hold a glass, and you miss it and it falls to the ground, you cannot say *The glass dropped.* You must say *I dropped the glass*, because you are visible. Similarly, if you say *The door slowly opened,* how is possible for the door to slowly open? Of course, by agents. You are not mentioning the agents, it's because of the visibility, which is that you can't see the agents. How come we can't see the agents, since the sentence goes on *The door slowly opened and two men walked in*. That means this is the direction of motion of 'walked in', therefore first they're outside, then they're inside. There is only one way that the door could open and you can't see the agents through it, and they start outside to inside. That's if, you, the observer are already inside. It's the only geometric possibility, assuming that the lunchroom walls are okay. Through some lightening calculation of geometry and linguistic principles, if you hear this sentence, you automatically know the perspective point is inside. But if you have the sentence *Two men opened the lunchroom door*, they are mentioned, therefore they must be visible, therefore you are probably standing outside and watching them do it. And then they walked in. That's fine—they are walking. *Walk* doesn't tell you towards or away from the speaker, like *come* and *go*. Fine, you're outside.

This, therefore, is an aspect of language that structures one of the great schematic systems that I treated in first lecture, and that's location of perspective point. In the first case, your perspective point is located inside the lunchroom. In the second case, it's located outside the lunchroom. It's ascertained through various structural devices. I suspect that location of perspective point is one the things that is highly part of visual perception, visual parsing. You automatically know the location of your own perspective point, if you're here, from here, or if you see it from over there. You seem to be able to project your perspective point like you can pretty much tell what somebody else is seeing from their perspective. You can project into somebody else's perspective, and see what's happening. So it seems like this is a good additional example of overlap between language and visual perception in terms of structure.

I think I'll end the comparison between language and vision with this, and then go on to the next comparison, between language and affect system. Affect is another system, it means emotions and feelings and so forth. It would include anything like anger, liking, hate, fear; all these kinds of things would be part of the presumed affect system, which I suspect our cognition has as a quasi-autonomous cognitive system, separable in some respects from other aspects of cognition. The question is, is there anything structural in that, that is also structural in language, as shown by the closed-class forms. In fact the finding, rather surprisingly, is that it's quite minimal. Language has very little

that's structural with respect to affect. It has sporadic instances of closed-class forms around various languages that refer to something affective. For example, the diminutives in many languages can represent an affect of affection. The pejoratives in many languages indicate an affect of dislike or disgust. You have desiderative forms in many languages, which indicate wanting, optative, hope. We have constructions, like the *on me* construction, like *My plants all died on me*, which indicates regret or feeling badly about something. We have closed-class forms like *lest* which indicate concern, like *We should clear the floor lest he trip*, out of concern for his tripping. There is an affect like surprise or amazement, like *It's so vivid, so unique*. It's kind of an affect, but that's it. It's sporadic, it's occasional. None of it seems to form into some kind of system.

Now by contrast, with languages with prepositions like English, which together form a whole system for marking distinctions of paths with respect to reference objects, or like the modals in English, which is a whole system that subdivides force dynamics, nothing in any language that I have ever encountered represents a distinctional system for affect. Now again I encourage adopting the Martian perspective and trying to invent what it would look like if we had it. So I invented such a system.

Let's say you've got a parent and a child, and they live on the tenth floor. Here is an open window. The child is standing near the open window. Now the parent, cognitively, has a cognitive complex consisting both of spatial knowledge and emotional knowledge. The emotional knowledge is anxiety, concern and fear for the child's safety. The spatial knowledge is that the child should move away from the window. Within this total cognitive complex, which portion is expressed within the closed-class form of language? It's the spatial. The parent in English will say *Get away from the window*. There is no emotional closed-class form which I will invent here, which is something like 'act AFEAR the window'. I made up a word AFEAR. It should be a closed-class form which should be one element within the system of affect. Nothing like that exists in English. Comparably, let's say in the same room, one wall is freshly painted. Another child is near the freshly painted wall. The parent is now worried the child is going to put its hands on the paint and ruin the paint. Now the parent is concerned about the paint job, not about the child, and wants the child to be nice to the paint job, to act in favor of the paint job. Again there is a spatial component, which is the child should move away, and there is an affect component of concern for, the desire for being nice towards the paint.

Again, out of this total cognitive complex, which elements are abstracted away for closed-class representation? Again it's going to be spatial. Again, the parent will say *Get away from the wall*, the same expression 'get away from'. There will be no counterpart closed-class form representing the affect, so again

I invented one. 'Act AFAVOR the wall'. There is no such thing. So you try to start mapping a system of affective things, 'AFEAR', 'AFAVOR'. Who knows what else? But nothing like that exists.

For some strange reason, the language seems to draw very little of any kind of structure or character from the affect system. One possible explanation is that the para-language system such as facial expression, body language, maybe gestures, were all independently present all along, and may have been a system already so capable of conveying emotional states, that language didn't bother to replicate this in its structural system. But in any case it seems to be the case.

The third comparison is between language and culture. Well, it's getting late, I will make this maybe my last comparison. Again, I propose the existence of a portion of cognition, a system within cognition, which is dedicated to picking up on cultural patterns, and in manifesting, orchestrating our cultural or a structural behavior. There are two ways to compare it, one is cross-linguistically compared to cross-culturally, so let's do that first.

George Murdock was an anthropologist who formed a list of some 73 features that in his time seemed to be universal in all of the cultures that were studied at that time. All cultures had all of these features. They all had marriage ceremonies; they all had food preparation; they all had legal systems; they all had greetings and so forth; they all had status differentiation. There are 73 of these there. You would think that there might be something within this list of 73, at least some large proportion of them might be structural in character within the culture system. And maybe that's the case, not simply the coincidence due to commonalities of how humans live their lives, but actually something structural wired in to the cultural system. The most that I could find were 8 linguistic closed-class types that seem to correspond at all to any of these 73. Of those, only 3 or 4 had any extensive closed-class representation or specialness. One of the main ones would be status differentiation, which seems to run through all cultures. There is a lot of closed-class representation of status difference in language, for example, the pronouns in some American Spanish. They make three distinctions, *vos/tu/usted*, for most familiar, second familiar, formal, that kind of thing. There is also for etiquette, courtesy. There are things in language that indicate politeness. For example, English has a way of making it polite: *Could you please speak up?* versus the imperative *Speak up!* That's politeness. Instead of directing something, you can suggest it as a courtesy, so you say *Why don't you go abroad*? as a suggestion instead of *You should go abroad*, that's an urging. This distinction of courtesy aka politeness seems to cross between cultural structuring and linguistic structuring, but very little else; there is rather minimal overlap.

Let me take an example comparing just an individual culture and an individual language. That's a single culture and a single language. That's page 136. A former colleague of mine, David Wilkins, worked on language called Mparntwe Arrernte, something like that. It's an Australian aboriginal language. This language has several overlaps between its own closed-class forms and its culture. For example, that culture as generally in Australia, is enormously concerned with kinship relationships, with many different distinctions. It turns out some of that shows up in its pronouns. For any of the dual or plural pronouns, first, second, and third person. There isn't just one plural pronoun for *we*, there are three, depending on the following things. If there are people within our group of three or more that belong to separate patrimoieties—I don't even know what a patrimoiety is, but some kind of kinship distinction—that's one pronoun. You use a different pronoun if they belong to the same patrimoiety but were different generations. The third pronouns are used if they belong to the same patrimoiety and were of the same generation. So here is a beautiful example where culture and language intertwine, but there's very little else.

In fact, I took the opposite perspective on this from David Wilkins. He looked for these examples to show how much penetration into language there was from culture, but I turned it on its head. In fact, these are his best examples, his two best examples. Everything else looks like grammatical distinctions that are made in many other languages with vastly different cultures. So it seems again that surprisingly, the structural delineations within culture are not much in overlap with those of the closed-class systems of language.

Taking this perspective allows me to show how the Benjamin Whorf hypothesis fits in here. The Whorf hypothesis, at least one of them, has to be seen from the following perspective. Of all the cognitive systems, only two have the following properties. Those two are language and culture. They have the following property, namely, each of them has one portion which is universal, like the universal grammar or the universals of culture which are true across all humans, another portion, which is locally changeable. You've got different particular languages, different particular cultures. This is not true with visual perception. You do not have local variations of visual perception. It's all universal. You do not have local variations of motor control. There are few things that change from culture to culture on how you move your body. But for the most part it's the same universal system. Only language and culture have this bipartite distinction between universal and particular. The Whorf hypothesis simply says that in any given local place, the particular aspects of the language system of that locality correlate with the particularistic portion of the culture of that locality. That's what the Whorf hypothesis, restated in this new perspective

means. The Whorf hypothesis doesn't even apply to the first thing I gave about the Murdock list, and it certainly doesn't apply to any of these other comparisons. This framework of comparing cognitive systems allows you to place other research endeavors into a larger framework.

Let me just give you one taste of this next section. The next section is the overlaps between the understanding system and language. In general, it seems to me that there's something in common between all the following. The concepts expressed by the closed-class systems of languages around the world; there's something basic about these all over. So the concepts expressed by the closed-class system, the structure present in infants, in children, in any cognitive system, in their visual system, in their motor system, in their understanding system, the concepts of structural aspects. I'm just going to refer to between language and the understanding system, not vision.

Within early science, as opposed to developed science, and within casual science, suppose among scientists just talking casually, there's something in common across all of those, which is some kind of core conceptual structuring, conceptual organizing system. That's my proposal, and so for example, as a child develops, let's say, concepts of force, the first concepts of force that a child is able to entertain, to experience, to understand, are precisely the ones that show up in the closed-class system of language. Later as a child acquires more complicated force concepts, the closed-class system of language has sealed off gradually, and no further more complicated force concepts can make their way into the closed-class system, and must instead, if they are going to be expressed, be expressed by open-class forms.

My idea is that there is a kind of core understanding system that's common to early childhood, the closed-class system of language, and early science, which is a kind of basic structural system. One example of that is in force dynamics, which is an expression of force. Force dynamics readily expresses certain very fundamental force relationships. So two forces opposing each other head-on is the most readily expressed in languages, and it may well be one of the force concepts that children most readily grasp, and it's also expressed in the closed-class system of languages. Less so is radial force, compression down into conceptual compression. For example, I think one of the senses of the Latin prefix, *con-*, as in *confine, contain*, is to indicate force compression radially inward.

It may well be that that kind of force concept is within the infant's conceptual ability, as in squeezing something. Still less represented by closed-class forms is forces that are in alignment. They show up in closed-class forms like *moreover*. This principle of this buttresses a few other places. It's not very

extensive. Maybe children have a small sense of forces in alignment, but not represented by closed-class forms are things like forces approaching each other at an angle, or three forces coming together at some arc angles, or force acting over an arc instead of straight. Those are all much more advanced concepts, and it may well be that as a child grows developmentally, more adult portions of its cognition are in fact able to absorb or handle those to get conceptualizations. But by then, the closed-class system of language is kind of sealed off. It's sort of like there is a formative stage, a sensitive phase in language acquisition, which permits importation into its closed-class system of certain structural aspects of other cognitive systems. But if they arrive after a certain critical phase, they can no longer enter into the closed-class system, and that's why we don't find these additional concepts in the closed-class system. If we find them anywhere, they are only in the lexical forms.

I'll end here. Let me just give a quick idea and summary of what I am doing. It's a comparison across all the different cognitive systems, major or ultimately minor cognitive systems, such as music. I've undertaken several pairwise comparisons between language and another system, for the most part to see what is common across them. In each case we find some things in common and some things that are not in common across these pairs, and ultimately we want then to look over all of these systems together, and see which structuring aspects run in common through all of them, as I suggested at the outset. Maybe hierarchical embedding would be one of those, and they would have to be the most fundamental structuring aspects of cognition, I suppose. If you pursue this kind of project, ultimately you'll find out with some certainty what is structural or what is organizational in human cognition.

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Handout Lecture 7

1. The Overlapping Systems Model of Cognitive Organization

this is a "lay of the land" type of investigation:
a heuristic delineation of the overall character of cognitive organization,
not a detailed demonstration of any one portion of it

1.1 Cognitive Systems

human cognition appears to comprehend certain relatively distinct major cognitive systems, including:

language; perception in general or in its several modalities: vision, hearing, kinesthesia, etc.;
a reasoning—inferencing—understanding system;
affect; a cognitive system for cultural structure; motor control

1.2 Organizing Factors

the major cognitive systems each have certain properties of organization
many of these properties are comparable across systems (= an "overlap" of the systems)
some properties are shown by only one system, some by several, some by all

the distinction made here between cognitive systems that get organized ("substantive systems")
and factors that organize them ("organizing/structuring factors")
is partly relative: some organizing factors (e.g., attention)
are elaborate, themselves subject to organizing by other factors

heuristic list of organizing factors

- constitutive factors

a. schematic structure: the abstracted schematic delineations and partitionings that structure a system, e.g.,:
   content-structure distinction: presence of a schematic or abstractive level of organization
      distinguishable from a substantive level of "content"

delineation of component "units", part-whole structure, hierarchical embedding, structural complexes

b. temporal structure: temporal characteristics of different aspects of a system, e.g.,:
"phase": starting, continuing, stopping, nonoccurring
"interrupts": putting on hold, resuming, waiting (until triggering event)
"rate": functioning quickly, functioning slowly, speeding up, slowing down
coordination with the timing of another process: synchronizing, sequencing, concurrence, alternation
c. causal structure: (assessments of) causality / force interaction applying to different aspects of a system
d. categorial structure: any form of categorization exhibited by a system, e.g.,:
prototype structure, hierarchical category inclusion,
tagging a particular type of unit with a particular "identity"
e. type of metric: the discrete/gradient, absolute/relative, etc. character of different aspects of a system
f. quantity structure : the (absolute or relative) amount or intensity (strength) of different aspects of a
system, e.g.,: scope, granularity, density
g. degree of differentiation in different aspects of a system, e.g.,:
approximate/precise, sketchy/elaborated, vague/clear character

- cognizing factors

h. attentional structure: deployment of attention over a system, e.g.,:
current foregrounding / backgrounding of different aspects of the system
general level of accessibility to consciousness by different aspects of the system
i. perspectival structure: the ways an adopted perspective point interacts with a system
j. memory structure: how different aspects of a system relate to memory, e.g.,: properties governing "storage", and "retrieval", including: learning
familiarity/novelty (= remembered/nonremembered)
recognition and identification
k. epistemic structure: assessments of (a) one's knowledge of, or (b) the reality of, different aspects of

a system, e.g.,:
ascribed degrees of (a) one's doubt/hesitance/certainty
(b) veridicality, likelihood, evidentiary corroboration
experience of a phenomenon as originating within oneself or externally

l. evaluation: assessments applied to different aspects of a system, e.g.,:
significance (important/irrelevant), value (good/bad),
esthetic quality (beautiful/ugly [not modality specific]), appeal (appealing/unappealing)

- processing and housekeeping factors

m. on-line monitoring of different aspects of a system, e.g.,:
error detection and correction, tailoring of system inputs and outputs to each other

n. affectability: the degree to which and the ways in which the states a cognitive system enters can be (intentionally) affected or controlled, either by
(other cognitive systems within) the individual or by an outside agent
(includes: scale of a system's modular autonomy vs. its integration with other systems)

o. plasticity: type and degree of long-term modifiability exhibited by different aspects of a system, e.g.,:
developmental changes through life span, response to environmental changes, response to internal or neighboring injury

p. maintenance: a system's upkeep of its functions and operations, and of its internal
integrity, across local and neighboring changes

- integrative factor

q. framework structure: a system's type of containing and integrating matrix in which
all other organizing factors are combined and coordinated in their specific interrelations

1.3 Overlapping Systems Model

I call the above the "overlapping systems model" of cognitive organization — called "systems" since they are not autonomous Fodorian "modules" due to their overlap

1.4 Three Neural Accounts of Overlap

three main ways to account for such comparability of properties across substantive cognitive systems:

1. the neural mechanism that underlies the manifestation of that property

exists independently in the brain and all the overlapping systems tap into that mechanism

2. one system has the neural mechanism and other systems tap into that mechanism there

3. each system has its own "copy" of the neural mechanism

1.5 Evolution of Cognitive Systems and their Overlap

one's view of this neural underpinning for cross-system comparability interacts with theories of how cognitive systems evolved:

for "1": a later-evolved system would have established connections with the already existing neural mechanism located outside the other systems

for "2": a later-evolved system would have established connections with the already existing neural mechanism that is part of one of the earlier systems

for "3", a later evolved system would have developd its own duplicate instance, or variant, of the mechanism

either a: by replication of the neural mechanism already present elsewhere

or b: by evolutionary convergence

or c: as an accidental coincidence

NB: any one system could have a combination of the above for its different organizing factors

language and cultural structure were the last major cognitive systems to evolve.
language, in particular, may have duplicated or tapped into many of the extant organizing mechanisms
— perhaps more so than any other major cognitive system.
— and this perhaps because language evolved as a general purpose kind of system

1.6 Language Organization perhaps in part Unique among Cognitive Systems

1.6.1 Two co-systems: expressional and conceptual

perhaps uniquely, language comprises 2 interlocked co-systems: the expressional and the conceptual
depending on the syntactic theory, the organizational properties of the expressional co-system
correspond either more or less to those of the conceptual co-system

1.6.2 Two subsystems: open-class/contentful and closed-class/structural

the expressional co-system has an open-class subsystem and a closed-class subsystem, formally
distinguishable
these specify conceptual content and conceptual structure, respectively, in the conceptual co-system

NB: nothing obviously comparable to these co- and sub-systems in other cognitive systems, e.g., in visual perception, affect, motor control

1.7 Problems of cross-system comparisons of structure

a. not clear what constitutes "structure" in a cognitive system other than language
e.g., there is no clear "grammar of vision"
= a principled basis for determining what is structural in visual perception
— e.g., is color a structural feature of perception?

b. not clear which level of a processing continuum to select for a comparison of structure
e.g., in vision, from retinal to high-level processing,
no principled basis for choosing one point as definitive of structure

c. use of the language system as possible entree into this difficulty

closed-class reference constitutes the fundamental conceptual structuring subsystem of language
thus, perhaps uniquely, language has an explicit dedicated component representing/constituting
a) what is structural, b) which level is structural
and so may offer the best entree to a cross-system study of cognitive organization

1.8 This Study: each system has which factors, not each factor appears in which systems

a study of the present kind can start either with cognitive s ystems to see what organizing factors they have
— representable by partially overlapping Venn circles —
or with organizing factors to see which cognitive systems they appear in

this talk does the former, and shows that language's closed-class-represented conceptual structure
has much overlap with structure in the visual, kinesthetic, reasoning and understanding systems
— but not much with the systems of afffect and cultural structure

here, the starting point of all cross-system comparisons is language, the area of my expertise

2. The fundamental conceptual structuring system of language

2.1 A fundamental formal property (design feature) of language

it comprises 2 subsystems: the open-class and the closed-class

2.1.1 Open-class or "lexical" (open-class forms = OCs):

any category of linguistic forms that are large in number and easy to augment

in any language, can comprise the roots of: nouns / verbs / adjectives / ?
ideophones
as well as collocations ("lexical complexes")

2.1.2 Closed-class or "grammatical" (closed-class forms = CCs):
any category of linguistic forms that are relatively few in number and difficult to augment

in any language, can include:
overt (phonologically substantive):
bound: inflections / derivations / clitics
free: determiners / adpositions / conjunctions / particles / …
suprasegmental: intonation/stress patterns (if comprising a small closed set)
abstract / implicit:
word order
grammatical categories (e.g., N, V, A, NP, VP)
grammatical relations (e.g., subject, direct object, indirect object)
grammatical complexes:
syntactic structures / grammatical constructions /
phrase structure & immediate constituency / complement structure

2.2 A semantic distinction correlates with this formal distinction

2.2.1 OCs are almost unconstrained as to what they can refer to

2.2.2 CCs are highly constrained, in two ways:

a. as to categories of concepts
number but not color
space, time, causation, but not food, health, work

b. as to member concepts even within acceptable categories
number: singular / dual / trial / plural / paucal
not: even / odd / dozen / numerable

OCs not subject to these constraints, as preceding lexical items attest

2.3 A functional distinction correlates with this semantic distinction

OCs represent conceptual **content** / CCs represent conceptual **structure**

These semantic and functional distinctions appear in two venues:
within any specific portion of discourse, e.g., a sentence
within the lexicon of any language and within language in general

2.4 First venue: OCs / CCs semantic + functional differences in discourse

in any portion of discourse, e.g., a sentence,
semantically: OC meanings are characteristically rich (much meaning of many different
categories together); referentially unconstrained
CC meanings are characteristically spare / schematic; within referential limits

functionally: in the cognitive representation evoked by a portion of discourse
most of the **content** is contributed by the OCs
most of the **structure** is determined by the CCs

2.4.1 Demonstrating OCs / CCs differences in a Single Sentence

(1) A rustler lassoed the steers.

a. the closed-class forms in this sentence:

(a) -ed 'occurring at a time before that of the present communication'
(b) the 'speaker infers that addressee can readily identify the specific referent'
(c) a 'speaker infers that addressee cannot readily identify the specific referent'
(d) -s 'multiple instantiation of object'
(e) a…-∅ 'unitary instantiation of object'
(f) -er 'performer of the specified action'
(g) grammatical category "verb" for *lasso*
'eventhood'

(h) grammatical category "noun" for *rustler / steer*
'objecthood' (for one possibility)
(i) grammatical relations "subject" / "object" for *rustler / steer*
'agent'/'patient' (among the possibilities)
(j) active voice
'point-of-view at the agent'
(k) intonation, word-order, character of auxiliaries
'the speaker "knows" the situation to be true and asserts it to the addressee'

b. the open-class forms in this sentence: each is a complex of concepts including—

(a) rustle property ownership, illegality, theft, livestock
particular mode of activity
(b) lasso a rope configured into a loop and a tail gripped by the hand
the loop twirled, cast over the neck of an animal, tautend, and drawn accompanying cognitive intending, directing, monitoring
(c) steer object of particular appearance, physical makeup, etc.
relation to animal kingdom castration institution of breeding for human consumption

c. changing One Type of Form while Keeping the Other Constant

(2) Will the lassoers rustle a steer?
A machine stamped the envelopes.

2.4.2 The same concept functions as content when in an OC / as structure when in a CC

the concepts 'past' and 'future' are experienced as setting structure when expressed by CCs:
when he arrivED—when he arriveS / WILL arrive
but are experienced as contributing additional content when expressed by OCs:
on his PREVIOUS arrival—on his UPCOMING arrival

2.4.3 OCs and CCs CAN incorporate each other's characteristic type of concepts, but then assimilate them to their native function

a. OCs CAN incorporate CC-type specifications, but
in a conflict, the CCs always determine the final structure, as per their function

(3) She's somewhat pregnant.

usual 'all or none' meaning component of *pregnant* may here shift to a 'gradient' sense in accommodation to *somewhat*
but *somewhat* will not shift from 'gradient' to 'all or none'

b. CCs CAN incorporate OC-type specifications,
but those specifications there become backgrounded / difficult to localize / "structuralized"

(4) a. We marched / rode / sailed / advanced /... upon them.
b. We marched / rode / sailed / advanced /... towards / past them.

an OC-type notion of 'attack' is incorporated in *upon*, but not in *towards / past*

as with any concept expressed by a CC, the 'attack' concept:
(a) is attentionally backgrounded—unlike when expressed in a verb, as in: We attacked them.
(b) is difficult for speakers to associate with the word *upon*
(c) may acquire a structural character as a kind of path notion

2.5 Second venue: OCs / CCs semantic + functional differences in Language / a Language

2.5.1 Within language in general as a system

considering the meanings of OCs and CCs cumulatively across all (possible) languages:

a. semantically:
the semantic freedom of OC meanings entails: they constitute an open-ended conceptual pool

the semantic constraint on CC meanings entails:
there is a relatively closed inventory of conceptual categories and member concepts
that can ever be expressed by CCs

properties of this inventory:

(a) hierarchical in the extent of occurrence across languages:
universal: e.g., polarity (positive / negative); mode (declarative / interrogative)
widespread: e.g., number
rare: e.g., rate (fast / slow)
absent: e.g., color

(b) fuzzy lower boundary: occasional concepts appear as a CC in perhaps just one language
e.g., English 'at the interior of a vehicle with a walkway and in use':
on / otherwise: *in*
in a car / on a bus; in a grain car / on a train;
in a helicopter / on an airplane; in a rowboat / on a ship The kids played in/*on the abandoned bus.

b. functionally:
OCs can potentially represent all of conceptual content
CCs meanings together constitute the fundamental conceptual structuring system of language

2.5.2 Within any specific language

the inventory is a universally available set of conceptual categories and member concepts
from which each language selects a different subset for representation by its CCs
this subset constitutes that language's particular conceptual structuring system

3. Non-overlap of structural properties between language and visual perception

[for the specific structural properties cited here and below,
the particular organizing factors of which they are a part are shown in brackets]

3.1 Prominent in visual structuring, minimal in language structuring

3.1.1 In vision

A. bilateral symmetry [< schematic structure]
B. rotation [< schematic + temporal structure]
C. dilation (expansion/contraction) [< schematic + temporal + quantity structure]
D. pattern of distribution / texture (e.g., of wood grain, foliage, pond ripples, surf foam)
[< schematic (+ temporal) structure]
E. color?

3.1.2 In language

languages may have minimal CC counterparts for these, e.g., English perhaps only:

A. reciprocal: *each other* (*They kissed each other*).

B. *around / over* (*The pole spun around / fell over*).
= orientation of spin axis: horizontal vs. vertical

generally not:
a. amount of rotation
turning less than vs. exactly vs. more than vs. several times one full circuit
b. relation of spin axis to object's geometry
at center: perpendicular disk (CD disk) vs. perpendicular line (propeller)
vs. aligned cylinder (pencil spinning on point)
at boundary: line ("hammer" swung in hammer toss) vs. transverse plane (swinging gate)
vs. parallel plane (swung cape)
at an external point: a point (earth about the sun) vs. a circle (spinning hoop)
c. uniformity of rotation
uniformly through object (spinning rope) vs. differentially through object (twisting rope)

C. *in / out* (*spread out / shrink in*)
= sign of the dilation: expansion vs. contraction

generally not:
a. geometry of dilating entity
1D: (stretched bungee cord) vs. 2D (stretched rubber sheet) vs. 3D (leavened dough)
b. continuity of the entity
continuous (as above) vs. set of objects (2D: dispersing crowd, 3D: expanding universe)
c. geometric part represented by the entity
whole (as above) vs. periphery (2D: stretched rubber band, 3D: blown up balloon)

D. distinctions with respect to the following parameters:
dispersion: dispersion-neutral vs. dispersion-positive
density: sparser vs. denser
motive state: stationary vs. moving
dimensionality: 1D vs. 2D vs. 3D

stationary—
dispersion-neutral: be on/in/ … *There are some peas on the table / in the aspic.*
dispersion-positive: sparser: here and there on/in/ …
There are peas here and there on the table / in the aspic.
denser: 1D: all along; 2D: all over; 3D: throughout
There are peas all along the knife / all over the table / throughout the aspic.

moving—
dispersion-positive 2D: sparser: (here and there) about / around
I walked (*here and there*) *about the town.*
denser: all about / all around / all over
I walked all about/around/over the town

generally not:
regularity: evenly vs. unevenly distributed
clustering: presence vs. absence of clumps
exhaustiveness: wholly adjacent vs. spaced apart
geometric form + arrangement: e.g., lines that are parallel vs. criss-crossed vs. intertwined

NB: American Sign Language does structurally mark many of the preceding distinctions

E. "color" absent

3.2 Prominent in language structuring, minimal in visual structuring

Language has closed-class forms that represent:

A. reality status ("mood"): indications that an event is—
actual / potential / conditional / counterfactual / negative [< epistemic structure]
vision: a situation currently viewed is apparently perceived only as actual

B. modality: the pattern of forces acting for or against the occurrence of an event, [< causal structure]
e.g.: can / should / must / may
vision: a situation currently viewed is apparently perceived simply as being in occurrence

C. addressee's inferred knowledge status ("definiteness"): [< epistemic structure]
a. definite: the speaker infers that the addressee can readily identify the referent
b. indefinite: the speaker infers that the addressee cannot readily identify the referent
a. I fed the cat. b. I fed a cat.
vision: an object currently viewed is apparently not regularly perceived as to its identifiability for another viewer

D. speaker's knowledge status ("evidentials") [< epistemic structure]
indications that a represented situation is, e.g.,:
known from personal experience as factual
accepted as factual through generally shared knowledge
inferred from accompanying evidence
inferred from temporal regularity
entertained as possible because of having been reported
judged as probable

vision: the visual system does not flag objects in the visual field for their evidentiary status
Thus, visual perception does not flag a partially occluded configuration as being 'unknown' or 'inferred as present'
Rather, it generally "fills it in" unconsciously with the expectable characteristics.

NB: the reasoning / inferencing system involves:
naive reasoning (a la Kahneman and Tversky), problem-solving
and perhaps includes many of the linguistic evidential distinctions
thus here having much overlap with the language system, unlike vision

4. Overlap of structural properties between language and visual perception

4.1 Pertaining to schematic structure

A. Configurational structure: the structure of objects and arrangements of objects
[<schematic (+ temporal) structure]

language: the referents of such linguistic closed-class forms as spatial prepositions
vision: e.g., the perception of particular spatial relations between objects in a scene

perhaps comparable: the linguistic representation and the visual perception of:

'in': a Figure object occupying a region of a certain volume of space,
where the Ground object is schematizable as a plane so curved as to define this volume of space e.g., water in a vase / a radio in a dumpster

'along': a Figure object moving so as to define a line that is parallel and adjacent to a second line,
where the Ground object is schematizable as this second line
e.g., The hunter walked along the trail. / The ball rolled along the ledge. / The caterpillar crawled along the twig.

B. interior structuring within bulk [<schematic structure]

language: the schemas represented by CCs are bulk-neutral
The caterpillar crawled up along the filament / tree trunk
vision: cf. Marr's representation of human figure in terms of axes of elongation
cf. children's stick figure drawings as explicitization of structure sensed within bulk

C. the topological character of such structuring [<schematic structure]

language:
in: magnitude neutral: in the thimble / volcano
shape-neutral: in the well / trench
closure neutral: in the beachball / punchbowl
discontinuity neutral: in the bell jar / birdcage

vision: perhaps one could perceive all the preceding examples for *in* as structurally involving inclusion: one object included / surrounded by another

D. factive/fictive representation [< schematic + temporal + attentional structure]

proposal: both a "factive" and a "fictive" representation of the same entity can be concurrently in cognition in language and, in a parallel way, in visual perception
one type: factive stationariness + fictive motion represented for the same entity
this type in language: factive form represented by our knowledge about the entity
fictive form represented by the literal reference of the expression
this type in vision: high-palpability representation seen explicitly as stationary
low-palpability representation sensed implicitly as moving

1. coextension path:
language: The fence goes from the plateau down into the valley.
vision: a two-stroke perception of a "+"?

2. demonstrative path:
language: The arrow points toward / away from / past the town.
vision:cf. Palmer: perception of equilateral triangles' direction of pointing

3. radiation path:
language: The light shone from the sun into the cave.
vision: perception of directionality in light rays?

4a. site-arrival:
language: The palm trees clustered together around the oasis.
[cf. real motion: The children quickly clustered together around the ice cream truck.]
vision: Pentland: perception of figurine as torso with limbs moved into attachment
Leyton: perception of an arbitrary curved surface as a deformation of a simple surface
Gestalt psychology: perception of, e.g., a pac-man shape as a circle with a wedge removed

4b. structural history and future [<schematic + temporal structure (+ inference)]
language: can represent a putative default history
e.g., in Japanese, not (a) but (b) is generally said:
(a) There are leaves / toys on the ground under the tree.
(b) Leaves are fallen on the ground under the tree. / Toys are placed on the ground under the tree.

vision:
Does the perception of a tilted picture frame include
1) a putative default history of its having been displaced from the true?
2) a projection of a future act of righting the frame?

E. reference frames [< schematic structure]

language: can impose a selected reference frame on objects being referred to
field-based: The bike is west of the church.
ground-based: The bike is behind the church.

observer-based: The bike is left of the church.
rectilinear frame: The boat sailed further and further away from the island.
radial frame: The boat sailed further and further out from the island.

vision: low-palpability perception/imputation of comparable reference frames?
— e.g., the sensing of compass directions in viewing scenery around one?

F. multiple hierarchical embedding of structure [< schematic structure]

language
in space:
a. I saw a duck. [... in the valley.]
b. I saw ducks. "
c. I saw a group of 5 ducks. "
d. I saw groups of 5 ducks each. "
e. I saw 3 acres of groups of 5 ducks each. "

in time:
a. The beacon flashed (as I glanced over).
b. The beacon kept flashing.
c. The beacon flashed 5 times in a row.
d. The beacon kept flashing 5 times at a stretch.
e. The beacon flashed 5 times at a stretch for 3 hours.

the structural complexes that are represented:
a. !
b. ... !!!!!! ...
c. [!!!!!]
d. ... [!!!!!]—[!!!!!] ...
e. [[!!!!!]—[!!!!!] ... [!!!!!]—[!!!!!]]

vision:
overall framework (e.g., of a restaurant)
> constellational pattern of contained elements (e.g., of tables, people)
> individual elements of the constellation (e.g., an individual table, person)

> external features or internal structural schema of each individual element (e.g., a person's facial/bodily/clothing features or internal Marrian structure)

4.2 Pertaining to causal and force-dynamic structure

G. force interaction

language: force dynamics—
the linguistic representation of the interactions of opposing forces such as
an object's intrinsic tendency to ward motion or rest,
another object's opposition to this tendency,
resistance to such opposition,
the overcoming of such resistance,
and the presence, appearance, disappearance, or absence of blockage.

1. be VPing / keep VPing —physical
   a. The ball was rolling along the green. b. The ball kept rolling along the green.
2. not VP / can not VP —physical/psychological
   a. John doesn't go out of the house. b. John can't go out of the house.
3. not VP / refrain from VPing —intra-psychological
   a. She didn't reply. b. She refrained from replying.

visual perception:
Engel and Rubin (1986): perception of force added/lost at the cusps on viewing a dot "bouncing" to the right with progressively increasing/decreasing curves

Jepson and Richards (1993): on viewing 2 blocks forming a "T", perception of an attaching force when the "stem" block is horizontal to the right of the "cap" block but only of contact when the "stem" block is vertically above the "cap" block

and consider perception of force dynamics on viewing
a large cement slab leaning at a 45 degree angle upon a rickety wooden shed

NB: the kinesthetic perception system
the part of kinesthesia involved with experiencing pressures, force
— both upon body surface and internally
Kinesthesia is probably the, or one of the, earliest perception systems
to start functioning already in the embryo
hence is probably fundamental in subsequent cognitive development

4.3 Pertaining to attentional and perspectival structure

H. distribution of attention over a represented / perceived scene
[< attentional structure]

language:

1. windowing of attention
e.g., the windowing / gapping of attention over portions of a path

The ball I'd thrown up on top of the house fell—

A. with maximal windowing over the whole of the path:
—off the roof, through the air, onto the ground.
B. with gapping over one portion of the path:
a. medial gapping = initial + final windowing
—off the roof onto the ground.
b. initial gapping = medial + final windowing
—through the air onto the ground.
c. final gapping = initial + medial windowing
—off the roof through the air.
C. with windowing over one portion of the path:
a. initial windowing = medial + final gapping
—off the roof.
b. medial windowing = initial + final gapping
—through the air.
c. final windowing = initial + medial gapping
—onto the ground.

2. level of attention

greater attention on the componential level

The bricks in the pyramid came crashing together / toward each other.
greater attention on the level of the Gestalt whole:
The pyramid of bricks came crashing in upon itself.

vision: perhaps attention can be distributed over a path /a composite object
in different patterns comparable to those in language
— cf. control over attentional distribution in the signing systems spontaneously developed
by deaf kids without exposure to language

I. deployment of perspective point relative to a represented/ perceived scene [< perspectival structure]

language:
1. perspective point's distance away
mid-range: She climbed the fire ladder in 5 minutes.
distal: Moving along on the training course, she climbed the fire ladder exactly at midday.
proximal: She kept climbing higher and higher up the fire ladder as we watched.

2. location of perspective point
interior: The lunchroom door slowly opened and two men walked in.
exterior: Two men slowly opened the lunchroom door and walked in.
(adapted from Fillmore)

3. motility of perspective point
stationary: There are some houses in the valley.
moving: There is a house every now and then through the valley.

vision:
distance away: moving to a closer or further viewpoint, or projecting one's viewpoint there
location: moving to a view from one or another location, or projecting one's viewpoint there
—including: projecting what someone else is seeing

motility: standing or moving along while viewing, or projecting one's viewpoint
— cf. control over perspective point in the signing systems spontaneously developed by deaf kids without exposure to language

4.4 Pertaining to the content vs. structure distinction and to framework structure

J. Complementary "content" and "structure" subsystems [<content vs. structure distinction]

their contrastive properties: substantive vs. schematic / quantitative vs. qualitative /
absolute vs. relative / Euclidean vs. topology-like /
bulk-based vs. lineament-based / precise vs. approximative

language: the open-class vs. the closed-class subsystems, as used in a sentence
open-class forms: substantive content and Euclidean specifics of shape, size, bulk, angle;
closed-class forms: topology-like schematic structure

vision: proposed:
one subsystem for the explicit / concrete / high-palpability perception of objects
another subsystem for the implicit / abstract / low-palpability perception of structure

many language-vision parallels above; one example:
language: OCS: pill/thimble/radio/dumpster, CC: in: The pill is in the thimble. The radio is in the dumpster.
vision: the high palpability subsystem: concrete Euclidean perception of pill/thimble/radio/dumpster
the low palpability subsystem: abstract, "sensed" topological, schematic perception of "inclusion"
both: the construct in the structure subsystem is abstracted away from particulars of:
the objects' size, shape, state of closure, discontinuity, relative orientation, relative location

since the language system evolved later, much of its closed-class subsystem apparently
tapped into or duplicated much of the neural mechanism for schematic structure
that the visual system already either tapped into or had within itself

K. Integrative structure [< framework structure]
language: closed-class forms, in conjunction with open-class forms—
over space:—help form coherent structured Gestalt of a static scene in reference
through time:—help form coherent structured Gestalt of a temporal sequence in reference and of interlocutor intentions through discourse

A: "John staggered along through the restaurant tables
and then bumped into a waiter carrying a tray. Did you see him?"
B: "Yes, but he was dizzy from some medicine he'd taken, not drunk."

from each other's utterances, B and A each integrate into a coherent conceptual model a mix of factors, including:

spatial geometry: "along through", "tables"
John generates a path curving through the interstices between tables
causal structure: "staggered"
often drinking too much makes someone stagger
reasoning: "staggered"
A apparently infers that John had drunk too much
spatial geometry: "carry"
the Waiter is generating a path, and causes an adjacent object (the tray) to move along the same path
temporal structure: "and then" + knowledge about staggering and waiter motion
the latter part of John's stagger temporally overlapped the waiter's motion
spatial geometry: "bumped into"
collision of 2 trajectories
temporal structure: past tense on "staggered" and "bumped"
A has this event in his memory, having witnessed it, and
is tapping this memory for the present speech situation

speech act setup: "Did you see?"
A switches from recounting his memory to the present moment to tap into B's memory
temporal structure: tense of "did" + OCs
A believes that B was there (maybe at a different table)
argument structure: "Yes but"
B indicates that A' s physical description stands, but his implication or assumption fails
temporal structure: "had taken"
B adds a point on the time line before the start of the stagger event for a medicine taking event
causal structure: "dizzy from"
two things can cause staggering, dizziness and drunkenness
model construction: "…, not …"
B directs A to redo his understanding of the cause of the staggering event
affect control: tone of B's utterance
B chides A for having assumed that John was drunk, a reproachable characteristic,
rather than in fact deserving of compassion over his medical impairment

vision:
over space: scene parsing, forming a Gestalt of structural delineations
through time: integration of motion of observed objects as well as of observer

example: witnessing of the above-recounted scene

Continuation of the Overlapping Systems Model: Relating Language to Further Cognitive Systems

5. Language and the Affect System: apparently little overlap

languages do have a scattering of closed-class forms indicating affect:
diminutive: 'affection' / pejorative: 'dislike, distaste'
subjunctive: 'wish' / optative: 'hope' / desiderative: 'want'
undergoer construction (*My plants all died* **on me**): 'unpleasantness'
lest (*I cleared the path lest he trip*): 'concern'
so/such (*It's so vivid!*): 'surprise, amazement'

But little is systematic. Thus, apparently no language has a subsystem of closed-class forms
that subdivides the affect domain in a way comparable, e.g., in English
to that of prepositions subdividing the domain of spatial relations,
or to that of modals subdividing the domain of force-dynamic relations.

what an affect system might look like: from the physico-emotional complex experienced by a parent
about a child standing near an open window on tenth floor:
spatial aspects usually expressed: Get away from the window!
affective aspects could be expressed: Act AFEAR the window!
about a child standing near a freshly painted wall:
spatial aspects usually expressed: Get away from the wall!
affective aspects could be expressed: Act AFAVOR the wall!

thus, affect low in hierarchical inventory of CC meanings; surprising, given its role in our psychology
its low rank militates against grammaticization down to CCs with affect meanings;
so, of verbs in *I keep/hate skiing*, only *keep* is likely to become auxiliary

6. Language and the Cognitive Culture System: apparently little overlap

6.1 Cross-linguistic + cross-cultural comparison of conceptual structure

6.1.1 George Murdock's (1965) list of 73 cultural universals

age-grading, athletic sports, bodily adornment, calendar, cleanliness training, community organization, cooking, cooperative labor, cosmology, courtship, dancing, decorative art, divination, division of labor, dream interpretation, education, eschatology, ethics, ethnobotany, etiquette, faith healing, family, feasting, fire-making, folklore, food taboos, funeral rites, games, gestures, gift-giving, government, greetings, hair-styles, hospitality, housing, hygiene, incest taboos, inheritance rules, joking, kin groups, kinship omenclature, language, law, luck superstitions, magic, marriage, meal times, medicine, modesty concerning natural functions, mourning, music, mythology, numerals, obstetrics, penal sanctions, personal names, population policy, postnatal care, pregnancy usages, property rights, propitiation of supernatural beings, puberty customs, religious ritual, residence rules, sexual restrictions, soul concepts, status differentiation, surgery, tool making, trade visiting, weaning, weather control

6.1.2 Linguistic closed-class representation of categories on Murdock's list

only 8 categories have any closed-class representation; only 3–4 extensively so

(1) "status differentiation"
e.g., S. American Spanish 2nd person singular: vos/tu/usted + verb inflections elaborate pronominal + inflectional forms of Japanese/Thai
(2) "etiquette"
e.g., grammatically represented by various markers and constructions for requesting as against commanding
(*Could you please speak up?* vs. *Speak up!*)
for suggesting as against directing
(*Why not go abroad?* vs. *You should go abroad.*)
(3) "Property rights"
perhaps those CCs expressing ownership and transfer of possession
e.g., Russian *u* +*GEN* 'in the possession of'
DAT 'into the possession of'
(4) "Personal names"
as a subset of proper nouns, have distinctive syntactic characteristics in some languages
(5) "kinship nomenclature" (see next)
(6) "greetings"
(7) "numerals"
(8) "calendar"

6.2 Single-Culture + Single-Language Comparison of Conceptual Structure

In Mparntwe Arrernte (Wilkins, 1988, 1993) CCs reflect cultural structure, but only in some 6–8 cases, out of perhaps thousands of forms. Two best examples:

6.2.1 Pronoun distinctions

1st, 2nd, 3rd person dual and plural pronouns have 3 distinct forms for people of
different patrimoieties; same patrimoiety, different generation; same patrimoiety, same generation

6.2.2 The way in which switch-reference is applied

In a sentence of the type: "Location A became defiled, when location B broke apart"
"broke apart" can take 'same subject' inflection if A and B have same totemic affiliation

In: "The little boy cried, as they walked along."
if "walked" has 'different subject' inflection, to indicate that the boy is socially different from the others in the group, can only mean that he is of a different harmonic generation (odd-number generation apart)

NB: Language and the culture system are perhaps the only two cognitive systems
whose organization and structural properties include both a general portion and
a "local" portion that varies from group to group and is developmentally learned therefrom.

In our model, the Whorfian hypothesis is equivalent to an extensive overlap between
the local organization of the language and that of the culture for the same group.
The evidence of this section, 6.2, challenges the hypothesis.

The Whorfian hypothesis does not apply to general overlap between cognitive systems,
hence, not to the language-culture comparison of section 6.1, nor to this model's other comparisons

6.3 Example of overlap across culture, language, gesture, vision: schema projection

culture: "ghost physics" (Boyer 1994): seemingly universal properties of spirits:
invisible / pass through solid material (e.g., walls)
also: evil eye, power emanations, magical influence
gesture: pointing to the next town while standing inside a building

language: demonstrative paths in fictive motion: The arrow points toward the town.
?vision: low palpability ception of line emanating from a vertex

7. Language and the Understanding System:

the putative understanding system generates mental models that one experiences as
accounting for / explaining the structure and function of some domain of phenomena
at whatever level of consistency , elaboration, or sophistication,
from idiosyncratic personal accounts to folk cultural accounts to scientific theories

7.1 Conceptual structure in language and in early science: examples of overlap

certain conceptualizations in early scientific theories may have arisen as writ-large theoretized versions of conceptual structuring
in the closed-class subsystem of language (as well as of that in other cognitive systems)
A. force dynamic opposition in language's closed-class forms
and in Freud's psychological theory of psychodynamics
a. intra-psychological force dynamic opposition
I [Antagonist] held myself [Agonist] back from responding.
b. Freud: id-superego conflict
B. in linguistic force dynamics, an object's tendency toward motion or toward rest
and classical/medieval physics ideas of impetus and an object's tendency to come to rest
C. causality in language's closed-class forms and Newtonian "billiard-ball" physics
a. causal distinctions commonly marked by closed-class forms across languages:
non-causative (The plate slid across the table.)
direct physical causation (I slid the plate across the table.)
mediated physical causation (I made the plate slide / got the plate to slide across the table.)

[as well as: inducive (The director had the actor slide across the table.)]
not interactive concepts like: 'foster' / 'guide'—perhaps amenable to dynamical systems theories
b. mechanics: an object continuing in its state of motion unless acted on; one object acting on another; a succession of such actions

D. representation of perception in language's closed-class forms and in early science
a. "sensory-path" type of fictive motion, going from the Experiencer to the Experienced
I looked toward / into / past / away from the canyon.
b. ancient Greek and medieval "extramission" theory of visual perception

E. topology in language's closed-class forms and in mathematics
a. magnitude- + shape- + bulk-neutrality b. family of topologies

F. language distinction between 'something' and 'nothing' not continuous with 'degrees of something' and the Roman numeral system lacking a zero
a. zero quantity vs. (degrees of) positive quantity
X: Did you see any dogs there? Y: Yes, several. / Yes, one. / No, none.
X: Did you see a dog there? Y: Yes, (I saw one.) / Yes, several. / No, I didn't.
stationariness vs. (rates of) motion (stationariness is not a form of total slowness)
I sped/crept through/*at the woods. I stayed at/*through the woods.
b. Roman numerals: I, II, III, V, X, L, etc. but no "0"

7.2 Conceptual structure in language and in certain realizations of the understanding system: much overlap

preceding: comparison of just one component from different conceptual subsystems here: comparison of the whole subsystems

speculatively, conceptual structure in the understanding system has a basic and an advanced portion
the basic portion = the whole of what appears developmentally early in any area of understanding
and persists as the core of that area as it matures, there joined by advanced material

perhaps the basic portion largely comprises all of the following,
which should thus show much structural overlap:
grammar, child conceptualization, naive science, traditional lore, early science, casual science
fuller characterization of these areas:
the semantics of the closed-class subsystem of language
developmentally early conceptual organization in various "modes of construal"
naive conceptual organization in adults (naive physics, etc.)
traditional cultural lore?
the concepts of early science
the concepts that sophisticated science expresses when being casual, not rigorous

my previous work suggests: all languages' CCs are semantically constrained,
both as to the conceptual categories and as to the member concepts they can ever express
so there is an apparently universal inventory of categories & notions
that each language draws from for its CC meanings
What has determined the contents of this inventory? It may approximately correspond to
conceptual structure in other developmentally early cognitive systems

e.g., closed-class force dynamic representation in language expresses:
most: 2 forces diametrically opposed; a bit: radially centripetal force; minimal: 2 forces aligned
not: 2 forces converging at angle; 3 or more forces; force acting along a curve
those FD concepts that make it into the CC system may roughly correspond to
the force concepts in the child's basic understanding system
the CC system then (gradually) closes off, so all more advanced force concepts
can enter only open-class forms & the advanced portion of the understanding system

relation between these findings and George Lakoff's findings that the conceptual structure
of scientific/philosophical theories largely corresponds to that of everyday metaphors:

his metaphors generally have phrasal scope and include advanced material of the understanding system
e.g., concepts like 'war', 'a building', 'a journey'
but the concern here: the conceptual structure only of the closed-class subsystem,
which is largely only a subset of the conceptual structure of everyday metaphor
and corresponds to the most basic portion of the understanding system

8. Examples of Organizing Factors Apparently Common across Cognitive Systems

such factors epitomize nature of conceptual structure for human cognition

8.1 The relating of one structure to another [< schematic structure]

this relating involves two main parameters:
the mereological relation of one structure to the other: inclusion, coextension, partial overlap, separation
parity: (a) the dual-entity conceptualization; (b) the single-entity conceptualization
(a) the two structures are conceptualized as representing two different entities
(b) the two structures are conceptualized as representing the same entity

8.1.1 Inclusion

a. dual-entity conceptualization: embedding

language: any embedding; semantic: The beacon kept flashing 5 times at a stretch for 3 hrs.
syntactic: The woman [holding the baby [that's drooling]] is my sister.
vision: the multiple structural embedding of, e.g., a restaurant viewed from a corner
reasoning: resolving one subproblem and plugging that into a larger problem to be resolved
motor control: twisting one's wrist as one raises one's arm as one approaches a vending machine to
insert a coin

b. single-entity conceptualization: part-whole relation

language: any constituent of a construction; semantic: the Figure of a Motion event
my pen fell off the table.
syntactic: a determineer in a noun phrase- *the* red book
vision: any component of a perceived entity, e.g., a vertex of a cube
reasoning: any component of a coherent train of thought; step in a proof
motor control: any component of a coherent movement, e.g., bending forward at the waist in sitting down

8.1.2 Coextension

a. dual-entity conceptualization—in space: co-penetration; in time: concurrence
exemplified here: temporal concurrence
two types: (i) coordinated (ii) non-related or conflicting

language: expressed by English CCs like (i) during, while, as, participial -ing; (ii) meanwhile
He slept while she worked. / Dad was in the kitchen cooking dinner; meanwhile, Suzie was in school learning fractions.
perception: e.g., (i) seeing 2 cars moving toward collision, lips seen moving + speech heard;
(ii) seeing jogger on one side of street and cat fight on other side
affect: e.g., (i) concurrent feelings of love and compassion for someone; (ii) ambivalence
motor control: e.g., (i) moving head forward in raising soupspoon to mouth; (ii) scratching itch while talking

b. single-entity conceptualization: identity / equality

language: e.g., equational sentences: George Bush is the president of the U.S.
or coreference / deixis—cf. deictic "I" in: *I ate snails for breakfast*.
imagine 2 filmstrips of (1) a person eating snails, (2) a person talking about this to others
deixis here: equating the 2 persons as instantiations of the same single entity

perception: identifying a current percept with an earlier percept of the same object
equating views from different perspective points as being of the same object
motor control: equating 2 different executions of the same action pattern

8.1.3 Partial overlap

perhaps has little role in cognitive structuring, e.g.,
language lacks spatial prepositions with meanings like: 'half on and half off'
*The book lay belap the table.
and temporal conjunctions like 'partly during & partly not during': **He slept halfwhile she cleaned*
vision may have little beyond percept of "crossing", as in a "+" formed of 2 lines/rectangles

8.1.4 Separation

a. dual-entity conceptualization: two distinct entities
b. single-entity conceptualization: a single discontinuous entity—the only type exemplified:

language: discontinuous constituent, e.g., French: ne… pas 'NEG', English: what… for 'why'
vision: the 2 end segments of a centrally occluded line
motor control: the <hugging> pattern realized by the 2 separate arms

8.2 **Relative quantity** [< quantity structure]

realized at 3 levels, each larger level embedding the next smaller level
A. scope: the relative amount of some entity being considered together at the same time
for the structural properties that exist at that choice of quantity
B. granularity: the relative size of the subdivisions into which this amount is internally partitioned
in one's attention
C. density: the relative number of elements within any such subdivision that enter into consideration

vision & discourse: directing attention to via perceiving or referring to—
A. a. large (global): a town; b. small (local): a room
for the room: B. a. coarse: furniture, people, architecture b. fine: knick-nacks, cracks
for fine: C. a. sparse: ashtray + wallpaper design
b. dense: these + crack in ceiling, sunbeam on portrait, stain on butler's tie

motor control: attentive monitoring and guidance over—
A. a. large (global): whole body b. small (local): e.g., right arm
for arm: B. a. coarse: chunked as to upper arm + lower arm, as in waving
b. fine: chunked as to upper arm + forearm + wrist + palm + fingers + knuckles, as in piano playing
for fine: C. a. sparse: forearm + wrist + first finger, as in playing "Chopsticks"
b. dense: all the fine-grained arm parts, as in playing Chopin

LECTURE 8

How Languages Represent Motion Events: Typologies and Universals

This is the eighth talk in the series. In the preceding seven, I laid out the most cognitive portions of my work, and in terms of its framework, I began by talking about the different schematic systems that language has for structuring conceptual content. One of them was configurational structure, which is the delineation in space and time and other dimensions that the closed class forms of language can structure.

Today's talk will fit into that. It is all about events of motion, which involve space and time, but for the first time I am going to focus on the difference between what's universal and what is typological or language particular. Everything up to this point has been more or less universal; there have been fundamental structuring properties of language. Today I am going to focus on both what's universal and the particular ways in which languages differ from each other in how they represent things, in particular, how they express events of motion. There will be a lot of stress on language differences, and on what some languages do uniquely, in a distinctive way. The emphasis is on the wonderment of how different languages can be from each other.

As I characterize it, an event motion proper consists of four components. One is the Figure; it is moving or located. When I say event of Motion, and I write it with a capital M, I mean either motion or stationariness. The Figure is the thing that's moving or located, often represented by a subject noun. The next component is the state of motion, it's either of two possibilities, either MOVE written in capital letters or BE LOCATED, capital BE with subscript LOC. Then there's the component of path which, if it's motion, it's path, and if it's locative, it's the site that the Figure occupies with respect to the Ground.

All original audio-recordings and other supplementary material, such as any hand-outs and powerpoint presentations for the lecture series, have been made available online and are referenced via unique DOI numbers on the website www.figshare.com. They may be accessed via this QR code and the following dynamic link: https://doi.org/10.6084/m9.figshare.5554969.

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The Ground is the fourth component. It's a reference object with respect to which the Figures pass through or the site is located.

That's the core of the Motion event proper, but most languages habitually express that core event of Motion together with what I call a co-event. This relates to the main motion event typically as its cause or as its manner, but it's actually a whole range: its precursor, its subsequences and so forth. That's the basic event of Motion, and that's what's universal. That formula is what's universal about representing an event of motion. Everything else is going to be typological.

The particular typology is based on which of these components at a semantic level a language or language family characteristically shows in the verb. The basic methodology is to look across different languages and see what semantic components characteristically show up in one or another kind of morphosyntactic component. Different languages characteristically put different components in different morphosyntactic categories, like in the verb. They put different things there. The methodology is to observe this, look for any patterns that arise, and then look for any cross-linguistic differences and see what patterns can be observed about that. That's the technique.

I'll start with three of the main typological categories of languages around the world. They differ, in this particular typology, by what shows up in the verb. The verb or verb root always has the fact of motion in it, the MOVE or BE $_{\text{LOC}}$, and in addition, typically has one or another semantic component from the motion event.

The first typological category I'll look at includes English, and in fact, most Indo-European languages except Romance, Finno-Ugric, and Chinese (although you are welcome to dispute this with me), and several other smaller languages. Its characteristic pattern is that the verb or verb root typically has the fact of motion, together with the co-event. The co-event can be either its cause or its manner. You typically have a set of verbs in these languages which indicate something moving in one or another manner or due to one or another cause. English is a perfect example of the type and I will illustrate it with English.

Since it covers both stationariness and motion, let me first give some stationary examples, these will be located things. I'll give you a series of examples the way we normally say them, in their conflated form where the two parts of the sentence are expressed together, and then an unconflated form. Something like *The lamp lay on the table* should be properly analyzed in this more analytic way as *The lamp was located on the table*, so that's the motion of event proper, in this case in its a stationary form, WITH THE MANNER OF *the lamp was lain.* Then you typically move the manner verb, this co-event verb

which is in the relationship of manner. to the BE_{LOC}. 'BE_{LOC} while lying' comes out as *to lie* in English, with the manner *The lamp lay on the table* (or it could even be *stand, stand* is also BE_{LOC}.) This is not terribly convincing, but it looks better if you take the next example: *The rope hung across the canyon from two hooks.* Here if you tease apart the two elements, the motion event proper, that is the stationary version of it, would be something like *The rope* WAS_{LOC} *across the canyon*, or you might want to say, *EXTENDED across the canyon*, WITH THE MANNER OF *it hung from two hooks*. That's the manner: *it hung from two hooks.* Then again you can take the *hung* part moved over and conflated, and you wind up with the sentence *it* WAS_{LOC} *while hanging* and you wind up with a surface verb *hung*. *The rope hung across the canyon from two hooks*. It's the fact that you've got *across the canyon* and *from two hooks*, these two separate phrases, that make you think that you have two separate semantic components that they're in construction with, and in fact that's my analysis. The *across the canyon* part is in the construction with the underlying semantic component WAS_{LOC} or *EXTENDED across the canyon*, and the *from two hooks* is in construction with the *hung* part, *be hanging* part.

That's the only stationary example I'll give. Let's go to some motion examples that are non-agentive, with no agent in sight. You just have the Figure and the Ground and so forth. Let's first consider the case where the relation of the co-event is one of manner. So you have things like *The rock slid down the hill*, *the rock rolled down the hill, the rock bounced down the hill, The rock slid down the hill.* The way I am going to analyze the motion event proper is *The rock MOVED down the hill*. The *down the hill* part, which is a kind of motion phrase, a prepositional phrase, goes with the semantic component of MOVE in capital letters that is a basic, in fact universal, semantic concept. So *The rock moved down the hill* WITH THE MANNER OF *the rock was bouncing* or *the rock was rolling* or *the rock was sliding.* Once again in English you take the manner verb from the co-event and move it over. I am just expressing in that way, it doesn't mean it actually happens cognitively that way or any process actually occurs like that, but it's just to think of it diagrammatically. It's as if the co-event verb moves over or conflates with the MOVE verb, then you get a new verb, something like *The rock rolled down the hill*.

The next example, in the normal surface pattern, is *The gate swung shut on its rusty hinges*. I would suggest this comes from something like *The gate moved shut*. *Shut* doesn't have to be a verb in English. It can also be one of what I'm calling a satellite, which are not prepositions. It's a satellite or verb particle as it's called traditionally, and it specifically came from *The gate moved shut. Shut* means 'move to a position across an aperture, across an opening'. Then WITH THE MANNER OF *the gate swung on its rusty hinges* or *the gate creaked on its*

rusty hinges. That's the co-event, and again you can take that verb to conflate with MOVE and you get a surface sentence like *The gate swung shut on its rusty hinges* or *The gate creaked shut on its rusty hinges.* Again, *on its rusty hinges* is a phrase in the final sentence that semantically goes with just a portion of the surface verb *creaked* or *swung*. That is the logical correlation of *swung on its rusty hinges*. Whereas the *shut* part of the meaning is a conflation itself of *to cross an opening* with the MOVE component. Each portion of the sentence, in effect, is in construction with a differentiable and isolable component of this conflated verb *creaked* or *swung*.

These have been non-agentive examples, and now we'll do agentive ones, so we add to the formula I gave at the outset, which just has the basic motion. We can embed that within a much larger matrix which includes an agent. I agented that, and then the basic motion verb, and my symbolization for it has a capital A as a subscript in front of the MOVE. So $_{A}$MOVE as in *I agentively moved, Somebody agentively moved* and it is itself a conflation of 'to agent' with 'something moved'. *I* $_{A}$*MOVED the keg into the storeroom* means 'I agentively caused that the keg moved into the storeroom WITH THE MANNER OF the keg rolled', still with manner, not cause here. It is still with manner. That comes out *I rolled the keg into the storeroom* or *I bounced the keg into the storeroom* or *I slid the keg into the storeroom*. This is now with the whole agentive complex at the top of the basic motion event. The figure, which is the keg, now shows up as the direct object, and the agent shows up as the subject, so it's kind of been demoted.

I twisted the cork out of the bottle or *I popped the cork out of the bottle*: this is again *I* $_{A}$MOVED *the cork out of the bottle* WITH THE MANNER OF *the cork twisted* or *the cork popped*. Then you wind up with *I popped the cork out of the bottle* or *I twisted the cork out of the bottle*. It gives you the manner in which you removed it from the bottle.

Now we switch to where the relation of the co-event is one of cause. So far they have been all manner. Let's go back to the case where there is no agent, so that the subject is going to be the Figure. Now all of sudden we have sentences like *The napkin blew off the table,* and this I derive from *The napkin MOVED off the table*, the basic motion concept, WITH THE CAUSE OF—now it's not WITH THE MANNER OF, but WITH THE CAUSE OF—something blew on the napkin, like air. Then if you take the *blow* part conflated with the *MOVE* part, you get *The napkin blew off the table*. Similarly *The bone pulled loose from its socket*. That's *The bone MOVED loose from its socket*; *loose* is another one of those path satellites that English has many of. *It MOVED to a state of being loose from the socket*, *MOVED out of the socket*, WITH THE CAUSE OF *something pulled on the bone* and the result is *The bone pulled loose from the socket.*

This is all taking place without any overtly mentioned agent. There may be no agent around; there isn't in the case of the wind example.

Now we can look at the agent again, and we have the same *keg*. Whereas before you said *I rolled the keg in*, you can now say *I kicked the keg into the storeroom*. This is now *I* $_A$ *MOVED the keg into the storeroom* WITH THE CAUSE OF *I kicked the keg*. The way you know which category it belongs to is which object manifested the basic meaning of the verb. If the verb is 'rolling', like *I rolled the keg into the storeroom*, that's what I call the manner. It is *I MOVED the keg into the storeroom* WITH THE MANNER OF *the keg rolled*. But in *I kicked the keg into the storeroom*, now it's *I* who am doing the kicking, it is not the keg that is doing the kicking. So here is the keg, like a barrel. I kicked it and it rolled into the storeroom. It could be either onset kicking or extended kicking, or similarly *I pushed the keg into the storeroom*.

Other examples are *I chopped the tree down to the ground at its base*. Here again we can see which sentence fragment goes with which component of the verb. *I chopped the tree down at the base* comes from *I* $_A$*MOVED the tree down to the ground*. So those parts *down to the ground* go with this MOVE portion, WITH THE CAUSE OF *I chopped on the tree at its base*. (English puts *on* in there, *I chopped on the tree*. If you do something extendedly *I chop on the tree*, it's not that anything actually happens. It's just repeatedly swinging the axe into the tree, the same with *I pushed on this table*. It doesn't mean the table moved.) That's the co-event, and again if you put the *chop* part, you get to leave the *on* there. You let it drop, and then move it over and you get *I chopped the tree down to the ground at its base*. Well, the *chopping* part goes with *at its base*. That's where you're chopping it. Again each fragment of the sentence goes with a different component of the main verb, and that's part of my motivation for analyzing these verbs as having separate semantic components, each within its own separate clause.

There is also self-agentive, like *I ran down the stairs*. That would come from *I WENT down the stairs* WITH THE MANNER OF *I was running*. This is from the verb GO which is itself derivative. It is derived from *I CAUSED my body to move*—agentively caused my body to move. That collapses into this GO verb in my analysis, which in turn can serve as the base onto which a co-event can conflate. Once again you get *I ran down the stairs; I limped down the stairs*, or *I slid down the stairs*. This is the self-agentive type.

That is the first pass through the English type, and in principle this is what most Indo-European does, except for Romance. I can ask you if this is what mostly Chinese does; it's what most Finno-Ugric does, and so forth. This is one of the main patterns for representing motion in the world, by what happens in the verb. It characteristically shows up in the verb. It's the most colloquial

pattern, the most preponderant pattern, the pattern which shows up across the most different kinds of semantic categories. That is what I mean by characteristic. Every language does exhibit alternative patterns, but this is the most characteristic one for English and maybe for Chinese.

Now we switch to another pattern which is, I suspect, the most common around the world, which is where what shows up in the verb, together with the fact of motion, is the path. This kind of language has surface verbs which mean things like 'to go along one or another path'. The languages for which this is the characteristic type include Romance languages, meaning those that evolved from Latin. Latin itself had an English type pattern, but it underwent a typological shift and gave rise to the Romance languages, including Spanish. It is characteristic of Semitic languages, Polynesian languages, Japanese, Korean and a number of American Indian languages such as Nez Perce and Caddo. Spanish is the perfect example of the type. To a speaker of English, or perhaps Chinese, what could be more natural than saying a sentence like *The bottle floated into the cave*. How else could you say it? Here is a cave. Here is water. Here is a bottle. *The bottle floated into the cave*. How else could you possibly say it? It turns out that in a Spanish-type language, which includes Japanese and Korean, you can't say it that way. It is impossible. There is no way in the language to say it that way. Instead you have to say something like *The bottle entered the cave floating*. You say *La botella* ... my Spanish is actually not great ... *La botella entró a la cueva flotando: The bottle entered to the cave floating*; or you can put the *flotando* after the *entró*. You can say *La botella entró flotando a la cueva*. If you try to say something like *The bottle floated into the cave*, first of all Spanish has no word like *into*. If you try saying something like *La botella flotó en la cueva*, it will only mean that here is a cave; the bottle is already inside and it is just floating there. There is no way to say it like English. All the kinds of path directions that English would express with a satellite, like *The bottle floated into the cave; out of the cave; past the island; through the tomb*, Spanish is instead going to express with separate verbs. I call them path verbs. Japanese also has them. It turns out Chinese also has them, and you can use the path verbs as the main verb of the sentence, but apparently that was more true for classical Chinese. These days you typically use your path verb as a second verb, the second verbal element which I'm also going to call a satellite. You say instead *The bottle floated in* or *The bottle float enter* with the *enter* coming more and more to resemble a path satellite against *in.* This is me talking, you can disagree with me. Spanish has not only *The bottle entered the cave floating,* but also *The bottle exited the cave floating: salió de la cueva* and *The bottle passed the rock: pasó por la piedra*, and *The bottle* ... there is no English word for it ... *traversed*, again this is *pasar* in Spanish, *pasó por el tubo* ... means *moved through* or *The balloon*

moved up, ascended through the chimney. You have to say *El globo subió por la chimenea flotando* or *The balloon floated down the chimney*. It is *bajó flotando por la chimenea*. *The bottle floated around the island* in Spanish is *le dió vuelta, gave turn to the island*, but still the path is expressed in the verb. *The bottle crossed the canal*, here is the canal, English would say, *floated across the canal*. The Spanish says *The bottle crossed the canal floating: cruzó el canal flotando. The bottle floated away from the bank* is *se fué de la orilla*. *The bottle floated back to the bank* (*returned*), you get to say *The bottle returned to the bank: volvió a la orilla*. *The two bottles floated apart: se separaron flotando*. *The two bottles floated together: se juntaron flotando*: they separated; they joined floating. You even have it for notions of ALONG and ALL ABOUT, so *The bottle floated along the canal*. It's *iba flotando*. This is the verb for *to move along* and *The bottle floated all about the canal*. It's *andaba en el canal flotando* or *por el canal flotando*.

Then you have all the same kinds of things with an agent. All this has been without an agent, so you get an agentive counterpart to this. Usually it's separate verbs, whereas English type languages keep the path indicator in the satellite in the same way whether it is with an agent or without an agent. So *The barrel rolled in, I kicked the barrel in*, it's still *in*. But Spanish, since it is putting its path in its verbs, it often has distinctive causative counterparts for the same path, and so does Japanese. Instead of *entró*, which is non-agentive, a figure moves in like *The bottle entered the cave*, and all of a sudden the non-agentive now has to switch to another verb *meter*. So *I inserted the keg into the pantry* is *Metí el barril en la bodega rodándolo*. Given that the verb is now occupied by the path, and cannot express the manner or the cause as the English verb did, now manner or cause has to be expressed elsewhere in the sentence. You often do that with some kind of gerundive type of expression like *flotando, floating,* or with a prepositional phrase like *with a kick*. That's *cause to enter*; there's also *cause to exit, to extrude the barrel from the storeroom, sacar*. You'd have the other examples with an agent, like *I felled the tree with an ax*. Where the English would say *I chopped the tree down*, Spanish says *I caused to fall, I felled the tree by chopping on it* or *with chop, with an ax, with chop blows*. You have to say *Tumbé el árbol*. That's what the main verb is, and then you have to express the cause elsewhere like *serruchándolo, sawing it;* or *con una hacha, with an ax;* or *a hachazos, with ax blows*. The same with another example in English, *I cut the wrapper off the package*. In Spanish you have to say *I removed the wrapper from the package*, so *Quité el papel del paquete*. *Remove* in English is ambiguous whether it's off a surface or out of an enclosure. *Quitar* is specific to 'off a surface', so that's it, *I removed it by cutting it*.

There are a whole series of *cut* verbs which are systematized, also agentive *put* verbs, where in English you would have *put* or *take* depending on

directions. *I put the figure into the ground*, Spanish would say *meter the figure a the ground; put the figure on the table* would be *poner the figure en the table*. Then *I took the figure out of the ground*, would be *sacar; I took the figure off the table*, *quitar; put two figures together* is *juntar*, and *take two figures apart, separar*. It's an immensely consistent system. The English system is consistent. The Spanish system is consistent.

Now you might be asking, at this point, how come I'm able to translate a lot of these Spanish path verbs with English verbs like *exit, enter* and so forth. It turns out that almost all of these path verbs that I am using in English to translate the Romance path verbs are in fact borrowed from Romance languages. They are not native Germanic words. They include all these path verbs that I have been using to translate the Spanish ones. In English they are verbs like *to enter*, from Spanish or French, *to exit, to ascend, to descend, to pass, to cross*, all from Romance languages, *to separate, to join, to advance, to return*. They're all borrowed from Romance where they are the native type. English does have a few path verbs, but they are rather few. They are things like *rise, leave, follow*, but otherwise it is not the native type. In fact, German doesn't even have all these Romance ones like *enter, exit*. German even lacks those, and we'd have a harder time translating it if I had given you this talk in German—which I couldn't—it would have been even harder trying to render the Spanish verbs.

Type three is another main type, but it's actually quite weird. It's the type in which what is characteristically conflated in the main verb root with the fact of motion is the thing moving, the Figure. You have a whole series of verbs which mean for one or another kind of object to move or be located. It shows up in the American-Indian language Atsugewi, which is a Hokan language that was spoken in Northern California; now it is pretty much dead. It's the main characteristic Navajo pattern, and it also shows up as one of the characteristic patterns in some Mayan languages.

I'll give an example of how it works. Atsugewi is a polysynthetic language, which means that it has a verb root at the center, and many prefixes and suffixes, so you can hardly get away with saying anything, no matter how simple, without a lot of prefixes and suffixes. Typically one of these polysynthetic words stands for a whole sentence; you often don't need much more in the sentence. That's the nature of polysynthetic languages. You can go for a long time in speaking one of these languages without ever using a noun, just a bunch of polysynthetic verbs. The verb root characteristically expresses one or another kind of figure, an object moving or located. English, as usual, has some examples of the type. I'll give two examples, one non-agentive, one agentive. You can say in English *It rained in through the bedroom window*. That means that raindrops moved in through the bedroom window, but instead of having a

noun subject representing the Figure, it's conflated in the verb. *To rain* means for rain to move.

Similarly, *to spit* is an example of the agentive type. It means 'to cause agentively that a packet of spit move in the given direction', so you can say *I spat into the cuspidor*. *A cuspidor* is a receptacle for spit. Those are examples of English verbs that incorporate the figure along with the fact of motion. Well, this is what Atsugewi does as a characteristic type. It has scores or dozens of verb roots that refer to some kind of object or material as moving or as located. Typically these can't occur by themselves; they have to be prefixed and suffixed. So for example *-lup-* typically refers to a small spherical object moving or located. It could refer to a hailstone. It could refer to a large round candy. It could refer to an eyeball. If you're going to poke someone's eye out, that's the verb you'd use. That's the verb root, 'to cause the eyeball to move out of its socket'. There's a verb root just *-t'-* for a planar object to move or be located. It could be a sunscreen, a sunshield on a baby's cradle, a cradleboard. It could be a patch on clothing. It could be a shingle on a roof. The one I'll illustrate right now is *-sťaq'-,* which means for runny icky material to move or be located. It could be guts, it could be rotten tomatoes, chewed chewing gum, runny mud, stuff like that. Here is a typical Atsugewi word with *-sťaq'-* in the middle, here it is going to be a locative example. There is a suffix which gives path plus ground together, it means *on the ground*. So the *-ik.* means *on the ground*, and it has to take a cause prefix, which indicates the cause that gave rise to the event of the main verb group, which in this case is for icky material to be located. The cause, in this case, is a prefix *uh-*, which means 'as a result of an object's own weight acting on it'. You could translate it 'as a result of gravity acting on it'. You get a verb with prefixes and suffixes which you need for person, tense, mood, voice and evidentials. You wind up with something like /'*-w-uh-sťaq'-ik.-ª*/ It means literally *Runny icky material is located on the ground as a result of its own weight acting on it*, it means that generally. But it could be used if you see some guts lying on the ground, you can say [*w'osťaq'ík:a*]

Let's take a motion example. If you take the same verb root and you suffix it with a directional suffix meaning *into liquid* -ic't and you put on the cause prefix which means 'as a result of wind blowing on it', which is *ca-,* and you put on all the prefixes and suffixes that you need for inflection, you get /'*-w-ca-sťaq'-íc't-ª/,* and it literally means *icky material moved into liquid as the result of the wind blowing on it*. That's literally what it means, but a typical application of it would be if there is a creek and some guts lying there, and then the wind comes up and blows the guts into the creek, you say [*c'wasťaq'íc'ta*]. So that's one single word.

Now an agentive example. There is a directional suffix which means 'into fire', *-cis*, and there is a cause prefix which means 'by acting on it with a linear object moving axially', *cu-*, and if I did it, you could say */s-'-w-cu-sťaq'-cis-a/*, which means that I caused that icky material to move into a fire by acting on it with a linear object that I'm moving axially. That could be something like I had a stick and I poked the guts or mud or rotten tomatoes into the fire. All that is in one word. That's how Atsugewi does it.

It too is thorough-going in its type; it doesn't just treat ordinary objects that way, it also treats body parts and garments that way. English treats body parts just like it treats any other object. It makes it the Figure, in this case if it's agentive, you can say *I held my hand over the fire.* The verb is one of manner or cause, so *I held my hand over the fire, I pulled my arm out of the cage, I laid my head on the pillow, I put my ear up against the wall*, all these kinds of things. It's just like any normal English sentence. In Atsugewi, it isn't like any normal Atsugewi sentence. It makes the verb root the place which shows the object moving, so there is a separate verb root which means for the ear to move or be located. If you put your ear up against a wall to listen something in another room, it is 'to cause the ear to move', 'to move one's ear', all in one root, followed by the directional suffix which means 'laterally against a vertical surface'. It is totally consistent, and the same goes with garments. English does, by the way, have a few of these kinds of verbs, as English keeps offering examples of how other languages do it. For example *to step* means to move the foot, so *I stepped upon the curb* means *I moved my foot upon the curb*. *I leaned out the window* means *I moved my torso*. *I reached toward the ceiling* means *moved my arm*. English has few, but that's the only way in Atsugewi.

The same with garments, English has a few. We normally say *put on a shirt, put a hat on your head*, that kind of thing. But we do have a few that are in the verbs themselves, like *I booted up; I shod the horse: I put the shoes on the horse*. But this is the only Atsugewi way, they have verbs which refer to the particular garment that's moving. That's the third main type. These are the main characteristic ways of moving the verb components of the otherwise universal motion event. These are the three main patterns.

You can ask about all the other possible patterns, so let's systematically go through them to see what the world languages have done with them. One possibility is to put the ground object in the verb together with *move* and have a whole series of verbs which mean 'to move with respect to one or another kind of Ground'; this barely exists at all. I had to scrounge to find a few English examples, like the morpheme *-plane* in the two-morpheme verb *to emplane* or *to deplane.* Maybe you can mount an argument that would say that *-plane* as

a morpheme means to move with respect to an airplane, and that the path is being expressed by a separate morpheme, the prefix *em-* or *de-*. But this barely exists as a system at all. If any language were to have it as its characteristic system, you'd also have to have forms like *to circumplane* meaning 'I walked around the airplane', and *to transplane*, 'I walked through the airplane'. Then you'd have to have things like *enhouse* meaning to walk to a house; *to dehouse*, 'to walk out of a house'; *to circumhouse*, 'to walk around a house', and it doesn't exit. No language I've ever heard has anything like it. The question is for me a mystery; I do not know why this possibility is left as an orphan. Maybe some language somewhere does have it, but it is just so far down the hierarchy. The pattern that conflates the path like Spanish and Japanese seems to be the most common in the world, just impressionistically. The pattern that conflates the co-events seems the next most common. The pattern that conflates the figure is pretty minor. It shows up just in few languages. Maybe there is some language somewhere that's never been recorded, that conflates the Ground, but I see no discourse reason why it shouldn't be viable. You can present reasons why you think so.

The next possible thing is for two of the universal components to show up conflated together with the factive motion in the verb. That does show up in various languages as a minor system, but never as a major system. For example, English does have a minor system of 'move plus a certain path plus certain ground'. They are usually agentive. Here is a non-agentive one, *to berth*, like *The ship berthed in its assigned mooring*; it means 'to move into a berth'. Usually they are agentive, so you have things like *to shelve*. *I shelved the books* means *I caused the books to move onto the shelf*. And *to box*, *I boxed the apples* means *I caused the apples to move into boxes*. So *move into boxes* is *to box, cause to move into boxes* means *to box*. There is another pattern of the sort where you have figure and move and path, but not the ground. So *to dust something* or *to powder*: *She powdered her nose* means *She caused powder to move onto her nose*, so *cause powder to move onto*. And *to scale a fish*: to cause the scales to move off the fish. Those patterns do exist, but no language I know of has any major systems, possibly because it would be too costly. You'd have to have a separate lexical entry for every relevant combination of ground and path, and languages are much more sparing of their lexicons than that. Still, I think it would be a possibility if you'd picked as ground objects not things like boxes and shelves, but things like volumes and planes and things that are geometrically more generic. It could have been a viable system, but again we don't find it.

The fourth possibility is that nothing conflates. You just have a verb *to move* which you keep using over and over again, or *be located*. Again, you don't find

any language with that; possibly the reason is that it is inefficient. You might well use up that slot, since it's going to be used over and over again, with something that's more contentful in character. Maybe that's the reason. Now as it happens, you do have languages with this kind of system for part of their motion events. Spanish, for example, does have a single fixed verb for the 'belocated' concepts like *estar*. They say over and over, *estar, estar, estar.* They do not continue their normal pattern of conflating the motion component with path. Other languages do. Halkomelem is a Canadian Indian language, it's Sahaptin, I think. It's otherwise like Spanish in its conflation pattern, but it's more consistent. It does have locative verbs that mean things like *to be in*, another verb *to be on*, another verb *to be between* and so forth. That's that type.

Then there's a fifth type where—it's as close as language tend to get to this last type—there they don't have just a single verb *move*, where they mark a few distinctions but not many. One of the American Indian languages around Clear Lake in California, Southwest Pomo, I guess, makes a three-way distinction of its move verbs, sort of like Atsugewi with its distinctions of kinds of figures, but just three. It's if the figure is single, dual, or trial or plural. But it has nothing like Atsugewi has, with whole different verb roots for different kinds of objects as figures moving. Just the three, and you hear those three verb roots over and over again. One might object that it is too monotonous, but nevertheless, that kind of thing does exist.

Next we get split systems. A split system is a language which has several of these basic types, and Spanish is one of them. As we already noticed, for locative things, it has one type of conflation pattern, namely zero conflation. Nothing moves into the BE_{LOC} verb. For motion, it has two types. The one we mainly saw, which is where the path conflates, but it does this primarily for certain path motions where you cross a boundary, like *into*. As Young Aske and Dan Slobin have pointed out, if it's a kind of path which doesn't cross a boundary, then you have, of all things, the English conflation pattern. In fact, in Spanish you would actually say *He ran from this house to the school*. Word for word, you say *run from the house to school* or at least *run to the school*. There is no path verb in Spanish which is 'to transmove home and school, running'. There is no way to say that. I'm just making this up, 'to transmove', there's no such verb. There is a mixed type, but we can maybe skip that in the interest of time.

What shows up in the verb has been the most diagnostic of the surface morphosyntactic forms to look at to see how languages differ from each other typologically as to how they express the motion events. It's been the best. But once a language puts one of the semantic motion components into the verb, what does it do with the rest of the components, where do they go? For this there's

a second place to look to see what happens. That's the second most diagnostic and that's the satellite.

Satellite is my own term for a kind of grammatical category. It's the element which is in direct construction with the verb root. We can look at the satellite as a kind of receptor constituent, just like we looked at the verb. We can look at the verb to see what shows up in it semantically, in terms of the semantic components. In English, what shows up in it is the co-event, in Spanish it's the path, and in Atsugewi it's the figure. So then what shows up in the satellite? Again we have an array of possibilities for the remaining semantic components in the motion event. Let's look at the English semantics of the motion event. The co-event is already accounted for as showing up in the verb. What shows up in the satellite? It's the path. In fact, more specifically in English, it's the combination of the satellite which goes with the verb, and the preposition which goes with the following noun, typically the Ground noun, that together, in English, represent the path. For example, if you have an object that moves geometrically and undergoes a path where it's first inside the enclosure, and then outside. That path, in English, is expressed by a little formula there. It's *out*, as a satellite to the verb, together with *of* as a preposition with the following noun. That combination represents that particular geometric conceptual path.

There is a rule in English where you can't drop the *out*, you have to keep it, but if the following ground object that the *of* goes with is a deictic or an anaphor, something you already know about, you can drop it and remove the prepositional phrase with it. So you can say *I stood just inside the door of house, and then I ran out of it*, or you can say, *I stood just inside the door, then I ran out*, dropping the *of it*. But the *out* plus the *of* is together the satellite plus preposition combination that represents this particular path concept. English has lots of these path satellites. They are really satellite plus preposition combinations. I list a whole bunch of them there, all the ones that you are probably familiar with. So *I ran in to the house, ran out of the house*. Then there is *ran up the stairs, ran down the stairs*, a whole list there of standard satellites which convey this, and there are several dozens I list.

In addition, I list some which would be less likely to be included as path satellites, but which I think should be; they function perfectly the same. This is where it starts off with *loose*, like *The bone pulled loose from its socket*. So *loose from* is the thing that represents this particular path. *The coin melted free of/ from the ice*. It represents a specific spatial configuration. *She swam clear of the oncoming ship* or just *She swam clear*. So here is an oncoming ship, here she is in the way. *She swam clear of the oncoming ship*. That's a particular spatial configuration. There is a whole set of *froze stuck to the window, baked fast to the clay*, and so forth. These are all the ways that English takes the path

component, which has to be expressed somewhere, and places it in the satellite plus preposition.

Now Atsugewi has a whole series of suffixes directly following the figure verb, which combine together path plus ground. It doesn't separate those it has, it combines path plus ground. There is a whole series of them, a dozen or so, that together represent English *into* plus some kind ground. These are all separate geometric configurations that Atsugewi is very strict on distinguishing. You have 'into liquid'. It's the suffix *-iċt*. If you have 'into an aggregate', *-isp-u*, such as *into a crowd, people into bushes, into a deer's rib-cage*, it's considered an aggregate. You use another one, *-wamm*, for 'into an areal enclosure', like *into a corral*. Another one, 'into a volumetric enclosure', that's *-ipsn*^{u}. That could cover, for example, *into a room, into a deer's stomach, into an oven*. Then there is another which is 'into a gravidic container', *-wam* such as *acorns into a basket, things in your cupped hand, water in a lake basin*, all of these are gravidic container-like. There is 'into a fire'. There is 'into a solid substance', three of them in fact. One is 'down into the ground', literally the ground, that's *-mic'*. There is another one, which is 'levelly into a solid substance', like this is a tree trunk, something above the level of the ground, and you swing an axe into it. It's *–iḱs*. The verb is 'by swinging', then you did it into tree trunk. The last one is 'down into the substance of something raised above the ground', like a tree stump. That will be *-cis*^{u}. Furthermore, there is 'into a corner', which is another geometric distinction. Also 'over a rim into', that includes, for example, water pouring down into a gopher hole or a fly flying into your mouth. Here the mouth is perceived as an opening with a rim surrounding it. There is another which is 'down into a pit in the ground', such as a house collapsing into the cellar, or if you dig a deep pit to trap a deer, and the deer falls and goes with that suffix. That's *-tip-u:* . There is also 'into someone's face', like to throw water in someone's face. That's *-mik:*. These are fine distinctions that Atsugewi makes with the INTO notion where in English we cover all of these grossly with just the more generic term *in*, and there is no *in* in Atsugewi. It's much more finely divided, and they never made a mistake that I detected. These are just as clear to them as distinctions as anything else. In any case, the point here is they represent both path plus ground together. Let's see, maybe we should start skipping things.

Let me just go to another kind of satellite type. There are languages that have satellites that express the Figure though noun incorporation. You may have heard of noun incorporating languages, and Caddo will be an example. Instead of saying *The cattle went into the water*, you say, *The cattle water-entered*. It's a compound verb, the main verb is *enter*, but it takes a prefix which refers to water and which takes you to the ground. Instead of saying *The house is at*

the woods edge, you actually say *its-house-being at the woods edge*. It's rather consistent itself in every respect. Other languages, like Nez Perce, express the manner with a prefix. It has Spanish-type verb roots like *to ascend, descend, to go across* and it has prefixes which mean things like flying, crawling, sailing and so forth. In fact, you can almost picture Spanish or Japanese developing into a Nez Perce type of language. As it stands, Japanese has the main path verb as the second of two verbs like *crawling-enter*. You could say 入あ. 入あ is the *enter*. You put the *crawl* verb in front, *to crawling-enter*. In the course of time you can imagine how that might boil down to just a set of prefixes. It almost is that now, pretty much like the Nez Perce system.

Finally, Atsugewi has yet another satellite system, that's the 'cause' system. You already saw the 'cause' system in some of the examples. We'll just go over a few of the some two dozen of these 'cause' prefixes. They mean things like 'as a result of weight acting on it', 'as a result of heat acting on it', 'as a result of wind blowing on it', 'as a result of the rain falling on it'. There are others, like 'as a result of acting on it with a linear object moving axially', such as by prodding, poking, or probing. There is another which is 'as a result of a linear object moving obliquely with respect to the ground object', such as by scraping, by whittling, by pulling a canoe. There's another which is 'by swinging', that would be like 'by swatting', 'by chopping' and so forth. There is a whole set which has to do with the body parts. That's how that system works.

I think we are in a position now to look at this kind of typology. We have the main typological system of what shows up in the verb of those three things, and the subcategorization for each of those of where those other things show up. For the prevalent proper type, where what shows up in the verb is the path, languages like Spanish basically have no satellites. A language like Nez Perce is like Spanish, but then uses the satellite position to express the manner, and languages like Caddo use the satellite position to express the Figure or the Ground. If you go to the English type where the verb root incorporates the co-event, the manner or the cause, then the satellite is typically used to represent the path. If you go to the Atsugewi type, where the verb is used to express the Figure, the thing that's moving, then it has in fact two satellite systems: one to represent the cause and the other to represent the path plus Ground together. This is where all the subcategorizations take place, where all the different parts of the motion event wind up showing up on the surface.

Now we can discuss an issue of salience. There seems to be a general principle that if some concept shows up in the verb or satellite, it is relatively backgrounded there in attention. You can express it with relative backgrounding, whereas if it is expressed anywhere else, like in a noun or a phrase or a clause or a gerund of any sort, then it is ipso facto foregrounded, it is more called

to attention. Up to this point we might have said that every language is simply equivalent, in that in every case there's a universal phenomenon of what the semantic structure is of the motion event with its components with their particular relations. And every language simply has its own way, or its own typological category, for displaying those components where they put them. But there is a difference. It turns out that whatever way the language has for where it puts its components, whatever it puts in the verb and satellite, that gets backgrounded, and you can't capture that in another language, in a language that does it differently. For example, you can contrast English with Spanish. I forgot to say that the English satellite system has the capacity to include many different aspects of the path within a single satellite phrase. For example, you can have up to four satellites in English. Let's say there's a child who built a tree house up in a tree, and the child's parent wants the child to come down. The parent can say to the child *Come right back down out from up in there*.

Here's the English sentence, it's *Come right back down out from up in there*, and you have this crescendo of stress, *right back down out*, and then you suddenly lower your voice to say *from up in there*. The *from* and the *up in there* is just like a noun. So *Come right back down out from up in there*. In this case it's expressed with three separate kinds of satellites, like *right*, which means 'immediately'. I don't know if it is a satellite, but it's acting as one. *Back* means 'return trip'; *down* means 'descent'; *out* means 'exit'. Try to do that in Spanish, you can't. If you want to say something like *He ran back down into the cellar*, Spanish has to pick one of those three PATH notions for its verb and that's all it can do, then it's done. You can say instead of *He ran back down into the cellar, He returns to the cellar running: Volvió al sótano corriendo*. You can background the return trip, but then what are you going to do with the fact of *down* and *in*. If you try to say it, it's probably very awkward. If you try to say it, it would be highly foregrounded and call attention to it. Or you could have picked *The man descended to the cellar running, El hombre bajó corriendo al sótano* ... But now what can you do about the *back* part and the *in* part? You could add a phrase, but then you've highly foregrounded the fact of *return* and so forth. You get the idea that because of the setup of what is placed where, languages generally differ as to what and how much they can background, express in a backgrounded way, without calling much attention to it.

Atsugewi outdoes English in this respect. In this example, it is a master of being able to background information without calling attention to it. For example, if you take the sentence which I gave earlier '*w-uh-sťaq-ik-ª*, literally you've got 'icky matter moved', that's the *-sťaq* part. *-ićt* is 'into liquid', *-ca*: 'as a result of wind blowing on it'. For each of these, you could put a noun phrase up front, like 'into the creek'. But you don't need these nouns; if you include

them, you foreground them. The verb parts themselves represent the same concept but in a backgrounded way. Now if English were to try and replicate the information content, we'd necessarily foreground some of these concepts. If English tried to equal the informational content generically, you'd have to say something like *Something icky blew into something liquid*. Now you really foreground the *icky* and the *liquid*. If you wanted to instantiate it, you could say something like *The guts blew into the creek*, but now you've foreground the *guts* and *creek* by virtue of their being nouns. If, however, you want to equal the backgrounded flavor of the Atsugewi sentence, then you'd probably have to use the English sentence *It blew in*. But now you have to drop all the informational specificity that the *it* is something icky and the *in* is something liquid. This is a trade off between backgroundedness and informativeness.

I've basically gone through the whole theoretical part. I'm returning now to the English type of co-event conflation, because the co-event conflation in English type languages is enormously elaborated. Maybe Chinese does it to some extent as well. I'm just picking the fourth thing out of a set of things that are kinds of elaborations that show up in English type languages, that again the Spanish type language can't hope to do. The issue here is what is the temporal sequence and what is the relation between the verb and the satellite. You may remember that the satellite arises from the main verb event like, *The rock rolled down the hill*, so *down the hill* is from the main thing. Then you might have it with a cause of 'a gust of wind blew on it'. *The rock moved down the hill from a gust of wind*, or *The rock blew down the hill*.

The verb in the normal sentence comes from this outlined co-event, whereas the prepositional thing comes from the main event. It's almost reversed in this respect from what you'd expect. What's the relationship? If you are going in temporal sequence, the first one is going to be precursion. This is where the co-event occurs before the event of the verb. The co-event which shows up in the verb occurs before the main motion event which is reflected in the preposition. An example would be *A glass splintered over the rug*. This comes from *The glass moved over the rug* WITH THE PRECURSION OF *the glass splintered*. First the glass splinters, and then it moves down onto the rug. In fact the reason it moved down onto the rug is probably because it splintered. This is the first kind of relationship that can show between them. It's precursion. That's a non-agentive example.

The agentive example would be, *The scientist ground the seeds into the test-tube*. So here is the test-tube, grinding seeds, grinding the seeds into the test-tube. Well, the grinding precedes the falling into the test-tube. So this is *The scientist caused to move the seeds into the test-tube*. That's the main motion event WITH THE PRECURSION OF *he ground the seeds*. The grinding,

which shows up in the verb, occurs before the motion event. The next is enablement. In enablement, the verbal part, the co-event, occurs immediately before the motion event and enables it. Without it, the motion event could not have occurred. If I say to you *Could you reach me that bottle down off the shelf* or *Could you grab me that bottle down off the shelf*, where it comes from is *Could you move the bottle down off the shelf* WITH THE ENABLEMENT OF *having first reached to it*. Here is the bottle on the shelf, *Could you reach to the bottle on the shelf and having grabbed it, move it down off the shelf*. The verb that shows up in the sentence is *reach: Could you reach me that bottle down off the shelf?* It means *Could you move that bottle down off the shelf* WITH THE ENABLEMENT OF *having first reached to it*. With *grab*, it is the same: *Could you grab that bottle down off the shelf: Could you move it down off the shelf having first grabbed it*. That's enablement.

The next temporally—we're getting closer—is CAUSE. It means like onset causation. *Our tent moved down into the gully*, WITH THE CAUSE OF—this is the onset causation instead of extended—*a gust of wind blew on it*. So the tent moved down into the gully from the gust of wind. Or we've had this type already, an agentive: *I batted the puck across the ice*, *off across the ice*. It means *I caused the puck to move across the ice* WITH THE ONSET CAUSE OF *I batted it*, I batted it then the puck moves, *I batted the puck off across the ice.* With continued extended causation, the two times are concurrent. *The water boiled down to the midline of the pot*. Here is the pot that starts with the water at the top. *The water moved down to the midline of the pot* WITH THE EXTENDED CAUSE OF *the water was boiling*. That's what caused it to move down to the midline of the pot. With an agent, you can say: *I squeezed the toothpaste out of the tube*. That's extended causation.

Then we've got manner, which we have seen many examples of. *The top spun past the lamp* means *The top moved past the lamp* WITH THE MANNER OF *the top was spinning*. And whatever the examples, these are again concurrent. Then another concurred type is what I call concomitant, which is where the co-event is not a manner that involves the figure's motion. It's independent of the figure's motion, nevertheless it's an activity that the figure is manifesting concurrently with its motion. One example is *She wore a green dress to the party*. This comes from *She went to the party* with the concomitance of *she wore a green dress*. They are unrelated events. Wearing a green dress doesn't abet going to a party. Nevertheless you can conflate them in English: *She wore a green dress to the party*. Similarly, concomitance is not that well expressed in English. It's very easily expressed in Atsugewi. Another example is *He whistled past the graveyard* meaning *He walked past the graveyard* WITH THE CONCOMITANCE OF *he was whistling*, meaning *As he walked past the graveyard, he whistled; he was whistling as he walked past*.

Next is what I call concurrent result. There must be a better name for it, but anyway, it's for sentences like *The door slammed shut*. Here is a doorway. Here is a door. The door slammed shut. *Shut* is the path satellite. It tells you what happens, it slams. 'Slam' is what happens at the very end point of the path event, of the path portion, then it slammed. That's why I'm calling it CONCURRENT RESULT. It's the result, but it's otherwise concurrent with the PATH. The co-event, the part about slamming, is now at the very terminal edge of the prepositionally indicated PATH. Another example of it is the *The rocket splashed into the water* means *The rocket moved into the water* WITH THE CONCURRENT RESULT OF *the water splashed*. So it's the exact entry point of it. Finally, CONSEQUENCE, where the co-event, as represented by the verb, actually occurs after the prepositional event, the motion event, the path. An example is, in an office building, I'm on the tenth floor, you are on the fifth floor and I'm going to go down to lunch. I can call you on the phone and say *I'll stop down at your office on my way out of the building*. *Stop down at your office*, that means 'I'll go down to your office and then stop at it'. The stopping, which is the co-event and shows up in the verb, follows the event of going down, so it's *I'll stop down at*. First you go down and then you stop. That's unlike anything we've had so far. Similarly *I'll look in at the stew on the stove to see if it's ok*. *I'll look in at* means I'll go in and then look. Still *look in* follows the *go in*.

Similarly *They locked the prisoner into his cell*. Here is the cell. Here are the guards. They take the prisoner, put him into the cell. Only after the prisoner is moved into the cell do they lock the door. *They locked him into a cell*. In fact, English distinguishes *they locked him into a cell* and *they locked him in a cell*. *Into* means first they put him in, and then they lock. With *They locked him in a cell,* it doesn't matter, he could already be there with the door open, then they lock him in the cell. So this is the distinction. The *into* one is one of these consequent ones. I should stop there.

Just to summarize: the whole issue here has been there is a conceptual domain. In this case I worked on the domain of motion event. If you take the conceptual domain, some of them are universal. All languages are the same. That's what all my preceding talks have been about. Today's talk has been about a conceptual domain which languages systematically do in certain different ways, where they represent the elements of this conceptual domain in a systematic way. Furthermore, each language can be amazingly consistent in its pattern for how it selects to place these elements of the universal domain in surface sentences. It can be very thorough-going, and it covers a wide range of semantic types and metaphoric extensions of these types.

Third, I went into how Atsugewi expresses different kinds of *into*. One of the lessons from this kind of cross comparison is how utterly differently languages can subdivide the world. It's the original Whorfian kind of observation, how

differently they conceptivize the world. You may have thought that this must be universal, because my language does it and English does it and Turkish does it. But there may be some language in the world that does it quite differently, and that's why you really need to look at a lot of different languages, especially the more exotic ones, to see what human cognition is capable of.

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Handout Lecture 8

1. Introduction

1.1 Methodology for Finding Meaning-Form Relations

("entities" = elements, relations, and structures: both particular cases and categories of these)

a. Determine various semantic entities in a language.
b. Determine various surface entities in the language.
c. Observe which (a) entities are expressed by which (b) entities—in what combinations and with what interrelations—noting any patterns.
d. Compare findings of this sort across languages, noting any patterns.

1.2 Semantic Structure of a Motion Event

[Figure Motion Path Ground]$_{\text{Motion event}}$ ←Relation [Event]$_{\text{Co-event}}$

"motion" has two realizations: MOVE and BE_{LOC}

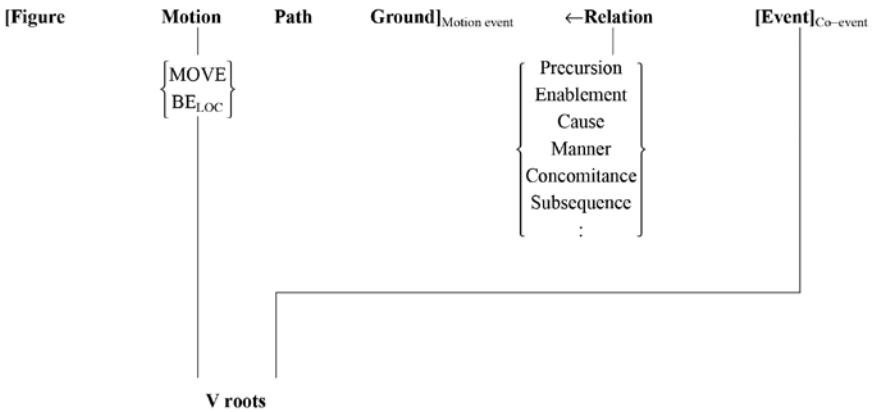
"Relation" can be: Precursion / Enablement / Manner / Cause / Concomitance / Subsequence

Note: "Motion" with a capital "M" covers both motion and location and "Path" with a capital "P" covers both path and site

2. Semantic Components of a Motion Event Characteristically Appearing in a Language's Verb Root

2.1 Motion + Co-event

2.1.1 Diagram of the Co-event conflated in the Motion verb



2.1.2 Some Languages / Language Families with the Motion + Co-Event Conflation Pattern

Indo-European (except for post-Latin Romance languages), Finno-Ugric, Chinese, Ojibwa, Warlpiri. English is a perfect example of the type

2.1.3 English Motion expressions—Conflated and Unconflated

BE_{LOC} + Manner

a. The lamp lay (stood / leaned) on the table =
[the lamp WAS_{LOC} on the table] WITH-THE-MANNER-OF [the lamp lay there]

b. The rope hung across the canyon from two hooks =
[the rope WAS_{LOC} (EXTENDED) across the canyon] WITH-THE-MANNER-OF [the rope hung from two hooks]

MOVE + Manner

non-agentive

c. The rock rolled (bounced / slid) down the hill =
[the rock MOVED down the hill] WITH-THE-MANNER-OF [the rock rolled]

d. The gate swung (creaked) shut on its rusty hinges =
[the gate MOVED shut (= the gate shut)] WITH-THE-MANNER-OF [the gate swung on its rusty hinges]

agentive

e. I bounced (rolled / slid) the keg into the storeroom =
I $_{A}$MOVED the keg into the storeroom] WITH-THE-MANNER-OF [I bounced the keg] Similarly: I twisted / popped the cork out of the bottle.

self-agentive

f. I ran (limped / jumped / stumbled / rushed) down the stairs =
[I WENT down the stairs] WITH-THE-MANNER-OF [I ran]

MOVE + Cause

non-agentive

g. The napkin blew off the table =
[the napkin MOVED off the table] WITH-THE-CAUSE-OF [(something) blew on the napkin]

h. The bone pulled loose from its socket =
[the bone MOVED loose from its socket] WITH-THE-CAUSE-OF [(something) pulled on the bone] Similarly: The water boiled down to the midline of the pot.

agentive

i. I kicked (pushed / threw) the keg into the storeroom =
[I $_{A}$MOVED the keg into the storeroom] WITH-THE-CAUSE-OF [I kicked the keg]

j. I chopped (sawed) the tree down to the ground at the base =
[I $_{A}$MOVED the tree down to the ground] WITH-THE-CAUSE-OF [I chopped on the tree at the base] Similarly: I blew / flicked the ant off my plate.
I knocked / pounded / hammered the nail into the board with a mallet.

2.2 Motion + Path

2.2.1 Diagram of the Path conflated in the Motion verb

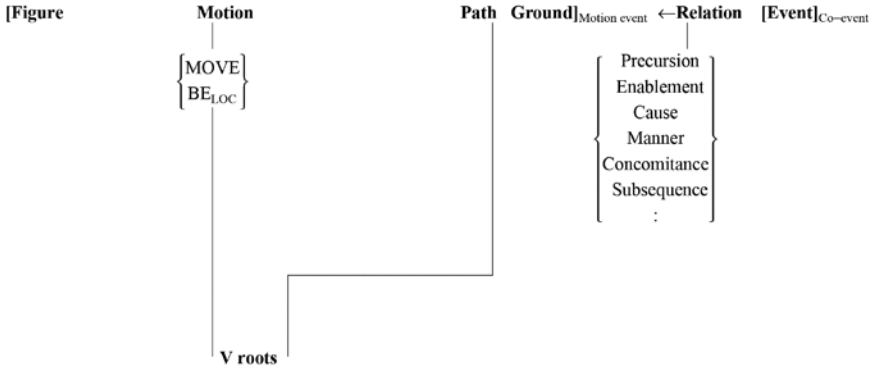


FIGURE 1.2 *Path conflated in the Motion verb*

2.2.2 Some Languages / Language Families with the Motion + Path Conflation Pattern Romance, Semitic, Japanese, Korean, Turkish, Tamil, Polynesian, Nez Perce, Caddo. Spanish is a perfect example of the type.

2.2.3 Spanish Expressions of Motion with Conflation of Path

- non-agentive—with Manner gerund

a. La botella entró a la cueva (flotando)
the bottle MOVED-in to the cave (floating)
'The bottle floated into the cave'

b. La botella salió de la cueva (flotando)
the bottle MOVED-out from the cave (floating)
'The bottle floated out of the cave'

c. La botella pasó por la piedra (flotando)
the bottle MOVED-by past the rock (floating)
'The bottle floated past the rock'

d. La botella pasó por el tubo (flotando)
the bottle MOVED-through through the pipe (floating)
'The bottle floated through the pipe'

e. El globo subio por la chimenea (flotando)
the balloon MOVED-up through the chimney (floating)
'The balloon floated up the chimney'

f. El globo bajó por la chimenea (flotando)
the balloon MOVED-down through the chimney (floating)
'The balloon floated down the chimney'

g. La botella se fué de la orilla (flotando)
the bottle MOVED-away from the bank (floating)
'The bottle floated away from the bank'

h. La botella volvió a la orilla (flotando)
the bottle MOVED-back to the bank (floating)
'The bottle floated back to the bank'

i. La botella le dió vuelta a la isla (flotando)
the bottle to-it gave turn to the island (floating)
(= 'MOVED around')
'The bottle floated around the island'

j. La botella cruzó el canal (flotando)
the bottle MOVED-across the canal (floating)
'The bottle floated across the canal'

k. La botella iba por el canal (flotando)
the bottle MOVED-along along the canal (floating)
'The bottle floated along the canal'

l. La botella andaba en el canal (flotando)
the bottle MOVED-about in the canal (floating)
'The bottle floated around the canal'

m. Las dos botellas *se juntaron* (flotando)
the two bottles MOVED-together (floating)
'The two bottles floated together'

n. Las dos botellas *se separaron* (flotando)
the two bottles MOVED-apart (floating)
'The two bottles floated apart'

Similarly:
avanzar 'MOVE ahead/forward',
regresar 'MOVE in the reverse direction',
acercarse 'MOVE closer to (approach)',
llegar 'MOVE to the point of (arrive at)',
seguir 'MOVE along after (follow)'.

- agentive

—with Manner gerund

a. Metí el barril a la bodega rodándolo
I-$_{A}$MOVED-in the keg to the storeroom rolling-it
'I rolled the keg into the storeroom'

b. Saque el corcho de la botella retorciéndolo
I-$_{A}$MOVED-out the cork from the bottle twisting-it

(or:

Retorcí el corcho y lo saqué de la botella
I-twisted the cork and it I-Amoved-out from the bottle
'I twisted the cork out of the bottle'

—with Cause gerund

c. Tumbé el árbol serruchándolo // a hachazos / con una hacha
I-felled the tree sawing-it // by ax-chops / with an ax
'I sawed / / chopped the tree down'

d. Quité el papel del paquete cortándolo
I-$_{A}$moved-off the paper from-the package cutting-it
'I cut the wrapper off the package'

- the "PUT" type of agentive verb

TABLE 1.1 *Spanish 'putting' verbs, differing according to distinctions of Path (A=Agent, F=Figure object, G=Ground object)*

A poner F en G	A put F onto G
A meter F a G	A put F into G
A subir F a G	A put F up (on)to G
A juntar F_1 &F_2	A put F_1 & F_2 together
A quitar F de G	A take F off G
A sacar F de G	A take F out of G
A bajar F de G	A take F down from G
A separar F_1 & F_2	A take F_1 & F_2 apart

2.2.4 English Path verbs like the Spanish ones

enter, exit, ascend, descend, cross, pass, circle, advance, proceed, approach, arrive, depart, return, join, separate, part,

—but all these are borrowed from Romance languages, where they are the native type. Few native English Path verbs: rise, leave, near, follow.

2.3 Motion + Figure

2.3.1 Diagram of the Figure conflated in the Motion verb

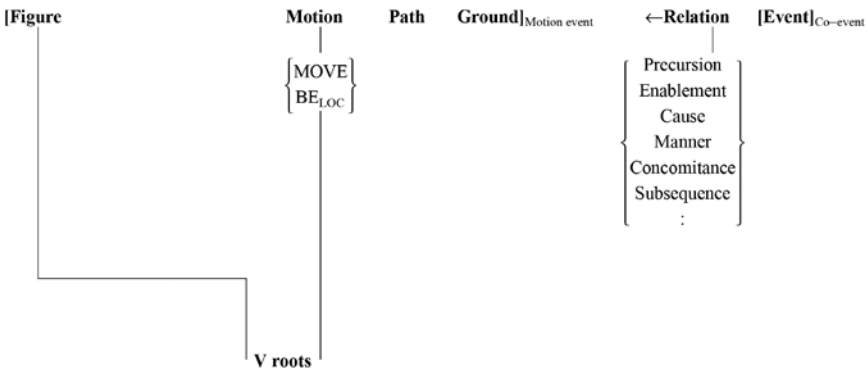


FIGURE 1.3 *Figure conflated in the Motion verb.*

2.3.2 Some Languages / Language Families with the Motion + Figure Conflation Pattern

Navajo, Atsugewi (Hokan), Tzeltal (Mayan)

English has a few verbs of this type, e.g., rain / spit

a. It *rained* in through the bedroom window [non-agentive]
b. I *spat* into the cuspidor [agentive]

2.3.3 Atsugewi examples

Atsugewi verb roots of motion with conflated Figure

-lup- 'for a small shiny spherical object (e.g. a round candy, an eyeball, a hailstone) to move/be-located'
-t- 'for a smallish planar object that can be functionally affixed (e.g. a stamp, a clothing patch, a button, a shingle, a cradle's sunshade) to move/be-located'
-caq- 'for a slimy lumpish object (e.g. a toad, a cow dropping) to move/be-located'

-swal- 'for a limp linear object suspended by one end (e.g. a shirt on a clothesline, a hanging dead rabbit, a flaccid penis) to move/be-located'
-qput- 'for loose dry dirt to move/be-located'
-sťaq̇- 'for runny icky material (e.g. mud, manure, rotten tomatoes, guts, chewed gum) to move/be-located'

Atsugewi expressions of motion with conflated Figure

a. locative suffix: -ik· 'on the ground'
Cause prefix: uh- 'from "gravity" (an object's own weight) acting on it'
inflectional affix-set: ´- w- -ª '3d person subject (factual mood)

/´w-uh-sťaq̇-ik -ª => [ẇosťaq̇íḱ·a]

Literal: 'Runny icky material is located on the ground from its own weight acting on it'
Instantiated: 'Guts are lying on the ground'

b. directional suffix: -iċt 'into liquid'
Cause prefix: ca- 'from the wind blowing on the Figure'
inflectional affix-set: ´- w- -ª '3d person subject (factual mood)'

/´-w-ca-sťaq̇-iċt-ª/ => [ċwasťaq̇íċ ta]

Literal: 'Runny icky material moved into liquid from the wind blowing on it'
Instantiated: 'The guts blew into the creek'

c. directional suffix: -cis 'into fire'
Cause prefix: cu- 'from a linear object, moving axially, acting on the Figure'
inflectional affix-set: s- ´- w- -ª 'I-subject, 3d person object (factual mood)'

/s-´-w-cu-sťaq̇-cis- ª/ => [sċusťáq̇cʰa]

Literal: 'I caused it that runny icky material move into fire by acting on it with a linear object moving axially'
Instantiated: 'I prodded the guts into the fire with a stick'

2.3.4 Same Pattern for Body Part / Garment Motion

mainly in English: body part Figure treated as direct object within standard conflation pattern
I held my hand over the fire / laid my head on the pillow
pulled my arm back out of the cage / put my ear against the wall / stuck my tongue out
rarely in English: body part Figure expressed in the verb
I stepped onto the curb / leaned out the window / reached toward the ceiling
all Atsugewi body part motion / location is of this latter type

Similarly in English for a garment Figure:
I have a hat on / put my shirt on / took my shoes off / put a coat on her
vs. I booted up / I shod the horse
all Atsugewi garment motion / location is of this latter type

Atsugewi wholly lacks verbs of 'object maneuvering' like English
hold, put (in), take (out);
have, give (to), take (from);
carry, bring (to), take (to);
throw, kick, bat (away);
push, pull (along)

2.4 Other Conflation Patterns

2.4.1 Motion + Ground—Unrealized

e.g., the English verb root *-plane* as in:
emplane, 'move onto a plane' / deplane, 'move off of a plane'
a full system, though, would further call for: circumplane / transplane
as well as, say: enhouse / dehouse / circumhouse / transhouse
but no language with a characteristic—or even minor—system of this sort is apparent

2.4.2 Motion + two semantic components—Only as a Minor System

e.g., English MOVE + Path + Ground (agentive):
to shelve, 'MOVE [Figure] onto a shelf': I shelved the books.
to box, 'MOVE [Figure] into a box': I boxed the apples

or English Figure + MOVE + Path (agentive):
to powder, 'MOVE powder onto': She powdered her nose.
to scale, 'MOVE scale off of': I scaled the fish.
but this pattern does not occur as a language's most characteristic system—perhaps because it would require enormously many distinct lexical items

2.4.3 Motion + no further semantic component—unrealized

this pattern would entail that the same single verb appear in all Motion sentences—or that one verb meaning 'MOVE' appear in all motion sentences
and one verb meaning 'BE-LOC' appear in all locative sentences
apparently no languages have this as a characteristic pattern, perhaps due to its inefficiency

But some languages do have a single recurrent verb 'BE-LOC' for all locative sentences, e.g., Spanish: *estar*

Note: other languages of the Spanish Path-conflating type, e.g., Halkomelem,
do have a set of distinct locative site verbs: 'be in', 'be on', etc.
Note: English, beside its locative *be*, does have locative Coevent-conflating verbs,
e.g., lie, sit, stand, lean, hang, surround, abut, flank

2.4.4 Motion + a minimally differentiated semantic component

Certain major systems do exist that approach the zero-conflation type.
Here, Motion does conflate with another component of the Motion event,
but where only two or three distinctions pertaining to that component are represented

Southwest Pomo conflates MOVE with the Figure, but only for 3 distinctions of number
—not for numerous distinctions of type, as in Atsugewi
-w / -?da / -p^{h}il
mean, respectively, 'for one/two or three/several together … to move'
These three roots appear recurrently in verbs referring to Motion events.

2.4.5 Split system of conflation

e.g., Spanish: Motion + zero conflation for locative event
Motion + Path conflation for motion event with a boundary crossing
Motion + Co-event conflation for motion event without a boundary crossing
Note: the latter distinction, proposed by Aske and Slobin, seems a first approximation, not fully correct

2.4.6 Parallel system of conflation

Here, a language can use different, equally colloquial, conflation patterns for the *same* type of Motion event.
Modern Greek has this arrangement for non-/self-agentive motion events, shown here for 'entry':

a. etreksa mesa (s-to spiti)
I-ran in (to-the house [ACC])
'I ran in (-to the house).'

b. bika (trekhondas) (s-to spiti)
I-entered (running) (to-the house [ACC])
'I entered (the house) (running).'

3. Semantic Components of a Motion Event Characteristically Appearing in a Language's Satellite

a satellite (to the verb) (Sat) = any constituent other than a
noun-phrase or prepositional-phrase complement that is in a sister relation to the verb root
It relates to the verb root as a dependent to a head.
Either bound affix or free word, it encompasses:
English verb particles, German separable and inseparable verb prefixes,
Latin or Russian verb prefixes, Chinese verb complements,
Lahu non-head "versatile verbs" Caddo incorporated nouns,
Atsugewi polysynthetic affixes around the verb root

verb complex = verb root +all occurring satellites
English verb complex can have up to 4 satellites:
Come ← right ← back ← down ← out from up in there!
(said, e.g., by parent to child in treehouse)

main typological category of a language determined by:
the components of a Motion event that appear in its verb root
subcategorization of this typology: of its remaining components, the ones appearing in its satellite

3.1 Path

characteristically in English, with the Co-event in the verb, Path appears in the satellite + preposition
e.g., the concept of a path from the interior of some enclosure to its exterior
is expressed by (F = Figure; G—Ground; PP in parens is deletable if G is deictic/anaphor)

F... ← out (of > G)
e.g., [I stood inside the house and then] I ran out (of it).

3.1.1 Main English Path Satellites

—here shown with associated preposition and Ground nominal deleted

I ran *in*.	He ran *across*.	It flew up_1.
I ran *out*.	He ran *along*.	It flew *down*.
I climbed *on*.	He ran *through*.	I went *above*.
I stepped off_1.	He ran *past/by*.	I went *below*.
He drove off_2.	She came $over_1$.	I ran up_2 (to her).
I stepped *aside*.	It toppled $over_2$.	She followed along *after* (us).
She came *forth*.	She spun $around_1$.	They rolled *apart*.
She walked *away*.	She walked $around_2$.	They slammed *together*.
He went *ahead*.	She walked (all) *about*.	
He came *back*.		

3.1.2 Additional English Path Satellites

F ... < -loose	(from > G)	The bone pulled loose (from its socket)
F ... < -free	(from > G)	The coin melted free (from the ice)
F ... < -clear	(of > G)	She swam clear (of the oncoming ship)
F ... < -stuck	(to > G)	The twig froze stuck (to the window)
F ... < -fast	(to > G)	The glaze baked fast (to the clay)
F ... < -un-	(from > G)	The bolt must have unscrewed (from the plate)

F ... < -over-	ø >G	The eaves of the roof overhung the garden
F ... < -under-	ø >G	Gold leaf underlay the enamel
G ... < -full	(of > F)	The tub quickly poured full (of hot water)

3.2 Path + Ground

3.2.1 Rare English examples

< -home 'to one's [the subject's/object's] home'; <l-shut 'to across an aperture'

a. She drove him *home* (to her / his cottage in the suburbs)
b. The gate swung *shut* (across the entryway)

3.2.2 As One of the Main Satellite Types in Atsugewi

Path + Ground satellites in Atsugewi Subdividing English 'into'

-iċt	'into a liquid'
-cis	'into a fire'
-isp -u· +	'into an aggregate' (e.g. bushes, a crowd, a rib-cage)
-wam	'down into a gravitic container' (e.g. a basket, a cupped hand, a pocket, a lake basin)
-wamm	'into an areal enclosure (e.g. a corral, a field, the area occupied by a pool of water)
-ipsn^{u} +	'(horizontally) into a volume enclosure' (e.g. a house an oven, a crevice, a deer's stomach)
-tip -u· +	'down into a (large) volume enclosure in the ground' (e.g. a cellar, a deer-trapping pit)
-ikn +	'over-the-rim into a volume enclosure' (e.g. a gopher hole, a mouth)
-ikc	'into a passageway so as to cause blockage' (e.g. in choking, shutting, walling off)
-iḱs^{u} +	'into a corner' (e.g. a room corner, the wall-floor edge)
-mik·	'into the face/eye (or onto the head) of someone'
-miċ	'down into (or onto) the ground'
-cis^{u} +	'down into (or onto) an object above the ground' (e.g. the top of a tree stump)
-iḱs	'horizontally into (or onto) an object above the ground' (e.g. the side of tree trunk)

3.3 Patient: (Figure/)Ground

"noun incorporation" = a satellite in the verb complex referring to the Figure/Ground of a Motion event or the Patient of a non-Motion event

examples in Caddo, whose verb root characteristically conflates Motion+Path

a. yak-cah-yih *nisah-ya-?ah* => [dahcahih tisay?ah]
woods-edge-LOC house-be-TNS
Literally: 'At woods edge it-house-is'
Loosely: 'The house is at the edge of the woods'

b. wá·kas na-*yawat*-yá-ynik-ah => [wa.kas taywacaynikah]
cattle PL-water-enter-PAST
Literally: 'Cattle water-entered'
Loosely: 'The cattle went into the water'

c. *nisah*-nt-káy-watak-ah => [tisánčáywakkah]
house-penetrate/traverse-PAST
Literally: 'He-house-traversed'
Loosely: 'He went through the house'

3.4 Manner

examples in Nez Perce, whose verb root characteristically conflates Motion+Path

/hi-	ququ.-	la hsa	*-e/* => [hiqqolahsaya]
3d person	galloping	go up	PAST

Literally: 'He/she ascended galloping'
Loosely: 'He galloped uphill'

partial list of Nez Perce Manner satellites (prefixal to the verb root)
?ipsqi- 'walking'
wilé.- 'running'
wat- 'wading'
siwi- 'swimming-on-surface'
tuk^{w}e- 'swimming-within-liquid'

we.-	'flying'
tu.k'e-	'using a cane'
ceptukte-	'crawling'
tuk'weme	'(snake) slithering'
wu.l-	'(animal) walking/(human) riding (on animal at a walk)'
ququ′.-	'(animal) galloping/(human) galloping (on an animal)'
tiq'e-	'(heavier object) floating-by-updraft/wafting/gliding'
?iye′.-	'(lighter object) floating-by-intrinsic-buoyancy'
wis-	'traveling with one's belongings'
kipi-	'tracking'
tiw'ek-	'pursuing (someone: D.O.)'
cu′.-	'(plurality) in single file'
til-	'on the warpath/to fight'
qisim-	'in anger'

3.5 Cause

the set of Cause satellites (prefixal to the verb root) in Atsugewi, whose verb root conflates Motion+Figure and satellite suffix conflates Path+Ground

Atsugewi Cause satellites (*P = the Patient, E = the Experiencer*)

natural forces

<-ca-	'from the wind blowing on P'
<-cu-	'from flowing liquid acting on P' (e.g., a river on a bank)
<-ka-	'from the rain acting on P'
<-ra-	'from a substance exerting steady pressure on P' (e.g. gas in the stomach)
<-uh-	'from the weight of a substance bearing down on P' (e.g. snow on a limb)
<-miw-	'from heat/fire acting on P'

objects in action

< -cu-	'from a linear object acting axially on P' (e.g. as in poking, prodding, pool-cueing, piercing, propping)
< -uh-	'from a linear object acting circumpivotally (swinging) on P' (as in pounding, chopping, batting)

< -ra- a. 'from a linear object acting obliquely on P' (as in digging, sewing, poling, leaning)
b. 'from a linear/planar object acting laterally along the surface of P' (as in raking, sweeping, scraping, plowing whittling, smoothing, vising)
< -ta- 'from a linear object acting within a liquid P' (as in stirring, paddling)
< -ka- 'from a linear object moving rotationally into P' (as in boring)
< -mi- 'from a knife cutting into P'
< -ru- 'from a (flexible) linear object pulling on or inward upon P' (as in dragging, suspending, girding, binding)

body parts in action

< -tu- 'from the hand(s)-moving centripetally-acting on P' (as in choking, pinching)
< -ci- 'from the hand(s)-moving manipulatively-acting on P'
< -ma- 'from the foot/feet acting on P'
< -ti- 'from the buttocks acting on P'
< -wi- 'from the teeth acting on P'
< -pri- 'from the mouth-working ingressively-acting on P' (as in sucking, swallowing)
< -phu- 'from the mouth-working egressively-acting on P' (as in spitting, blowing)
< -pu- 'from the lips acting on P'
< -hi- 'from any other body part (e.g. head, shoulder) or the whole body acting on P'

sensations

< -sa- 'from the visual aspect of an object acting on E'
< -ka- 'from the auditory aspect of an object acting on E'
< -tu- 'from the feel of an object acting on E'
< -pri- 'from the taste/smell of an object acting on E'

4. Chart of the Motion Event Typology

TABLE 1.12 *Typology of Motion verbs and their satellites*

Language/language family	**The particular components of a Motion event characteristically represented in the:**	
	Verb root	Satellite
Romance Semitic Polynesian	Motion + Path	ø
Nez Perce		Manner
Caddo		(Figure/)Ground [Patient]
Indo-European (not Romance) Chinese	Motion + Co-event	Path
Atsugewi (most northern Hokan)	Motion + Figure	a. Path + Ground b. Cause

5. Salience in the verb complex

apparent general principle: a concept is relatively foregrounded in attention in an NP and backgrounded in a V root or satellite

English, with its Coevent verb and Path satellite, can background Manner/Cause and Path Atsugewi, with its V root and satellites, can background Figure, Cause, Path, and Ground

/´-w-ca-staq-ict-ª/ => [cwastaqi´ . 'c ta]
—from wind-blowing —icky matter-moved —into-liquid—Factual
Cause .....] Figure .....] Path + Ground

English sentences equivalent in information but not in backgroundedness:

a. Some icky matter blew into some liquid
b. The guts blew into the creek

English sentence equivalent in backgroundedness but not in information:
It blew in.

6. Extensions of the Co-event conflation pattern

6.1 Conflation onto mid-level verbs based on BE_{LOC} or MOVE

a. GIVE: [A_1] $_A$MOVE [F] into the GRASP of [A_2]
[I GAVE him another beer] WITH-THE-MANNER-OF [I slid the beer] => I slid him another beer.

b. PUT: [A] controlledly $_A$MOVE [F] by limb motion but without body translocation
[I PUT the hay up onto / down off of the truck] WITH-THE-CAUSE-OF [I forked the hay]
=> I forked the hay up onto / down off of the truck.
(**I forked the hay to my neighbor's house down the block* shows that *fork* is based on PUT, not on $_A$MOVE)

6.2 Conflation onto combinations of MOVE with matrix verbs

a. GO: [A] AGENT himself [i.e., his whole body, = F] to MOVE
[the child WENT down the hallway] WITH-THE-MANNER-OF [the child hopped]
=> The child hopped down the hallway.
Similarly: I ran into the house.

b. GET: [A_1] INDUCE [A_2] to GO
[I GOT him out of his hiding place] WITH-THE-CAUSE-OF [I lured / scared him]
=> I lured/scared him out of his hiding place.
Similarly: I talked him down off the ledge.
I prodded the cattle into the pen.
They smoked the bear out of its den.

c. URGE: [A_1] AIM to GET [A_2] = [A_1] AIM to INDUCE [A_2] to GO
[I URGED her away from the building] WITH-THE-CAUSE-OF [I waved at her]
=> I waved her away from the building.
Similarly: I beckoned him toward me.
I called him over to us.

6.3 Conflation onto metaphorically extended MOVE

Motion-like change of state constructions
non-agentive
a. "MOVE": [F] MOVE metaphorically (i.e., change state)
[he "MOVED" to death] WITH-THE-CAUSE-OF [he choked on a bone]
(=> He died from choking on a bone.—or:)
=> He choked to death on a bone.

b. BECOME: "MOVE" in the environment: __Adjective
[the shirt BECAME dry] WITH-THE-CAUSE-OF [the shirt flapped in the wind]
(=> The shirt dried from flapping in the wind.—or:)
=> The shirt flapped dry in the wind.
Similarly: The tinman rusted stiff.
The coat has worn thin in spots.
The twig froze stuck to the window.

c. FORM: [F] "MOVE" into EXISTENCE (cf. the phrase *come into existence*)
[a hole FORMED in the table] WITH-THE-CAUSE-OF [a cigarette burned the table]
=> A hole burned in the table from the cigarette.

agentive
d. "$_A$MOVE": [A] AGENT [F] to "MOVE"
[I "$_A$MOVED" him to death] WITH-THE-CAUSE-OF [I choked him]
(=> I killed him by choking him.—or:)
=> I choked him to death.
Similarly: I rocked/sang the baby to sleep.

e. $_{A}$BECOME = MAKE$_1$: "$_{A}$MOVE" in the environment: __Adjective
[I MADE$_1$ the fence blue] WITH-THE-CAUSE-OF [I painted the fence]
=> I painted the fence blue.

f. $_{A}$FORM = MAKE$_2$: [A] AGENT [F] to "MOVE" into EXISTENCE (cf. the phrase *bring into existence*)
[I MADE$_2$ the cake out of fresh ingredients] WITH-THE-CAUSE-OF [I baked the ingredients]
=> I baked a cake out of fresh ingredients.
Similarly: I knitted a sweater out of spun wool.
I hacked a path through the jungle.
The mouse chewed a hole through the wall.

6.4 Conflation across the various relations of the Co-event to the Motion event

a. **Precursion**

[glass MOVED onto the rug] WITH-THE-PRECURSION-OF [the glass splintered]
Glass splintered onto the rug.
[I $_{A}$MOVED the seeds into the testube] WITH-THE-PRECURSION-OF [I ground the seeds]
I ground the seeds into the testtube.

b. **Enablement**

[could you $_{A}$MOVE that bottle down off the shelf] WITH-THE-ENABLEMENT-OF [you reach to / grab the bottle]
Could you reach / grab that bottle down off the shelf?
[I $_{A}$MOVED jellybeans into her sack] WITH-THE-ENABLEMENT-OF [I scooped up the jellybeans]
I scooped jellybeans up into her sack.

c. **Reverse Enablement**

[I $_{A}$MOVED the sack to an open conformation] WITH-THE-REVERSE-ENABLEMENT-OF [(someone) had tied the sack]

Ich habe den Sack aufgebunden.
I have the sack open-tied
"I untied the sack and opened it."

[I $_{A}$MOVED the dog TO FREENESS] WITH-THE-REVERSE-ENABLEMENT-OF [(someone) had chained the dog]

Ich habe den Hund losgekettet.
I have the dog free-chained
"I set the dog free by unchaining it."

d. **Cause**
onset:

[our tent MOVED down into the gully] WITH-THE-ONSET-CAUSE-OF [a gust of wind blew on the tent]
Our tent blew down into the gully from a gust of wind.

[I $_{A}$MOVED the puck across the ice] WITH-THE-ONSET-CAUSE-OF [I batted the puck]
I batted the puck across the ice.

extended:

[the water MOVED down to the midline of the pot] WITH-THE-EXTENDED-CAUSE-OF [the water boiled]
The water boiled down to the midline of the pot.

[I $_{A}$MOVED the toothpaste out of the tube] WITH-THE-EXTENDED-CAUSE-OF [I squeezed on the toothpaste/tube]
I squeezed the toothpaste out of the tube.

e. **Manner**

[the top MOVED past the lamp] WITH-THE-MANNER-OF [the top spun]
The top spun past the lamp.

[the frond MOVED into its sheath] WITH-THE-MANNER-OF [the frond curled up]
The frond curled up into its sheath.

[I $_{A}$MOVED the mug along the counter] WITH-THE-MANNER-OF [I slid the mug]
I slid the mug along the counter.

f. **Concomitance**

[she WENT to the party] WITH-THE-CONCOMITANCE-OF [she wore a green dress]
She wore a green dress to the party.

[I WENT past the graveyard] WITH-THE-CONCOMITANCE-OF [I whistled]
I whistled past the graveyard.
cf. I read comics all the way to New York.

g. **Concurrent Result**

[the door MOVED TO A-POSITION-ACROSS-AN-OPENING] WITH-THE-CONCURRENT-RESULT-OF [the door slammed]
The door slammed shut.

[the rocket MOVED into the water] WITH-THE-CONCURRENT-RESULT-OF [the water splashed]
The rocket splashed into the water.

h. **Subsequence (including: Consequence / Purpose)**

[I will GO down to your office] WITH-THE-SUBSEQUENCE-OF [I will stop at your office]
I'll stop down at your office (on my way out of the building).

[I will GO in [to the kitchen]] WITH-THE-SUBSEQUENCE-OF [I will look at the stew cooking on the stove]
I'll look in at the stew cooking on the stove.

[they $_{A}$MOVED the prisoner into his cell] WITH-THE-SUBSEQUENCE-OF [they locked the cell]
They locked the prisoner into his cell.

(with PLACE: [A] PUT [F] TO [G])

[I PLACED the painting down on the table] WITH-THE-SUBSEQUENCE-OF [the painting lay (there)]
I laid the painting down on the table.

Similarly:
I stood/leaned/hung the painting on the chair/against the door/on the wall.

Comparably:
I sat down on the chair.

6.5 Multiple conflation

a. [could you GIVE me the flour]
WITH-THE-ENABLEMENT-OF [you $_{A}$MOVE the flour down off the shelf],
WITH-THE-ENABLEMENT-OF [you reach$_1$ to it with your free hand]?

=> [could you GIVE me the flour,]
WITH-THE-ENABLEMENT-OF [you reach$_2$ the flour down off that shelf with your free hand?]
=> Could you reach$_3$ me the flour down off that shelf with your free hand?

Similarly: [I $_{A}$MOVED a path through the jungle]
WITH-THE-ENABLEMENT-OF [I FORMED a path (==> *out*)]
WITH-THE-CAUSE-OF [I $_{A}$MOVED STUFF away]
WITH-THE-CAUSE-OF [I hacked at the STUFF with my machete]
=> I hacked out a path through the jungle with my machete.

b. [the prisoner SENT a message to his confederate]
WITH-THE-MANNER-OF [the prisoner $_{A}$MOVED the message along the water pipes]

WITH-THE-ENABLEMENT-OF [the prisoner FORMED the message (==> *out*)]

WITH-THE-CAUSE-OF [the prisoner tapped on the water pipes]

=>The prisoner tapped out a message along the water pipes to his confederate.

LECTURE 9

A Typology of Event Integration in Language

In case anybody heard the talk yesterday afternoon, this is going to be a generalization of that. That talk was about how languages expressed events of motion. To introduce the present topic, let me give an example of two ways to express the same event of motion, both in English. On the one hand, you might say something like *The rock moved down the hill, bouncing in the process* or *moved down the hill as it bounced*, something like that. It is not great English, but it's possible. As against *The rock bounced down the hill*. The first of these has two separate clauses, namely: *the rock bounced* or *the rock moved down the hill*, that is the event of motion, the translational motion, where I'm going to call the rock the Figure, and the hill would be the Ground. It's occupying the main clause, so this first version is a complex sentence, in the traditional terminology, which consists of a main clause and a subordinate clause, with a relationship between the two. The main clause is something like *the rock moved down the hill* and then something like *the rock was bouncing in the process* as the subordinate clause which I call 'co-event'.

The first thing with the motion of event proper. The second is the co-event, which could be in some relationship to the motion of event. It could have the relationship of manner, of cause, and a number of others, precursion and so forth. What typically happens in an English type of language and in Chinese is that (I'm not suggesting this happens cognitively) in effect, the verb from the co-event, in this case *bounce*, moves over, jumps over and combines with the move verb, as if you are getting *move while bouncing*, all of which conflates into a single surface verb *bounce*, and you wind up with the single clause: *the rock bounced down the hill*. It turns out that this is a major pattern where the same circumstance, the same situation, can be represented in two different ways: either as a complex sentence consisting of a main clause and subordinate clause with the relationship from one to the other, which in effect represent a motion

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event, a co-event and the relationship between them; or the whole thing can conflate, it's the term I use, into a single clause. The same circumstance can be represented either as a complex sentence or as a simple, single clause into which all the relevant information has been collapsed into a single form. I'm calling this kind of situation a macro-event. A macro-event is one that could be analyzed to consist of a main event and a subordinate event with a relationship, or as a collapsed, single event. That's the macro-event. It turns out that, in a sense, that's what we dealt with in the last talk. Then I only spoke about a motion event, an event like *the rock moved down the hill*, but this whole relationship between a complex sentence or event structure and the single clause or collapsed event structure generalizes, and can be seen to hold for four further kinds of events: not only a motion event, like *the rock moved down the hill*, but also an event that I call temporal contouring (I'll be going through each of these in turn), change of state, something I'm calling action correlating and finally something I'm calling realization. It turns out that all five of these types of circumstance behave alike in a certain way.

Let me start with the motion event, the first type. The motion event is probably the prototype and the others seem to follow it. Languages seem to model the additional four types of main events on the motion event in some kind of abstract metaphorical way.

It turns out that all of these five types exhibit a kind of two-way typology. Languages largely fall into two categories on the following basis. By the way, for a motion event like *the rock moved down the hill*, there will be a framing event, the co-event, and the relation the co-event has to the framing event, so that's my new term which generalizes over motion. The framing event is now going to cover motion and all the other four things I mentioned. Within this framing event, I'll now use the motion event as an example, there's a special portion of it, which I call the core schema, which consists either of the path alone or the path together with the ground. The motion event consists of the figure, factive motion, the path and the ground object. The typology that I'm proposing depends on where this core schema shows up in a language characteristically. There are two main places where it shows up characteristically: either in the verb, and I will call languages of that sort a verb-framed language, or it shows up in a satellite, and I'm going to call that a satellite-framed language, English and Chinese are satellite-framed. Satellite-framed languages include most Indo-European languages, that's English and all the familiar European languages except for Romance. It includes: Finno-Ugric, languages like Finnish and Hungarian. It includes Chinese but you're welcome to argue with me about this, and it includes Ojibwa, several other American Indian languages, and several other languages. It is probably the second most common

typological category in this typology. The other one is probably the commonest one, the verb-frame language. The verb-frame languages include Romance languages such as Spanish, and Polynesian and Semitic and Japanese and Korean. It's probably the most extensive. Again, they are determined by where the core schema shows up. I will be illustrating all this in a second; I'm just doing a little bit of an introduction in an abstract way.

The core schema can either show up in the verb in the surface sentence or it shows up in a satellite. What is a satellite? A satellite is a constituent that is in an immediate construction with the verb root, that's not a noun phrase or a prepositional phrase. It would be a particle-like example in English, *to run in*, or *run down*, or *run up*, those are satellites. In Chinese, they would be the second verb, the resultative verb, I will call that a satellite.

Let me start then to progress through these five different types. I'll start with the basic one, the prototype one, which is exactly what I covered yesterday. I'll just give a shortened version of what I dealt with extensively yesterday. That's the case where the framing event is in fact a motion event, an event of motion or of location, either one. I'll contrast systematically throughout this talk the two language types, the two typological types: a language which is satellite-framed and a language which is verb-framed. For example, you can take the English sentence, which is satellite-framed, *The bottle floated into the cave*. Here is the cave, here is some water, here is a bottle and it floated into the cave. Here the satellite is *in* or *into*. Typically, if you do it right, it's the satellite plus preposition, which is collapsed in this case into *into*. So *into* represents this geometric path: from outside the enclosure to in the enclosure. That's *into*. With the core schema represented in this satellite, you can ask where is the co-event. The co-event in this case is 'floating'. The full sentence, the sentence regarded as a complex sentence, would be something like *the bottle moved into the cave* with the manner of *the bottle was floating, the bottle was floated on the water*. You take this floating thing, jump it over here to 'move', and you end up saying *The bottle floated into the cave*, so the co-event has the floating thing, and in this case has the relationship of manner to the framing event. It shows up in the verb. In a satellite-framed language, the path, in the case of a motion event, characteristically shows up in the satellite like 'floated *in*'; the *in* part and the co-event, the floating part, show up in the verb. This much is just like Chinese.

Now you look to Spanish or to Japanese, and they cannot say it this way. In Spanish, to capture the same meaning, they must say *The bottle entered to the cave floating*. In Spanish—my accent is not great but here it is—it is something like *La botella entró a la cueva flotando*. You can stick *flotando* inside to make it a single clause, you can say: *La botella entró flotando a la cueva* (*the bottle*

entered floating to the cave.) That's the same way. What they've done is to put the path, which is the core schema for a motion event, into the verb. The verb means 'to enter'. That's why I call it verb-framed. English is satellite-framed: the path shows up in the satellite, *the bottle floated in*, that's the satellite, and in Spanish it's *the bottle entered*, so the path shows up in the verb. So English has path satellite, Spanish has path verb. And then, since they have occupied the verb with the path, you can ask where the co-event has gone. The English co-event is in the verb, but the verb is now occupied. In Spanish the co-event goes into some kind of gerund type of form like *flotando* (floating), or it could be some kind of prepositional phrase, or just dropped, because it's kind of awkward to include.

This is an example where there is no agent, and what I am calling the support relation, the relation of the subordinate event to the main event, the co-event to the framing event, is one of manner. You can also have one where the subordinate relation is one of cause, so an example in English would be: *The bone pulled loose from its socket*. Here is the bone, here is the socket, *The bone pulled out of its socket*. Again, if you think of this in terms of the complex sentence format, then it would be a structure something like *The bone moved out of its socket* WITH THE CAUSE OF, (that's the support relation), *something external pulled on the bone*. Again, as in the English style, I'm not saying this actually happens, it's as if the verb from the co-event jumps over and combines in the main event and you get *The bone pulled out of its socket*, a perfectly good English sentence. Spanish, again, cannot say that. English is putting the path part in the satellite, *The bone moved <u>out</u>*, it's the 'out' part, and the co-event is showing up in the verb *The bone <u>pulled</u> out of its socket*. In Spanish, since it's verb-framed, you put the framing constituent, the core schema, in this case the path, into the verb. The verb in Spanish is going to be 'went out', it's *se salió*, it is this spacial concept. It means 'it moved out' all in a verb, the special verb form *to move out*. You say *El hueso se salió*. The bone moved out, exited from its place, *de su sitio*. Now the co-event is going to be expressed elsewhere in this case.

These two sentences were without an agent. The same phenomenon takes place if you add the whole agentive semantic complex, where there's an agent who performs certain actions which then bring about these same things I've been talking about, whether the complex event or the simplex event, the conflated event. With the support relationship of manner, you can have something in English like *I rolled the barrel out of the storeroom*. Seen as a complex construction, it would be something like I $_{A}$MOVED, I agentively moved, (I write capital moved with the capital subscript A to show it is not autonomous but agentive). *I moved the barrel out of the storeroom*. This is the motion event with THE MANNER OF, again manner, *I rolled the barrel* or *the barrel rolled* (either

one, I don't care.) Again, we can take the 'roll', put it in here, we get *I rolled the barrel out of the storeroom*. Just to make sure we know what the English sentence means: here is a storeroom, here is a barrel, I go like that with the barrel. As I roll it, it moves out of the storeroom. That's what the sentence means. Spanish, again, has to put the core schema, the path, in the verb and they have the verb which means to agentively move out, to cause to move out, which is *sacar*. You can say I extruded, in English this means something like 'cause to move out'. *So I extruded the barrel from the storeroom, rolling it*. It is *Saqué el barril de la bodega rodándolo* (rolling it).

One more example. We've got the agent, now we'll try one where the support relationship is one of cause. The English sentence would be something like *I kicked the ball into the box*. Seen as a complex, it's something like I agentively moved, I caused to move, the ball into the box WITH THE CAUSE OF I kicked the ball. Then you get *I kicked the ball into the box*, and that's the conflated, single clause way we have of saying this otherwise rather complex construction or conception. Again, English puts the core schema, in this case the path of the motion event, into the satellite, *in*. Spanish, once again, puts the path in the verb. They have an agentive path verb which means 'to cause to enter', and would be *meter. Metí la pelota a la caja de una patada*, with a kick. It means *I inserted the ball to the box with a kick.* But it doesn't mean quite the same thing as English *insert*. This is in a fact a recap of yesterday's talk. Now it's just forming one portion of a five-way pattern.

Let's move on to number two, which is temporal contouring. Temporal contouring is essentially the same thing as aspect, but I have devised a special term to refer to the case where aspect, in other words, temporal pattern, can be conceptualized as a separable event in its own right, and represented separately by, for example, the verb. Here we have a really extensive and beautiful contrast between a verb-framed language and a satellite-framed language, between Spanish and German. English doesn't do so well here. I mean English is mixed, since English borrows so many Romance words like *to exit, to enter, to cross, to pass* and so forth. The reason is because it borrowed them from Romance where this the native type.

English also has borrowed some aspectual verbs from Romance like *to continue*, and *to finish*, and *to used to* and so forth. English is a kind of mixed type, but German is pretty pure. We are going to find that Spanish uses the main verb to express the temporal contour (ten of them are listed here, I'm not going to go through all ten), and in each case, German uses something other than verbs, uses either a true satellite or at least something outside the verb, like an adverb. The easiest one to look at is *I finished writing the letter*. Because English in this case has both forms, in English you can usually say *I finished writing the*

letter or *I wrote the letter to completion* or *I wrote the letter to a finish*. We have both styles, whereas Spanish has only the first, and German has only the second. In this case, Spanish has a verb 'to finish', *terminar*, so we can say *Terminé de escribir la carta*. (I finished from writing the letter.) German would have to say: *Ich habe den Brief fertiggeschrieben* (I wrote the letter to completion). The *fertig* there is a satellite, a true satellite; it's showing up as a prefix to the verb *schreiben* write, so it means 'I completion-wrote the letter', something like that.

The second type is 'to again', 'to repeat'. Again Spanish expresses the notion of iteration, of repeating something, in its main verb. It's again a verb-framed language. If you want to say *I saw him again*, you'd say *Lo volví a ver*. (I repeated to see him.) Literally, *I returned to see him*. *I repeated to see him*. German, which is satellite-framed, will place the repeat notion in the satellite, and you would say: *Ich habe ihn wiedergesehen*. (I have him reseen, again seen.) The *re-* in English is a perfect example, the *re-* is a satellite, it is a separate morpheme which indicates repetition. In this case, English has that kind of thing. A third type: in English you might say something like *I just ate*. While that aspectual concept is expressed in Spanish as a main verb, it's *acabar de*. You say *Acabo de comer*. (I have just to eat.) You cannot say it in English. In German, it would be *Ich habe gerade gegessen* (I have just eaten), so pretty much the same as English. In any case, the concept of repetition shows up in the main verb in Spanish, but in the satellite in German, at least, not in the verb but in the adverb. Again, English has both types, you can say *She continues to sleep* or *she's still sleeping*. You can have both types. Spanish has to use, or at least has the option of using, the abstraction of using the main verb which is *seguir*, 'to follow', 'to keep on', 'to continue', so you have *Sigue durmiendo* (He continues to sleep). German would say something like *Er schläft noch* (He sleeps still).

The last one I will go through is the one that would mean 'habitually'. *I habitually eat meat*. Spanish has the whole verb which means 'to habitually', that's the verb *soler*. *Suelo comer carne* ('I habitually eat meat'); you cannot say this in English. German would have to say it again with an adverb: *Normalerweise,* (usually, as a rule) *esse ich Fleisch*. It happens that English has a specific construction, the simple present, which means this habitual *I eat meat* as opposed to *I am eating meat*. In the past, Spanish would use the same verb with the past form, *Solía comer carne*, and German would say *Früher habe ich immer Fleisch gegessen*, 'Previously, I always ate meat'. Here English has a special form *used to*, which is borrowed from a Romance verb.

We have a rather nice demonstration of how temporal contouring, a form of aspect, is following the same typological pattern that path is in an event of motion. Spanish, as we saw in a motion case, is a verb-framed language. It habitually puts the core schema in the verb. It did so when the core schema

was the path in an event of motion as we saw. It does it again, putting the temporal contour in the main verb, in an event of temporal contouring. Whereas German, which is pretty much like English, is a satellite-framed language, and it puts the temporal contour in the satellite. In all of these, I hope that you are thinking of parallels in Chinese, because as I understand it, a lot of aspectual markers are also placed in a second verb. In another words, Chinese is acting pretty much like German and English, it's consistent, if you agree that it is a satellite-framed. In the spacial cases, if you say something like *The ball rolled in*, I wouldn't try to say it, but I do know you say something like *The ball rolled* 进. The 进 is the *in* part, I mean, it is still functioning as a main verb, which is the crucial issue, and the second verb is starting to grammaticalize, starting to become something like the English satellite system. I mean, that's one of the big questions. But in any case, the path shows up in second position, and so does a lot of aspect as I understand in Chinese, like *I ate finished*, where 完 would be in the second position. It is in exactly the same second position as the *in* would go in. It's parallel.

The third kind of event is the event of change of state. The metaphor that languages seem to be operating by is that just as some Figure object can move from one Ground object to another, so some entity can change from one property to another, from one state to another; that seems to be the underlying abstractive metaphor. To start this off, it works better for English-speaking audiences if I do this, there are some state change constructions in English; *to death* is one of them, which look on the surface like a Path-Ground construction. It is easier to start with them because they more or less explicitly demonstrate this metaphorical parallelism between state change and location change. Here is an example which you can say two ways in English: one is, if you look at it from a more complicated way, *He 'moved' to death*, putting 'move' in quotes (it is in quotes, I hope, in my handout) to indicate that it's metaphorical. It's a metaphorical move, not a literal motion. *He moved to death* WITH THE CAUSE OF *he choked on the bone*. In English you say *on, He choked on the bone*. It means you get a bone stuck in your throat, you're choking so you can hardly breath. You could conflate each clause separately and say something like *He died; He moved to death from choking on the bone*, that's a two-clause way of saying it. Or you could take the choke verb once more, jump it over to the first clause and say something like *He choked to death on the bone*. In fact the *on the bone* thing is left there and the fact that it is *on* shows that it's triggered by the use of the verb *choke*, because *choke* idiosyncratically takes this preposition *on* in English. But in any case, you have these two kinds of *to death*. If you conflate it like that, you have the single clause representation. You can have a single clause like *He choked to death on the bone* and *to death*

indicates the state of change from life to death. How would Spanish represent this? English is representing the core schema now in the state change type of event; the core schema is now going to be the change of state. In the motion event it was the path, in the temporal contouring it was the temporal contour. And in the state change kind of event it's the change of state.

The change of state, the co-event, the core schema, shows up as a preposition plus noun. It is looking like the 'into the box' kind of construction. As usual in English, the co-event shows up in the satellite. So *he choked to death*, it's the core schema representing the framing event, the main event that happens, namely the guy died. Spanish, typically for its typological category, expresses the fact of the framing event, the core schema, in its verb. You have to say *He died*. There's no alternative to this: *he died*, that's what the verb has to say. In English, you could say *He choked*, but in Spanish you have to say *he died*. Then if you want to say the co-event, the cause of his death, you can add on this additional phrase, for example: *atragantado por un hueso*, 'choked by a bone'. Again, Spanish does it separately and I assume that Chinese does it like English, probably *choked die*, something like that. (Is that right?) Just to gradually break in, since English has *into death*, it turns out German has for the same concept a genuine satellite as an inseparable prefix on the verb root; it's the prefix *-er* and essentially it means 'to death'. If you stick it to *squeeze*, which is *stechen*, *erstechen* means 'squeeze someone to death'. That's the same as English, except it represents the satellite-framing of the result of the state change in this inseparable prefix.

Since we are on this, German has another one—I give it different subscript—which essentially translates 'into one's possession'. We do not have a nice English type construction for this. If you want to say something like it, the complex form is *The army moved the peninsula into its possession with the cause of it fought, it battled*. It is not good English to say *The army fought the peninsula into its possession*. It would be nice if we had that construction, but it's bad Rnglish. It turns out that English in this case is limited. It has to resort to a Spanish type of construction. All that English can say is that the army won the peninsula, and just stop there. But German does continue with the satellite-framed language type of construction. German says essentially 'The army fought the peninsula into its possession' *Die Armee hat* (*sich*) *die Halbinsel erkämpft.* Another example of that sort is 'The workers moved the pay raise into their possession with the cause of they struck'. You can't say in English '*The workers struck a pay raise into their possession'. It's not good English. You can say *The workers won a pay raise by striking*. So English has to switch to this Spanish type construction, it falls short here. But German goes right on with

the *er-* prefix, and says essentially 'the workers struck the pay raise into their possession', *Die Arbeiter haben sich eine Lohnerhöhung erstreikt*.

Let me do a bit more state change, a bit more systematically, with a particular kind of state change which is either going out of existence or coming into existence. The first state change would be from the presence to the absence, going from being in existence to out of existence. We will see that this kind of state change is expressed in a satellite-framed language in the satellite. Here English is pretty good. For example, one of the meanings of *out* in English as a satellite (everything is polysemous; the single morpheme here does have more than one meaning) is 'to extinguishment' for flames, fires, candles or lights. If you conceptualize the more complex form, you might say *The candle moved,* metaphorically *moved to extinguishment WITH THE MANNER OF it flickered or sputtered.* You can also say *The candle extinguished flickering*. (It is not good English.) Or you can do the usual satellite thing: put the co-event, the concept of flickering, into the main verb and say *The candle flickered out*. *Out* is a satellite that stands for 'into extinguishment'. That's what it means in this case. So *The candle flickered out* means 'the candle extinguished flickering as it did so, flickering in the process'. You can also have it with the support of the event of cause, so if you had 'The candle moved into extinguishment with the cause of something blew on it', like some wind, you can say *The candle blew out*. Just like the napkin can blow off the table. The candle extinguished as a result of the wind blowing on it. Spanish, of course, could not say this. They would have to put the extinguishment part, the core schema, the changed state, into the main verb. They would have to say the candle extinguished with whatever the manner or cause. You would have to say *La vela se apagó con el viento*, 'with the wind'. Again, it uses the verb to express its core schema, the change of state.

English has another nice example of going from presence to absence, *away*, which means 'gradually disappear due to some natural process'. You can say things like *The meat rotted away*, that means 'the meat moves gradually to disappearance with the cause of the meat was rotting'. If you had put a piece of meat on the table and come back three weeks later, all you are going to see is a brown stain, and you can say: *The meat rotted away*, which means 'disappeared gradually as the result of rotting'. Similarly, you can say *The hinge rusted away*. There was used to be a hinge on the door, it rusted and rusted and now is just a bunch of powder down there. *The picture faded away*: there was delineation on the picture frame, now you come back and see nothing there. *The elbows of my sleeve wore away* means 'they disappeared gradually from wear'. Wearing means abrasion. It makes a contrast with the Spanish. You can say something like *The leaves withered away*. It means they disappeared gradually by withering. All

that Spanish can say is *The leaves disintegrated by drying*. Again, they have to put the change state, the fact of disintegration, in the main verb. English is putting it in the satellite, *away*, the gone part is in *away*.

Maybe that's all for going out of existence. How about coming into existence? English also does this well. The satellite *up* has many different meanings. I think you're better off trying to isolate the separate meanings than bunching them all together as if there is one thing running through them. I doubt there is. One of the *ups* means *into existence*. For example, if you say *to xerox, to photocopy*, you have the original letter, and you want to make some copies, so you put it in the xerox machine. You can say *I xeroxed the original letter*. That's fine. But you cannot say *I xeroxed up the original letter*. But you almost must say *I xeroxed up three copies of the original letter*, meaning 'I created three copies of the original letter by xeroxing it'. The underlying thing is *I moved three copies into existence*, therefore 'moved up' with the cause of *I xeroxed the original.* So *I xeroxed up three copies*. Similarly, with *boil*, you cannot boil up some water because you haven't created anything, but you can boil up some coffee. You can create coffee by boiling water and coffee grounds. Similarly, *think up a plan* means 'to create a plan by thinking'. You can't 'think a plan'. In my quasi-translation, 'I moved a plan into existence', where into existence is represented by *up* as a satellite. 'I moved into existence a plan, with the cause of I thought about things'. So *I thought the plan up*. Again, Spanish couldn't say any of these things. I think that's enough for bringing into existence.

There is a whole set of things for satellite languages, which in this case are the interesting ones. The satellite-framed languages, like Chinese and English, are perhaps counterintuitive, because the second part is not a verb, it's a particle. It's like *up, away, out*, and that is the part of sentence that carries the weight of the whole framing event. That's what so strange about it, it's not the verb as you might have thought. Yes, it is the verb in Spanish that does all these things. But in Chinese, and more particularly in English, it is this little strange satellite, not the verb, which determines the argument structure and the aspect and the negation. It is determinative. That's why I call it the framing event, and it's the locus of the core schema of the whole framing event. I call it the framing constituent, and it's vital in the sentence, even though it is so innocuous. That's why it's kind of counterintuitive. Anyway, various of the satellite-framed languages, which include Russian and German and so forth, have rather peculiar framing event meanings tied up in their little particles.

First let me do one that contrasts with Spanish. There is another meaning of *up*, which in English means 'to destruction', with the dog chewing on the shoe. In English you can say *The dog chewed on the shoe for 20 minutes*. Here you say *chew on*. Here is the shoe, the dog chews on, chews, chews, and chews,

nothing happens to the shoe; no state change. But you can say *The dog chewed the shoe up in …* I think I have to step back for a few seconds, I want to first do the case where it means 'go out of existence', because I skipped one verb: *I ate the popcorn; I ate the popcorn up*. I just want to go back to that, because I use them later. This is *the log burned*, and *the log burned up*. This case is another one of the five *up* senses which means 'to consumption', 'to consumedness'. *The log burned for 20 minutes before I decided to put it out*, but *The log burned up in 30 minutes* means 'the log moved to consumedness with the cause of it's burned'. If you say the log is burned up in 30 minutes, it means it's gone, no more log. The same with popcorn, if you say *I ate the popcorn*. Here is a bowl of popcorn. If you say *I ate the popcorn for 20 minutes*, there is still popcorn. But if you say *I ate the popcorn up in 30 minutes*, no more popcorn. It means I moved it to consumedness, all gone. Let me return to the dog and the shoe. In English, you can say *The dog chewed on the shoe for 20 minutes*; but *The dog chewed the shoe up in 30 minutes*. It means 'the dog moved the shoe to a state of non-intactness with the cause of the dog chewed on the shoe', so we get the *chew* jumping over and you have *The dog chewed the shoe up in 30 minutes*.

German has a special satellite for this: *kaput*. Spanish, again, has to say something like *The dog destroyed the shoe chewing on it*, it has no alternative. In the first case, if you want to say *The dog chewed on the shoe for 20 minutes*, it's fine. Spanish uses its main verb for chewing, *mordisquear*, but as soon as you say *The dog chewed the shoe up in 30 minutes*, now Spanish has to change its verb, because the verb has to represent the framing event, which is now moving to a state of non-intactness. Spanish has to say *The dog destroyed the shoe chewing on it*. Let me just skip to the Russian example. Russian has all of its satellites as prefixes on the verb, they never leave the verb as separate morphemes. Russian has a very nice prefix, *za*, which is reflexive and means (this is all my translation) something like 'to get attentionally absorbed in something to such a degree that you miss something else that you would be otherwise concerned about'. That's what it means. For example, if the verb is *to read*, let's say you are reading along and someone calls your name and you don't respond, and all of a sudden you hear and you say *Oh, I'm sorry, za-čitat.* It means 'I got absorbed in reading to the point where I missed hearing you calling me'. Literally, it might be the framing event: 'I got attentionally engrossed to the point of missing you', that's all the *za* part, with the instantiation of 'I was reading', that's the co-event. Another example is 'walking at someone'. He was walking along and passed by the house because he kept watching someone in front of you. He actually walked by his own house because he was so absorbed in watching the person in front of him and he said *Excuse me, I got absorbed to the point of missing what I would be concerned with, with the cause of I was looking at*

something. So 'I looked myself into missing', something like that. I don't know if Chinese has that one. If you had it, it would be 'I look', with a second verb, 'looked missed' or something like that. (You can tell me if you have it.) I'm sure that you have many other interesting ones.

Languages are choosing to represent this. The agency performs some kind of actions, and the agent correlates her actions with those of the agency. There are several kinds of correlations. The correlation can be that she does it in concert with the agent, sort of like together. She does it in accompaniment with it, so this is the main thing but she is ancillary, secondary. She does it in imitation of the agency, so here the agency performs this action, she watches and imitates it. It could be she does it in surpassment. Here this agency does this action; she does the same action but better. And another fifth type we'll skip, because it's slightly complicated. The core event, the framing event, is the very process that this agent undergoes of putting this same or similar action into one or another kind of correlation with this action. That process of putting it into the correlation, that's the framing event. What shows up on the verb? That type of correlation of one of the five that I just mentioned shows up in the satellite in a satellite-framed language, and in the main verb in a verb-framed language. In a satellite-framed language the co-event is what shows up in the verb, it's this same pattern. For example, let's take 'in concert'. There would be things like *She sang along with him.* It means he's singing or it could be a record, and she sang along with the record. Here is a record, that's why I call it agency, because it doesn't have to be a living agent. Let's say my image is an old opera playing on a record, so she listens to the old opera, she sings along with the record.

Right now, it is 'together with'. Let's say *I played the melody together with him*, or *I jogged together with him*. That means we together form a unit, we are in concert, so *I jogged together with him* means we are co-equal. *I play the melody together with him*, we are co-equal, we are equal partners in the whole thing. Also *She sings together with me*, we're a duet. Spanish has a way to say that, 'accompany', *lo acompañé tocando la melodia* ('I accompanied him in playing the melody'). In English it's not a common word, it has a very specific meaning, but in Spanish, it just means the same as 'do together with' apparently. I'm moving through the series where the agent is progressively less integrated, at a greater remove from, the agency. This is where they are co-equal, 'in concert'. Next is 'in accompaniment', that's the second one we started off with. If I say *I jogged together with him*, we arranged the jogging program together. But if I say *I jogged along with him*, it means he's the main jogger, he's going to jog every day and I will join him sometimes. So *I jogged along with him* means I am somehow secondary, subsidiary. *She sang along with us*, 'sang along with us' means

we are a main group and she joined us as a secondary member. *I played the melody along with him*, He's the main guy and he's on the piano, I have my saxophone, I played along with him. That's where she sings along with the record.

The third one, English doesn't have, but German does, 'to imitate'. English here has to resort to the Spanish type of construction, and say *I imitated him in playing*. It's possible maybe you could say *I played along after him*, but that doesn't quite do it; but German does. They would say 'I played along after him' *Ich habe ihm die Melodie nachgespielt* (I to him the melody after-played), meaning *I played along after him*. The imitation notion is in the satellite to the verb again, it is a prefix. Spanish, of course, would say *I followed him in playing the melody*, *Lo seguí en tocar la melodía*.

Finally 'in surpassment of': English has 'to out-'. In this case, the satellite in English which represents this kind of correlation shows up in the prefix. So *I outplayed him* means 'I surpassed him in playing'. *I outplayed him. I outcooked him*. It means 'I surpassed him' at cooking. This particular construction doesn't permit you to bring along all the other arguments from the original construction. If you say *He played the melody*, you cannot say *I outplayed him the melody*, you can only say *I outplayed him*. I am not quite sure what the metaphor in action correlating is. Apparently, languages are treating the process of correlating your action with somebody else's as somehow metaphorically comparable to moving with respect to some reference object.

The fifth main type of framing is what I call 'realization', and this is where Chinese is the master. English doesn't have it that much. To set up the framework, there is a sequence of four degrees to which things can correlate to each other. 'Realization' is the idea that some event which is only potential gets realized, gets fulfilled; that's one kind of realization. Something that's only potential gets fulfilled. Another is something that is only assumed gets confirmed. I'm putting those both under the aegis of realization. The first type is without realization; there's no realization here, it's just straight, it's neutral to that.

We are going to have four different types of verbs. The first type of verb I call intrinsic fulfillment. An example would be in English the verb *kick, I kicked the hubcap*. The hubcap is the center of the car wheel, here is the hubcap, here is my foot, *I kicked the hubcap*. *Kick* in English means all of 'to volitionally thrust your leg and foot forward into impact with something else'. You have to kick something, it's basically transitive.

In this case, if you add a satellite, this satellite will give you an additional bit of information. It won't pertain to this kicking event itself; it would be something that falls outside the kicking event per se. If you say *kick the hubcap flat,*

flat is the extra satellite in this case. It means 'I kick the hubcap and as a result it flattened'. So the hubcap became flat as a result. I call the satellite in that case a 'further event satellite'.

The second type is a gradient type of realization. This is where the verb itself, as intrinsically lexicalized, means something like 'to actually perform certain actions with the intention that those actions will lead to a certain result or goal that you have'. *Hunt* is an example. *Police hunted the fugitives for six days*. It means they looked for tracks, they asked people, that's what they actually did, with the intention that it should lead to their finding and capturing the fugitives. So that's the potential, it doesn't mean it happened. If you say *The police hunted the fugitives for six days*, somebody can ask: 'Did they find them, did they capture them?' You don't know. It is actively unknown. Therefore, I call it a 'moot-fulfillment verb'. *Moot* means it is not clear. It is unknown. So it is a moot-fulfillment verb.

Now if you add a satellite, like *The police hunted the fugitives down*, the *down* is a fulfillment satellite. It says that whatever was potential in fact got fulfilled. Police in fact found and captured the fugitives. Now it changes the aspect. The aspect before was an activity. Now it is an accomplishment. It means you can say *The police hunted the fugitives down in one week*. You cannot say *The police hunted the fugitives in one week*. And you cannot say *The police hunted the fugitives down for one week*. It is quite clear, the aspect shifts. That's one of the main types that Chinese has, most Chinese agentive verbs are of this type or the type that follows, and English has very few.

Let's go to the third type, which is the implied fulfillment verb. In this case, the example might be *wash*. You say *I washed the shirt*. It means that you did certain activities, in this case, you agitated it in soapy water, with the intention that that will lead to a certain goal, namely, the shirt becomes clean. But it doesn't say that it actually happens. Because you can say in English, *I washed the shirt but it came out dirty*; it doesn't necessarily mean it got clean. Nevertheless, if you simply say in English *I washed the shirt*, the implicature is that it came out clean. Unlike *hunt*, if you say the police hunted the fugitives, it's definitely moot; I can ask you: 'did they find them? Did they capture them?' With *wash* the assumption is that it got fulfilled. So it has an implicature in there. But you can confirm the implicature by adding a satellite. In this case, it would be a confirmation satellite. *I washed the shirt clean*. Once you say that, you can no longer negate it. You cannot say *I washed the shirt clean, but it came out dirty*. Now since this might not be fair, since the word *clean* automatically means 'clean', there's another example which works a little better. It doesn't work well for all English speakers but it works for me. If you say *I called her*,

it's an implicature that you reached her. For me it means you dialed the phone with the intention of thereby telephonically reaching someone, and if you say nothing more, the implication is that you did. If you say *I called her* and nothing more, the assumption is she answered. But it is not definitive because you can defease it. You can say *I called her but there was no answer*. But if you say *I called her up*, for me that means she answered. In my English, you can't say *I called her up but there was no answer*. I think some English speakers may be able to say it. Anyway, that's a similar kind of example. Chinese apparently has verbs of that sort as well. They are not numerous in English.

Finally, there are what I call 'attained fulfillment verbs', which means 'to do certain things with a certain intention that something else happens, and in fact it happened'. The example is *drowned*, meaning someone immerses someone's head in the water, with the intention that it will kill them, and in fact they die. If you say *The stranger drowned him*, you cannot say *but he is still alive*. If you said the stranger drowned him, he is dead. In this case, if you try to add a satellite, it's called pleonastic in linguistics; it means that it will simply restate the same meaning that the verb already includes. Typically English doesn't like that. You would not say *The stranger drowned him dead*, or *to death*; that's bad English. The *to death* part is already included in *drown* and since it is an attained fulfillment verb, you do not add a satellite which essentially says the same thing. In fact there is a kind of cline here. You can say *The strange choked him, but he was still alive when the police arrived*. That's fine. Therefore you can also say *The stranger choked him to death*. There's only a slight sense of fulfillment, of attainment. It's stronger with *stab*, it gets harder to say this, and with *strangle* it is really hard. If you say *The stranger strangled him but he was still alive when the police arrived*, maybe it works just barely, and it is pretty hard to say *The stranger strangled him to death*, that's pretty bad, but in any case, it is better than with *drown*, which is totally impossible. It is like a kind of gradient.

Here are some Mandarin examples, which you pronounce better than me, I won't even try. Apparently, if you say 我开了门 (wo kai le men) it is either a moot fulfillment verb or a implied fulfillment verb. In any case, you can deny it. 我开了门，但是门没开 (wo kai le men, dan shi men mei kai). But as soon as you add an additional satellite, 我开开了门 (wo kai kai le men), then the second 开 (kai) confirms it. It is a confirmation satellite or a fulfillment satellite. I don't know, native speakers will have to tell me. Similarly, some dialects differ on this, you'll tell me, with *kill*, 杀 (sha), with 杀 (sha), 杀死 (sha si). Apparently, 杀 (sha), if you just say 我杀了他 (wo sha le ta), it doesn't mean necessarily that he is dead. Some speakers say no, some say yes. Does anybody think you can say: 我杀了他，但是没杀死 (wo sha le ta, dan shi mei sha si)? Let's have

hands. Who says it is okay? How many hands? Put up your hands. No hands. I'm going to scratch that example. Let's try the 踢 (ti) example.

By the way, there are speakers who tell me that's okay. Chinese is in a kind of a complementary relationship with English. Because for speakers who will do it this way, we have an almost perfect complementary case. In English 'kick' necessarily refers to a completed event. In English it is an intrinsic fulfillment verb. It does have a mechanism you can add that resects the last portion of this total action. You can say, for example, *I kicked out at him*, which doesn't mean that your foot hit him. It didn't touch him. *I kicked out at him*, or just *I kicked at him*, it resects it, and in fact means you did not hit him. *I grasped the rope* is this, and *I grasped at the rope* means you didn't touch the rope, it means you tried to but you didn't make it. Similarly, the progressive marker in English does the same thing. If you say *I opened the wine bottle*, that means it is open. But if you say *I was opening the wine bottle when I heard a scream*, we don't know, it's moot. We don't know if you actually opened the bottle or not, if the cork came out of the bottle or not. So the progressive marker does that in English. The way I had it set up, at least for those Chinese speakers who do it the way I described, is that the English intrinsic verb, after being resected by additional markers like *at*, winds up at this moot fulfillment place which is what the original Chinese verb means; in turn, in a complementary way, the Chinese verb only goes so far, and then would have to add a realization satellite to bring it up to what the English verb means intrinsically. That would be the relationship if it is true. If it is not true, forget all this. This goes on in English and in Chinese, I mean there are things in Chinese like 'wash something dirty', aren't there? That's impossible in English, you can't wash something dirty. Meaning to put it in water, and it comes out as dirty as it was before. Is it fine? You can't say it in English. You are speaking for your dialect. We are now comparing dialects. You cannot speak for all of Chinese. You are in complete agreement with the guy that I got it wrong? *I washed the shirt dirty* means, for example, you washed it in the creek, in the river, but the river water was so dirty that the shirt came out dirtier than it started. Is that okay? Not for you. We can vote. How many people can say that? Over half.

Here is another one. You have a verb *to bend*; I'm going to talk about bending bamboo. You can bend bamboo broken. Is that okay? *I bent it broken*. That's impossible in English. You can also say *I broke the bamboo bent*, which means you tried to break it but you only got so far as to bend it. Is that okay? I'm calling those fulfillment and underfulfillment situations, and English can't do any of those. For example, if you have a stick which is so thick that you tried to break it, but you only got so far as bending it. You didn't snap it. To say *I broke the stick bent*, 折 (zhe) for the first, what is 弯 (wan)? so it would be 折弯 (zhe wan), so

折 (zhe) means to trying break by squeezing it? No, 弄 (nong)is too generic. It avoids the issue.

Let me just say a few things from the last section. It is no surprise for verb-framed languages that the verb should determine all sorts of things, the argument structure, the aspect, the negation and so forth. That's no surprise. What's surprising is when you go to satellite-framed languages, that it's the satellite that determines everything. For example, it determines the argument structure, so if you say *I blew on the flame*, it's intransitive. But as soon as you add *out*, it can take a direct object, *I blew out the flame*. *Out* demands that you have a direct object, it's otherwise intransitive. It is *out* that's determining this. For example, if you say *He ran, ran* is intransitive. *He ran along the street* is intransitive, but as soon as you use *out, I outran him*, it adds a new argument, and makes it the direct object. It is the *out* doing it. Furthermore, it determines the aspect. For example, if you say *The bottle floated on the water, float* as a verb is basically an activity. But as soon as you say *across, The bottle floated across the canal*, that *across* determines the aspect, and you have to say *The bottle floated across the canal in 5 minutes*.

For example, if you say in English *I didn't eat the popcorn*, then in fact no popcorn entered your mouth. But if you say *I didn't eat up the popcorn*, then it means that you did eat the popcorn, popcorn did enter your mouth, and what's getting negated is the *up*. The target of the negation is *up*, meaning the completion. It means that you did not exhaust the supply of popcorn in eating. The same goes for *The police didn't hunt the fugitive*, it means that they just stayed in their police station, they didn't go looking for him. But if I say *The police didn't hunt the fugitive down*, then the negation does not apply to the hunting. They did hunt him, they did look for him. It applies to the satellite. It means that they didn't find them. It's this satellite in the satellite-framed language that's determining the aspect and most of the argument structure, the upshot. Finally, in satellite-framed languages, where the satellites are the constituent that bears so much of the content, often those languages make available a very generic verb. Because if you don't feel like specifying the particular co-event, but you really want to get on to the interesting part, to the satellite which is telling you the interesting stuff, you can just have a generic verb. English has them. It typically has *put, make, do* and so on. For example, *The candle is out* means 'to extinguishment', and you want to use *out* for that purpose. You don't feel like having to pick a verb that says how it went out, you don't want to say *The candle flickered out* or *the candle sputtered out*, you can say *The candle went out*, you use *go* as the generic verb to fill the slot for the verb in order to get to the interesting part, the extinguishment part. Similarly with the agentive, instead of saying *I blew the candle out*, you can just say *I put the candle out*. So *put* fills

this kind of dummy position, a placeholder. Similarly, you could say *I outdid him*. You can say *I out-cooked him*, meaning 'I beat him at cooking'. But you can also say *I out-did him at cooking*, so this *do* is acting as a dummy verb. You can say *I ran off with the money*. *Off with* is the satellite complex meaning you have stolen something and you are making your escape. That what it means. If you say *I ran off with the money*, it means you ran, or *you drove off with the money* means you drove, or you sailed off with the money. But when you don't want to specify which manner you used, you say *I made off with the money*. Similarly, for *they talked on*, you can say *they went on talking*.

German typically uses *gehen, machen* for filling in all these verbs. So *nachmachen* means (we saw *nach-* for the imitation thing), *nachmachen* can now act almost as a Spanish type verb meaning 'to imitate'. *Mitmachen* can mean something like 'to join in with'. I think Chinese has some, you just used one, 弄 (nong), meaning a sort of generic causative, that gets you to the interesting part, you have 弄弯 (nong wan). That would be an example of one of the generic verbs that act as markers until you get the interesting content held by this satellite.

Just to sum up, there is a very pervasive pattern running across languages where what is otherwise conceptualized as a complex construction involving a main event and a subordinate event and the relationship which the subordinate event has to the main event, can all be collapsed into a single construction across a lot of languages. Within the single construction, the crucial elements are the verb and the satellite. Languages fall into two main typological categories on the basis of whether the core schema of the main event shows up in the verb or the satellite. Languages tend to be consistent in using either the verb or the satellite for five to six distinct kinds of framing events, which they presumably are linking together on the basis of some kind of extensive metaphors.

References

Note: All my work is freely available on my website:
http://linguistics.buffalo.edu/people/faculty/talmy/talmyweb/index.html

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Handout Lecture 9

0 Introduction

0.1 The Macro-Event

the "macro-event": a kind of situation with extensive and apparently universal representation across languages that is systematically conceptualized at two levels of granularity:

a. as a complex situation that consists of a main event, a subordinate event,
   and the relation of the latter to the former
   that could be represented by a complex sentence with main and subordinate clauses

b. as a unitary event that could be represented by a single clause

the main event = the "framing event"; the subordinate event = the "co-event" the relation of the latter to the former = the "support relation"

five types of framing event discovered so far that behave alike across languages: Motion; temporal contouring; state change; action correlating; realization

the co-event bears to the framing event a support relation mainly of either Manner or of Cause, but a number of further relations also occur

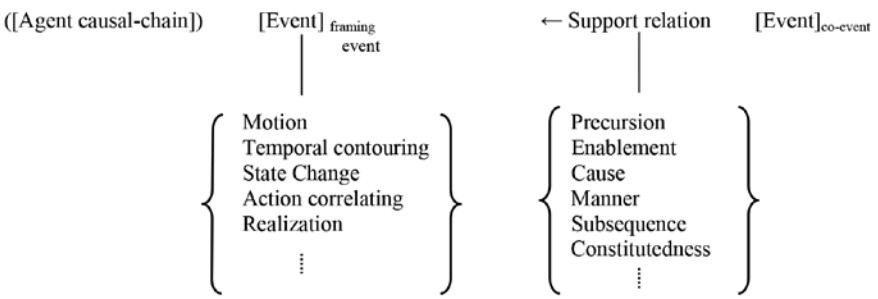

FIGURE 1 *Conceptual structure of the macro-event.*

the framing event consists of four components. As shown here, these components are generic enough to work for all
five types of framing event.

For a framing event of Motion in particular, these components are more specifically realized as:

Figure Motion (MOVE/BE-located) Path (path/site) Ground

A certain portion of the framing event—the "core schema"—is criterial for the typology described next

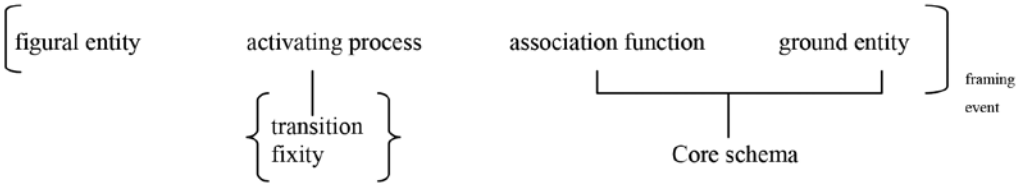

FIGURE 2 *Conceptual structure of the framing event.*

0.2 A Typology for The expression of the Macro-Event

The core schema of the framing event characteristically shows up in the main verb in "verb-framed" languages such as: Romance, Semitic, Japanese, Tamil, Polynesian, Bantu, some branches of Mayan, Nez Perce, Caddo.

FIGURE 3 *Syntactic mapping of macro-event in verb-framed languages.*

The core schema of the framing event characteristically shows up in the "satellite" (and/or preposition)
in "satellite-framed" languages such as:
most Indo-European minus Romance, Finno-Ugric, Chinese, Ojibwa, Warlpiri.

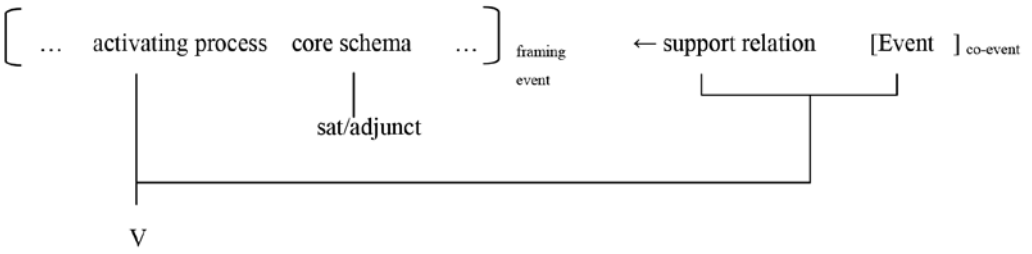

FIGURE 4 *Syntactic mapping of macro-event in satellite-framed languages.*

1 **A Motion Event as the Framing Event**
typological contrast shown here by English, a satellite-framed language, and Spanish, a verb-framed language

(1)

a. **non-agentive**

1. *support relation: Manner*
[the bottle MOVED in to the cave] WITH-THE-MANNER-OF [it floated]
English: The bottle floated into the cave
Spanish: La botella entró flotando a la cueva.
"The bottle entered (MOVED-in) floating to the cave."
2. *support relation: Cause*
[the bone MOVED out from its socket] WITH-THE-CAUSE-OF [(something) pulled on it]
English: The bone pulled out of its socket.
Spanish: El hueso se salió de su sitio de un tirón.
"The bone exited (MOVED-out) from its location from a pull."

b. **agentive**

1. *support relation: Manner*
[I $_{A}$MOVED the keg out of the storeroom] WITH-THE-MANNER-OF [I rolled it]
English: I rolled the keg out of the storeroom.
Spanish: Saqué el barril de la bodega rodándolo.
"I extruded ($_{A}$MOVED-out) the keg from the storeroom rolling it."
2. *support relation: Cause*
[I $_{A}$MOVED the ball in to the box] WITH-THE-CAUSE-OF [I kicked it]

English: I kicked the ball into the box.
Spanish: Metí la pelota a la caja de una patada.
"I inserted ($_{A}$MOVED-in) the ball to the box by a kick."

2 Temporal Contouring (Aspect) as the Framing Event

"Temporal contouring" is temporal aspect when it is conceptualized as a separate event in its own right, abstracted out from an entire situation.

In a verb-framed language like Spanish, it is extensively expressed by the main verb. In a satellite-framed language like German, it is extensively expressed by the satellite,
or by some other non-verbal constituent such as an adverb.

(2)

a. 'to finish Ving' / 'to V to a finish / to completion'

Spanish: terminar de V-Inf
German: fertig-V

[I "$_{A}$MOVED" the letter TO COMPLETION] CONSTITUTED-BY [I was writing it]
Terminé de escribir la carta.
Ich habe den Brief fertiggeschrieben.
'I finished writing the letter.' / 'I wrote the letter to completion.'

b. 'to V again / re-V'

Spanish: volver a V-Inf
German: wieder-V / noch mal V

Volví a comer. / Lo volví a ver.
Ich habe noch mal gegessen. / Ich habe ihn wiedergesehen.
'I ate again.' / 'I saw him again.'

c. 'to have just Ved'
Spanish: acabar de V-Inf (acabar: imperfective forms)
German: gerade V (perfect forms)

Acabo de comer. / Acababa de comer cuando llegó.
Ich habe gerade gegessen. / Ich hatte gerade gegessen, als er kam.
'I just ate.' / 'I had just eaten when he arrived.'

d. 'to continue to V / 'to still V'

Spanish: seguir V-Ger
German: (immer) noch V

Sigue durmiendo. / Seguía durmiendo cuando miré.
Er schläft noch. / Er hat noch geschlafen, als ich nachschaute.
'He's still sleeping. / He was still sleeping when I looked in.'

e. 'to customarily V'

Spanish: soler V- Inf
German: normalerweise V (present) / [früher/…] immer V (past)

Suele comer carne. / Solía comer carne.
Normalerweise isst er Fleisch. / Früher hat er immer Fleisch gegessen.
'He eats meat.' / 'He used to eat meat.'

f. 'to V (NP) one after another cumulatively'

Spanish: ir V- Ger (NP)
German: (NP) nacheinander / eins nach dem anderen V

(i) Las vacas se fueron muriendo aquel año.
Die Kühe sind in dem Jahr (kurz) nacheinander gestorben.
'One after another of the cows died that year [Spanish: not necessarily all].'
contrast: Las vacas se estaban muriendo aquel año.
'The cows were (all sick and concurrently) dying that year.'

(ii) Juan fue aprendiendo las lecciones.
Johann hat die Lektionen eine nach der anderen gelernt.
'John learned one after another of the lessons.'

g. ‘to finally V’ (positive) / ‘to not quite V’ (negative)

Spanish: llegar a V-Inf ‘to finally V after all’
no llegar a V-Inf ‘to not quite get so far as to V’
German: schliesslich / dann doch V
nicht ganz / dann doch nicht V

(i) El tiempo llegó a mejorar.
Das Wetter ist schliesslich / dann doch besser geworden.
‘The weather finally did improve after all.’

(ii) La botella no llegó a caer.
‘The bottle never did quite go so far as to actually fall [though teetering].’
Die Flasche wackelte, aber fiel dann doch nicht um.
‘The bottle teetered, but didn’t quite fall.’

h. ‘to end up Ving’

Spanish: acabar V- Ger [perf] ‘to end / wind up Ving after all’
German: am Schluss… dann doch V

Acabamos yendo a la fiesta.
Am Schluss sind wir dann doch zur Party gegangen.
‘We wound up going to the party after all (after wav e ring / deciding not to go).’

i. ‘to have been Ving (since / for …)’

Spanish: llevar V-Ger ‘to have been Ving’
German: schon V

Lleva estudiando 8 horas. / Llevaba estudiando 8 horas cuando llegué.
Er studiert schon 8 Stunden lang. / Als ich kam, hatte er schon 8 Stunden studiert.
‘He’s been studying for 8 hours. / He had been studying for 8 hours when I arrived.’

j. 'to be Ving'

Spanish: estar V- Ger
German: gerade V (non-perfect forms)

Está escribiendo una carta. / Estaba escribiendo una carta
Sie schreibt gerade einen Brief. / Sie schrieb gerade einen Brief.
'She is writing a letter. / She was writing a letter.'

3 State Change as the Framing Event

3.1 Forms Suggesting Parallelism with Path + Ground

(3)

a. non-agentive
[he "MOVED" TO DEATH] WITH-THE-CAUSE-OF [he choked on a bone]
English: He choked to death on a bone.
Spanish: Murio´ atragantado por un hueso / porque se atraganto´ con un hueso.
"He died choked by a bone / because he choked himself with a bone."

b. agentive
[I "$_{A}$MOVED" him TO DEATH] WITH-THE-CAUSE-OF [I burned him]
English: I burned him to death.
Spanish: Lo maté con fuego / quemándolo.
"I killed him with fire / [by] burning him."

The English state-change expression *to death*, which parallels a Path+Ground expression, is equivalent to the monomorphemic German satellite *er-* in one of its usages:

(4) German: er$_{1}$-V NP-Acc 'V NP to death' / 'kill NP by Ving NP'

(er-) drücken / schlagen / würgen / stechen / schiessen
'to squeeze / beat / choke / stab / shoot (to death)'

The German satellite *er-*, in another of its state-change usages, has scant English counterpart but didactically could be cast as an English Path+Ground expression, though this does not exist either

(5) German: er_2-VNP-Acc (Refl-Dat) "VNP into one's possession"/'obtain NP by Ving'

a. [the army "$_A$MOVED" the peninsula INTO ITS POSSESSION] WITH-THE-CAUSE-OF [it battled]
Die Armee hat (sich) die Halbinsel erkämpft.
'The army gained the peninsula by battling.'
as if: "The army battled the peninsula into its possession."

b. Die Arbeiter haben sich eine Lohnerhöhung erstreikt.
'The workers won a pay raise by striking.'
as if: "The workers struck a pay raise into their possession."

c. Wir haben uns ölerbohrt.
'We obtained oil by drilling.' as if: "We drilled oil into our possession."

3.2 Change in State of Existence

3.2.1 From presence to absence

(6) V out (NP) 'V (NP) to extinguishment' / 'extinguish (NP) by Ving'

non-agentive with Manner:
[the candle "MOVED" TO EXTINGUISHMENT] WITH-THE-MANNER-OF [it flickered /...]
The candle flickered / sputtered out.

non-agentive with Cause:
[the candle "MOVED" TO EXTINGUISHMENT] WITH-THE-CAUSE-OF [SOMETHING blew on it]
The candle blew out.

agentive with Cause:
[I "$_A$MOVED" the candle TO EXTINGUISHMENT] WITH-THE-CAUSE-OF [I blew on /... it]
I blew / waved / pinched the candle out.

Spanish: Apagué la vela soplándola / de un soplido.
"I extinguished the candle [by] blowing-on it / with a blow"

(7) V away 'V to gradual disappearance' / 'gradually disappear as a result of Ving'

[the meat "MOVED" GRADUALLY TO DISAPPEARANCE] WITH-THE-CAUSE-OF [it rotted]
The meat rotted away.
also: The ice melted away. / The hinge rusted away. / The image faded away. / The jacket's elbows have worn away.

English: The leaves withered away. Spanish: Las hojas se desintegraron al secarse.
"The leaves disintegrated by withering."

(8) V up 'V to consumedness' / 'become consumed in Ving'
V up NP 'V NP to consumedness' / 'consume NP by Ving it'

a. [the log "MOVED" TO CONSUMEDNESS in 1 hour] WITH-THE-CAUSE-OF [it was burning]
The log burned up in 1 hour.
contrast *burn* alone: The log burned (for 30 mins. before going out by itself).

b. [I "$_{A}$MOVED" the popcorn TO CONSUMEDNESS in 10 mins.] WITH-THE-CAUSE-OF [I was eating it]
I ate up the popcorn in 10 mins.
contrast *eat* alone: I ate the popcorn (for 5 mins. before I stopped myself).

In the following, the state change from presence to absence pertains not to a first-order object, which instead may continue in existence, but rather to an abstract second-order meta-object, the supply.

(9) German: ver-V NP-Acc 'use up / exhaust NP by Ving (with) it' / "V NP to exhaustion"

a. [I "$_{A}$MOVED" all the ink TO EXHAUSTION] WITH-THE-CAUSE-OF [I wrote with it]
Ich habe die ganze Tinte verschrieben.
"I've written all the ink to exhaustion."
'I've used up all the ink in writing.'

b. Ich habe alle Wolle versponnen. 'I've used up all the wool in spinning.'

c. Ich habe meine ganze Munition verschossen. 'I've exhausted my ammunition in shooting.'

3.2.2 From absence to presence

(10) V up NP 'V NP into existence' / 'make/create NP by Ving'

a. [I "$_{A}$MOVED" INTO EXISTENCE three copies of his original letter] WITH-THE-CAUSE-OF [I xeroxed it]
I xeroxed up (*xeroxed) three copies of his original letter.
contrast *xerox* alone: I xeroxed (*up) his original letter.

b. I boiled up (*boiled) some fresh coffee for breakfast at our campsite.
contrast *boil* alone (any acceptable use of *up* has a different sense):
I boiled (*up) last night's coffee for breakfast / some water at our campsite.

c. [I "$_{A}$MOVED" INTO EXISTENCE a plan] WITH-THE-CAUSE-OF [I thought (about the issues)]
I thought up (*thought) a plan.
contrast *think* alone: I thought *up / about the issues.

In the following, the state change from absence to presence pertains not to a first-order object, which instead is already in existence, but rather to an abstract second-order meta-object, an accumulation.

(11) V up NP 'progressively accumulate / amass NP by Ving'

a. [I "$_{A}$MOVED" INTO AN ACCUMULATION 5,000 dollars in 5 years] WITH-THE-CAUSE-OF [I saved it]
I saved up 5,000 dollars in 5 years.
contrast *save* alone: I saved (*up) (the/my) 1,000 dollars for 2 years.

b. Jane has bought up beach-front property in the county.
—i.e., has progressively amassed a good deal of property over time
contrast: Jane has bought beach-front property in the county.
—possibly just a little on one occasion

contrast of satellites pertaining to a first-order object
and a second-order meta-object: an accumulation:

(12) Russian: na-V NP-Gen 'create an accumulation of NP by Ving NP'
Ona nagrebla orexov v fartuk. "She accumulation-scraped nuts(Gen) into apron."
'By scraping them together into her apron, she accumulated (a heap/pile of) nuts'.
contrast: Ona sgrebla orexi v fartuk. "She together-scraped nuts(Acc) into apron."
'She scraped together the nuts into her apron'.

3.3 Change in Condition

further cases of state change other than change in state of existence

(13)
a. English: V up NP / German: kaputt-V NP-Acc 'make NP non-intact by Ving it'

[the dog "$_{A}$MOVED" TO NON-INTACTNESS the shoe in 30 mins.]
WITH-THE-CAUSE-OF [he chewed on it]
The dog chewed the shoe up in 30 mins.
contrast *chew* without *up*: The dog chewed on the shoe (for 15 mins.).

b. German: Der Hund hat den Schuh in 30 Minuten kaputtgebissen.
"The dog bit the shoe up in 30 mins."
contrast: Der Hund hat 15 Minuten an dem Schue gekaut.
"The dog chewed on the shoe [for] 15 mins."

c. Spanish: El perro destrozó el zapato a mordiscos / mordiéndolo en 30 minutos.
"The dog destroyed the shoe with bites / [by] biting it in 30 mins."

contrast: El perro mordisqueó el zapato (durante 15 minutos).
"The dog chewed-on the shoe (for 15 mins.)."

from other satellite-framed languages, state-change satellites that are semantically unusual from the English perspective: German:

(14)
German: ein-V Refl-Acc in NP-Acc
'to have gradually managed to become easefully familiar with all the ins and outs of NP in Ving (in/with) NP'

a. Ich habe mich in das Buch eingelesen.
"I have read myself into the book."
'I've gotten familiarized enough with the book
that I can keep all the characters and plot involvements straight.'

b. Der Schauspieler hat sich in seine Rolle eingespielt.
"The actor has played himself into his role."
'The actor has come to know his part with ease in the course of acting in it.'

c. Ich habe mich in meinen Beruf eingearbeitet.
"I have worked myself into my job." 'I know the ropes in my work now.'

In the preceding, it was the Patient that manifested the change in condition; in the following, it is the Agent

(15) German: heraus-V NP-Acc [V: sensory verb]
'detect and sensorily single out NP among other comparable NPs via the sensory modality of Ving'

Sie hat ihr Kind herausgehört.
"She has heard out her child."
'She could distinguish her child's voice from among the other children talking.'

Russian / Dutch / Yiddish:

(16) a. Russian: za-V -s'a (=reflexive)
'become attentionally engrossed/absorbed in the activity of Ving and hence be inattentive to other events of relevance in the context'

where V = čitat' 'read': za-čitat'-s'a
'to get absorbed in what one is reading' (so that, e.g., one misses a remark directed at one)

where V = smotret' 'look': za-smotret'-s'a
'to get absorbed in watching something' (e.g., a person ahead of one as one walks along,
so that, e.g., one bypasses one's destination)'

b. Dutch: bij- V NP
'put the finishing touches on NP in Ving it /execute the few remaining bits of Ving action that
will bring NP up to optimal / complete/up-to-date condition'
[example from Melissa Bowerman, p.c.]

where V = knippen 'cut with scissors': bij-knippen
e.g., 'trim those hairs that have grown out beyond the hairdo'

where V = betalen 'pay': bij-betalen
'pay the additionally necessary increment', e.g., to correct an error and bring a sum up to the right
amount or to upgrade a ticket to the next higher class

c. Yiddish: tsu-V (NP1) tsu NP2
'add NP1 by Ving it—or add the (intangible) product of Ving—to the same or comparable material already present in NP2'

Ikh hob tsugegosn milkh tsum teyg.
"I have ADD-poured milk to-the dough"
'I added milk to the dough by pouring it.'

Ikh hob zikh tsugezetst tsu der khevre.
"I have REFL ADD-sat to the group"
'I pulled up a chair and joined the group.'

4 Action Correlating as the Framing Event

Here, there are two entities—an Agent and an Agency—each performing some action.

The Agent sets her action to correlate with that of the Agency: either to be the same as or similar to it, or to complement it.

It is this act of correlating that constitutes the framing event, and that is expressed by the verb in a verb-framed language but by the satellite in a satellite-framed language

(17) [Agent ACT In-Correlation-With Agency] CONSTITUTED-BY [Agent PERFORM]

4.1 The Agency's Action is the Same(-Category) as the Agent's Action.

4.1.1 'Concert'

(18) English: V together with NP 'act in concert with NP at Ving'

[I ACTed IN-CONCERT- WITH him] CONSTITUTED-BY [I played the melody]
I played the melody together with him.

4.1.2 'Accompaniment'

(19) English: V along (with NP) / German: mit-V (mit NP-Dat)
'act in accompaniment of / as an adjunct to // accompany / join (in with) NP at Ving'

[I ACTed IN-ACCOMPANIMENT-OF him] CONSTITUTED-BY [I played the melody]
English: I played the melody along with him.
German: Ich habe mit ihm die Melodie mitgespielt.
Spanish: Yo lo acompañé cuando tocamos la melodia.
"I accompanied him when we played the melody." (both he and I played)
Yo lo acompañé tocando la melodia.
"I accompanied him [by] playing the melody." (only I played)

a further English example contrasting 'concert' with 'accompaniment':
I jogged together / along with him.

Yiddish subdivides the 'accompaniment' type into:
mit- 'contributory accompaniment'
tsu- 'peripheral accompaniment'

(20) Yiddish: tsu-V 'V as a peripheral accompaniment to another action'

where V = krekhtsn 'to groan, gripe'
Er hot tsugekrekhtst. "he has TSU-griped"; for example:
'He punctuated his exertions with an undertone of periodic groans.'
or 'He chimed in / piped up in our gripe session with some of his own gripes.'

where V = tantsn 'to dance'
Zi hot tsugetantst. "she has TSU-danced"; for example:
'She did a little dance on the sidelines in time to the music.'

4.1.3 'Imitation'

(21) German: nach-V (NP-Dat)
'V in imitation of NP' / 'imitate / copy NP at Ving'

[I ACTed IN-IMITAT ION-OF him] CONSTITUTED-BY [I played the melody]
German: Ich habe ihm die Melodie nachgespielt.
English: I played the melody in imitation of him.
Spanish: Yo lo seguia cuando tocamos la melodia.
"I followed him when we played the melody." (both he and I played)
Yo lo seguia tocando la melodia.
"I followed him [by] playing the melody." (only I played)

4.1.4 'Surpassment'

(22) English: out-V NP 'surpass / best / beat NP at Ving'

[I ACTed IN-SURPASSMENT-OF him] CONSTITUTED-BY [I played (the melody)]
English: I outplayed him. (cf.: I outran / outcooked him.)
Spanish: Yo lo superé tocando la melodia.
"I surpassed him playing the melody."

4.2 The Agency's Action is Fixed and Distinct from the Agent's Action

4.2.1 'Demonstration—observation'

(23) German: vor-V NP-Dat 'demonstrate to NP one's Ving'

[Agent PUT Agent's Action IN-DEMONSTRATION-TO Agency's OBSERVATION]
CONSTITUTED-BY [Agent PERFORM]
[I ACTed IN-DEMONSTRATION-TO him] CONSTITUTED-BY [I played the melody]
German: Ich habe ihm die Melodie vorgespielt.
"I played the melody in demonstration to him."
English: I showed him how I / how to play the melody.
Spanish: Yo le mostré como toco / tocar la melodia. (same as English)

5 Realization as the Framing Event

"Realization" is the indication that some intended event that had been understood
as merely potential or presumed has in fact been realized.
It has two main types: fulfillment of an intended goal & confirmation of an implicature.
Not all languages have an extensive system of indicating realization. But among those that do,
the indication is made by a satellite in satellite-framed languages & by the main verb in verb-framed languages.

parallels across types of framing event:
as the space domain has motion from elsewhere to a particular location,
and as the state domain has change from the absence to the presence of a particular property,
so the realization domain has transition from a potential stage to an actualized stage of realization,
or from an assumed degree to a definite degree of realization.

5.1 Incremental Semantic Series Containing Realization Types

(24)

a. **intrinsic-fulfillment verb:** action
further-event satellite: the state-change resulting from that action

e.g., V: *kick* 'propel foot into impact with'
Sat: *flat*: 'thereby causing to become flat'
I kicked the hubcap. / I kicked the hubcap flat.

b. **moot-fulfillment verb:** action + goal
fulfillment satellite: fulfillment of that goal

e.g., V: *hunt* 'go about looking with the goal of thereby finding and capturing'
Sat: *down*: 'with fulfillment of the goal'
The police hunted the fugitive for/*in 3 days (but they didn't catch him).
The police hunted the fugitive down in/*for 5 days (*but they didn't catch him).

c. **implied-fulfillment verb:** action + goal + implicature of fulfillment of the goal
confirmation satellite: confirmation of that implicature

e.g., V: *wash*
'immerse and agitate with the goal of cleansing thereby + the implicature of attaining that goal'
Sat: *clean*: 'with confirmation of the implicature of attaining the goal of cleansing'
I washed the shirt (but it came out dirty).
I washed the shirt clean (*but it came out dirty).

or V: *call*
'dial a number with the goal of thereby telephonically connecting with a party'
+ the implicature of attaining that goal'
Sat: *up*: 'with confirmation of the implicature of attaining the goal of connecting'
I called her (but there was no answer).
I called her up (*but there was no answer). [this example works for most speakers]

d. **attained-fulfillment verb:** action+goal+fulfillment of that goal
pleonastic satellite: fulfillment of the goal (generally avoided in English)

e.g., V: *drown* 'submerge with the goal of killing thereby + attainment of that goal'
Sat: *dead / to death:* 'with the attainment of the goal of killing'
I drowned him (*but he wasn't dead). / *I drowned him dead / to death.

NB: the (a) + (d) verb types—i.e., the intrinsic-fulfillment and the attained-fulfillment types—
are both **fulfilled** verb types
the (b) + (c) verb types—i.e., the moot-fulfillment and the implied-fulfillment types—
are both **conative** verb types
and the (b) + (c) satellite types—i.e., the fulfillment and confirmation types—
are both **realization** satellite types

5.2 Cline in Strength of Implicature

(25) The stranger (a) choked / (b) stabbed / (c) strangled / (d) drowned him.
(but he was still alive when the police arrived.)

(26) The stranger choked / stabbed / ?strangled / *drowned him to death.

5.3 Lexicalized Implicature

1. intention 'to make clean': is part of the meaning of *wash*
I soaked / ?? washed the shirt in dirty ink.

2. implicature 'it gets clean': is automatically associated with the morpheme *wash*
I soaked the shirt.—no implicature 'it got clean'
I washed the shirt.—implicature 'it got clean'

3. notion 'getting clean': is not an essential part of the meaning of *wash*
I washed / *cleaned the shirt, but it came out dirty.

4. notion 'getting clean': is not simply a part of a larger metonymic frame
"washing action + getting clean + drying + putting away for use"
I washed the shirt and left it wet.
?? I washed the shirt and left it dirty.

5. notion 'getting clean': is not conventional implicature, because it is defeasible
   I washed the shirt but it came out dirty.
   *He stayed but she left,
   and there is no contrast between these two facts.

proposed term: "lexicalized implicature".

5.4 Typological Difference in the Expression of Realization

(27)

a. [Agent "$_{A}$MOVE" TO FULFILLMENT the INTENTION (to CAUSE X)] WITH-THE-SUBSTRATE-OF [Agent ACT + INTEND to CAUSE X THEREBY]

b. [Agent "$_{A}$MOVE" TO CONFIRMATION
   the IMPLICATURE of the FULFILLMENT of the INTENTION (to CAUSE X)]
   WITH-THE-SUBSTRATE-OF [Agent ACT + INTEND to CAUSE X THEREBY
   + IMPLICATURE of the FULFILLMENT of the INTENTION to CAUSE X]

5.4.1 Mandarin: a Satellite-Framed Language Exhibiting Realization

(28) a. wǒ kāi le mén (dàn-shi mén méi kāi)
I open PERF door (but door not-PAST open)

b. wǒ kāi kāi le mén
I open(V) open(Sat) PERF door

(29) a. wǒ shā le tā (dàn-shì méi shā sǐ)
I kill PERF him (but not-PAST kill dead)

b. wǒ shā sǐ le tā
I kill dead PERF him

(30) a. wǒ tī le tā (dàn-shì méi tī zháo)
I kick PERF him (but not-PAST kick into-contact)

b. wǒ tī zháo le tā
I kick into-contact PERF him

5.4.1.1 Comparison of English and Mandarin Verb Lexicalization

English has "resection": processes for cutting back on the full reference of a fulfilled verb
down to a moot-fulfillment reference accomplished by such grammatical devices as: the progressive / addition of *at*

(31) a. I opened the door / wine bottle.
b. I was opening the door / wine bottle when I heard a scream.

(32) a. I kicked him. / I grasped the rope.
b. I kicked (out) at him. /I grasped at the rope.

symmetric complementarity between the characteristic English and Mandarin verb types:

the Mandarin conative verb *tī* = English *kick at*
i.e., a fulfilled verb that has been resected the English fulfilled verb *kick*= Mandarin *tī zhao*, 'kick into-contact',
i.e., a conative verb that has been realized.

5.4.2 Tamil: a Verb-Framed Language Exhibiting Realization

(33) a. Nāṉ avaṉai koṉṟēṉ.
I he-Acc kill(Finite)-Past-1s
'I killed him.'

Āṉāl avaṉ cāka-villai.
but he die-Neg
'But he didn't die.'

b. Nāṉ avaṉai koṉṟu-(vi)ṭṭēṉ.
I he-Acc kill(Non-Finite)-leave(Finite)-Past-1s
'I killed him.'

*Āṉāl avaṉ cāka-villai.
but he die-Neg
*'But he didn't die.'

6 Evidence that the Framing Satellite Expresses the Main Event

6.1 Determining Complement Structure and the Semantic Character of Arguments

A framing satellite determines most or all of the complement structure of its clause
as well as the semantic character of the arguments represented in these complements.

with satellite added: intransitive → transitive complement structure
(as well as: unbounded → punctual aspect; steady-state → state-entry)
I blew on the flame.
I blew the flame out.

with satellite added: same as preceding + semantic shift of participants:
Path+Ground (course followed) --> animate Patient (person surpassed)
I ran along the street.
I outran him.

with satellite added: shift in transitivity + definiteness (as well as aspect):
indefinite or definite:
mit (der) Tinte schreiben 'write with (the) ink'
definite only:
die (ganze) Tinte verschreiben 'exhuast (all) the ink in writing'
*Tinte verschreiben 'exhaust ink in writing'

with satellite added: shift in argument order / precedence
I poured water (Figure) into the glass (Ground).
I poured the glass (Ground) full of water (Figure).

6.2 Determining Overall Aspect

Path satellites:

with satellite added to the following basic sentence with unbounded aspect:
The bottle floated on the water for an hour / *in an hour (before finally sinking)
across shifts it to bounded aspect:

The bottle floated across (the entire canal) in ten minutes / *for ten minutes

in / past shifts it to punctual aspect:

The bottle floated in (-to the cleft) / past (the rock) at exactly 3 o'clock / *for an hour

along maintains the unbounded aspect:

The bottle floated along (the canal) for one hour / *in an hour.

state-change satellites:

without satellite, aspect can be unbounded or punctual, but not bounded:

The candle flickered for minutes / at exactly midnight / *in 5 minutes.

with satellite added, aspect can be punctual or bounded, but not un bounded:

The candle flickered out *for minutes / at exactly midnight / in 5 minutes.

6.3 Determining the Auxiliary in German

(34) a. Ich bin / *habe um die ganze Stadt gelaufen.
'I ran around the whole city.'

b. Ich habe / *bin die Füsse (*um die ganze Stadt) wundgelaufen.
'I ran my feet sore (*around the whole city)' /
"I made my feet sore in running".

6.4 Determining the "Upshot"

The framing satellite, in representing the main event, expresses the "upshot" of the whole macro-event:

the core of what is asserted in a declarative construction, denied under negation,

asked about in an interrogative construction, demanded in an imperative

(35) a. I didn't eat the popcorn.
b. I didn't eat up the popcorn. [I did eat it, but did not finish]

(36) a. The police didn't hunt the fugitive.
b. The police didn't hunt down the fugitive. [They did search, but did not find him]

6.5 Licensing Generic (Dummy) Verbs

satellite-framed languages, where the satellite can express the semantically rich content of a framing event,
often develop a system of generic verbs as syntactic "place markers"
that express no particular co-event content but that allow the sentence to go on to its satellite's content,
when this alone is what the speaker wants to convey

English mostly uses: go / put / do / make:
The fire blew out. / The fire went out.
I blew the fire out. / I put the fire out.
They talked on. / They went on (talking).
I outcooked him. / I outdid him (at cooking).
I ran off with the money. / I made off with the money.

German mostly uses: machen / gehen
fertigmachen 'to finish',
weitermachen 'to continue',
kaputtmachen 'to destroy',
mitmachen 'to accompany, join in with',
nachmachen 'to imitate',
vormachen 'to demonstrate'

LECTURE 10

Digitalization in the Evolution of Language

This is the 10th lecture, and in the previous 9 I've been at some pains to document the incredible structure of human language, its semantic structure and its syntactic structure. The question, of course, arises: is it comparable to other preexisting cognitive systems? If you divide up our total psyche very roughly, there are things like perception in general, which includes several modalities like visual perception, kinesthetic perception, and auditory perception. There is another cognitive system of motor control, there is the affect system of emotions, there is the reasoning system and the attentional system. Each of these systems has a certain kind of organizational system and a set of structuring features.

The last two main cognitive systems to have evolved are language and cultural structure, because I propose that there is a cognitive system devoted to cultural structure. As they evolved, the question is: Were they able to exhaustively provide for their own organizational make-up simply by borrowing, taking pieces from the other cognitive system that were already in place, or did something new have to evolve? My general proposal here is that in fact language, as it evolved over who knows how long a period, certainly hundreds of thousands of years, perhaps over a million, had to overcome a certain bottleneck, it had to have evolved a certain property which I'm calling digitalization. Most of the other cognitive systems in much of their functions are analog in character, involving gradients and iconic aspects. For language to perform its function, my proposal is that it had to either elaborate what was already in existence, or evolve afresh this new kind of digital system that I'll describe in a second, which at least has to involve discrete kinds of units.

Here is the evolutionary problem it might have faced. I'm speaking metaphorically, of course; evolution is not teleological, but just to speak metaphorically, early hominids may have faced a kind of bottleneck of two opposing

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tendencies. One was hominids were presumably increasingly getting smarter, so they were having more and more conceptual capacity in their cognition. As that happened, the bottleneck was between increasing capacity for a greater range of conceptual content, and the possibility of communicating such concepts within the individual hominid to its fellows. This included a greater range of qualitative conceptual content, a greater range of complexity and granularity. All this might have started being on the verge of evolving or in progress of evolving, together with the communication of all that by an individual hominid to his fellows. You would be on the verge of increasing thought capacity, with the need to increase the capacity to communicate more of that, more quickly and with greater fidelity. The bottleneck was that the means for communication at that point, in the vocal-auditory channel, between mouth and ear, was highly limited. It had many constraints or limitations which, as they were constituted at that time in evolution, were inadequate as a carrying capacity for this potentially increasing capacity of thought and its communication across members of the species. It was limited for about four different reasons. One is, it had what I'm calling low parallelness. It had relatively few independent parameters of variation that could vary in the auditory channel. I will elaborate all of this in a second. It had very low iconicity, both of which would have been advantageous. It had relatively little degree of differentiation within the auditory; the auditory range is relatively limited. Finally, the medium through the air was rather noisy. What happened? Let me remind you that the bottleneck probably has existed in many places and many species many times during evolution, and may never have been resolved. But it could be that the hominids were the first to have evolved the relevant mutations that wound up resolving this bottleneck, and developing the means for communication. What it meant was that the vocal-auditory track became increasing digital in character.

It went from having been primarily analog, meaning involving gradience and iconic kinds of things, to being increasingly digital. Here is what I mean by *digital*, it encompasses four steps. First, instead of gradience, it can have discrete units within it. That's the first level, discrete units instead of a gradient analog kind of thing. Secondly, each discrete unit could also have its own categorial distinct identity. Instead of discrete jumps along a single parameter, it could be a qualitatively distinct category of thing. While all these appears in language, I should say that the first two, discreteness and qualitatively distinct categories, also appear in other cognitive systems like visual perception and motor control, I suspect. So those two are precursors, and language as it evolved could easily have borrowed or tapped into those preexistent forms of digitalness in other cognitive systems.

There are two more steps to what I call digitalization. My term for the third is recombination, similar to the notion of recombinant DNA. If you have an inventory of discrete categories, do they simply remain in their home sites where they originate? Or can they recombine, in other words, enter into different arrangements relative to each other, and so enter into different patterns? That's what I call *recombination*. We're already starting to see less of this phenomenon, recombination, in other cognitive systems. I am a novice when it comes to looking at other cognitive systems, but a glance through them suggests there is relatively less recombination present in other cognitive systems.

The fourth step in what I called digitalization is where each of these distinct rearrangements of the units, in turn, constitutes a new higher level entity. It's what I called emergentness. They could remain just different arrangements, or the different arrangements could in turn each have its own new identity. The commonest example of what I'm referring to is phonemes into morphemes. You have, let's say phonemes 'k', 'a' and 't' in English. You can recombine them into different orders like cat, tack, act, and furthermore, each of these different arrangements has a new higher level identity as a normal morpheme, each of which has meaning. Each of these three combinations I just gave you has its own meaning, and is experienced cognitively as a discrete higher level unit. That's the basic idea of the fourth level of what I'm calling digitalization.

It seems that as language evolves, the first two levels could easily have been borrowed from other cognitive systems. The second two steps, while there are putative examples in other cognitive systems, they are relatively minimal, I think. Language either borrowed them already preexisting and then greatly elaborated them, or it evolved them for the first time and also greatly elaborated them. In doing so, it happened for the first time in hominid evolution, and it resolved the bottleneck. It now permitted the means of communication, this vocal-auditory channel, to have the carrying capacity to express, to represent, this large number of distinct concepts, and to do so with some fidelity in this noisy medium, by virtue of being digital, and to do it quickly.

That's the general layout of the thing, and the steps that I'll take in analyzing this are first, to show how the vocal-auditory channel is in fact very limited in its capacity. I'll demonstrate that first by comparing it with another channel, the one used in sign language, the manual-visual channel. Each of these two channels has a production and a perception component. The vocal part of the vocal-auditory channel is the production part, the auditory is the perception part. In sign language, you have the manual, or more generally, bodily facial gesticulations, and the perception part is visual.

As we contrast the vocal-auditory channel with the manual-visual channel, we will see that the manual-visual channel has many more advantages, is

much less limited, much less constrained than the vocal-auditory channel. If it had wound up being the channel used for communication, which it wasn't, a number of elements of this bottleneck might have been resolved at the outset; there might not have been a bottleneck. But for whatever reasons, the vocal-auditory channel was the one that got involved in the further evolution of communication, and so it had a bottleneck.

The first thing I'm going to do is to compare and contrast these two channels, these two modalities of communication, to show how limited the vocal-auditory channel is. First, it's limited in terms of parallelness; by this I mean how many distinct independent parameters the modality has, each of which can vary independently. It turns out that the manual-visual channel has a very large number, and the vocal-auditory channel has relatively few. The advantage to having many parallel parameters, each of which can independently and concurrently express some channel of information, is that you can communicate more information in the same unit of time. It's a broad band, as opposed to a narrow band. You can communicate more information in the same unit of time, or if you have a certain amount of communication, it'll take you less time to convey everything if you've got multiple channels to do them. Let's look at the number of distinct parameters available in each channel. Let's first look at the vocal-auditory channel. I count eight. The main one the language in fact uses is itself a digital system. It's a discrete system and it's digital. Whether it evolved later or preexisted among animal communication systems, I'm not sure, but in any case, it's the parameter of the distinction between 'p' 't' 'g'; 'b' 'd' 'g'; 'm' 'n', and all the different vowels, I'm calling that phonetic quality, and it's a discrete system.

That's one parameter. There are seven more parameters, which I collectively call vocal dynamics. It is a gradient system. It includes things like loudness, pitch, how high, how low, and timbre—the thing that distinguishes different instruments from each other. Several other features, like how enunciated things are or various other vocal qualities like nasality and so forth. Then there are two temporal ones: the rate, that's things going faster or slower, or the duration for which anything is held, shorter or longer. I suspect that the vocal dynamic set of parameters, the seven—I mean, seven is not inscribed in stone, maybe it's eight, maybe it's nine, I don't know, however you divide it—in any case, it's a gradient system, it's an analog system. I suspect it's a more ancient system which was already present in animal communication. Animals have long since had the capacity to vary things in terms of magnitude, like loudness, or extent of gesture, speed and pitch, all those kinds of things. I suspect that that analog system is more ancient, and simply was carried over into modern-day language as a vocal dynamics system, side by side with the

newly evolving phonetic quality system which has this digital character. That's my guess.

By contrast, go look at the number of separate individual parameters in sign language. Each of these eight parameters in spoken language can vary independently; they are totally independent variables, they owe nothing to each other. In sign language, there is a list of some thirty by my count—this is my analysis of it, and I am a novice of sign language analysis—some thirty independent variable parameters present in a sign language system. This was part of the fifth or sixth talk I gave, where I went into detail into contrasting the spoken language system for representing the spatial domain and the sign language one. There are many different sign languages, including a Mandarin sign language, I mean one signed in parts of China. But I'll illustrate with the American Sign Language—ASL. All sign languages seem to have a specific subsystem which is generally called the classifier subsystem, poorly named, but that's what's it called, and it's separate from the system of lexical signs. This is the lexical sign for *book*, this is the lexical sign for *enter* and their modulations. That's a separate kind of system. The classifier subsystem is totally devoted to representing objects moving with respect to each other in space. That's all it does. I'll repeat the example that I gave when I gave this talk. The right hand, the dominant hand, represents the object that is moving, the location of the Figure. It could be a ground vehicle or aeronautic vehicle or an animal or a person moving along, it could be any of these. The other hand is the Ground object, the reference object with respect to which the Figure moves. This could be a tree. This then could be *A car drove past the tree*. In addition, you can vary many aspects of it, and these are all independent parameters, which can be represented concurrently with each other, and each varying separately. First it's the path then, relative to the Ground, it could be uphill, drove past the tree, could be up a curved hill, could be up a bumpy, curved hill, could be fast, could be that the road could pass close to the tree or far from the tree this way or this way. Let's say it is close to the tree, it could start further way, or could start close to the arm and further way. All these things are possible. You can concurrently layer one kind of dimension, one kind of parameter, on top of another.

Each of these dimensions is listed separately as one of the thirty on the list. I'll skip right past the thirty. In addition to simply having more available independent parameters in any given channel, you also have to use them. I mean they might be available, but do you use them? It turns out that modern-day sign languages use every one of these thirty a lot, independently. If there is a category of parameter range, you could say that sign language has parameter spread. It uses all if its different parameters. Spoken language, even though it has eight, doesn't use all of them very much to convey most of its conceptual

content. It mainly relies on the first one, the phonetic quality one, in which, by the way, I would include tones in Chinese under No.1, rather than pitch. It has what I would call parameter concentration even though it has a few parameters at least in its list. It uses parameter No.1, more than all the other parameters together, to convey conceptual content. So it has parameter concentration.

The interesting thing is that with parameter spread, one thing that sign languages do in this particular classifier subsystem is use different kinds of movement to represent different kinds of conceptual content. True, the conceptual content all pertains to objects moving relative to each other in space. Still, that has different aspects to it, and a number of different aspects are separately represented by different ones of these parameters. For example, the kind of object moving is represented by the hand shape, be it a car or plane. The distance between the Figure and Ground is represented by the distance between the Figure and Ground. The speed at which it's moving is represented by the speed at which it's moving. The angle of the path is represented by the angle of the path, straight.

First of all, that's iconic. But the point here is that you've got a subdivision of qualitatively different kinds of information, conceptual content, represented severally by distinct kinds of motions, so they're categorized into different slots, whereas spoken language is radically different from this. This whole range of conceptual content, with all these different kinds, is all channeled down to one parameter: phonetic quality, I mean, all the different phonemes as they are grouped together into morphemes and then into sentences. It's all funneled together in just one type of parameter, all these distinctions as to speed, rate. For example, if I try to say in English something like *The car sped bumpily up past the tree on a curved road*, it's all done with one parameter, phonetic quality. The separate types of information are not subdivided into separate different types of motions. There is an example of parameter concentration for you. Presumably the logic of why this happened is that as spoken language evolved, in order to overcome this bottleneck, it had to rely on digitalization, and it did so in a big way. It picks one parameter, went digital with it, and put all its eggs in this one basket.

All this is by way of showing the limitations of the vocal-auditory channel; it'll prove relevant a bit later. For now, just for completeness, let's look over what's needed, what's available in any channel that is necessarily both a production and a perception channel. For anything to serve as an available parameter in it, it has to be good for both components of the channel. There are some things in each of these channels that are unavailable precisely because they only exist in one of the components. For example, in the manual-visual channel, some relevant distinctions are available visually to the perceptual

part, such as texture or color, but are not readily representable by manual representations. There's a bit of texture stuff available in ASL, this is 'dotted stuff' for example, but it's relatively minimal, and you certainly can't represent color manually in the same system. You can do this in a lexical sign, but not in this classifier system. And the other way around: there are some things available manually which can't be perceived, namely degree of pressure. Interestingly, there is a language for people who are both blind and deaf which is manual-manual, and that one does have available degree of pressure, but the standard manual-visual modality does not. So those three kinds of conceptual types are not included in that channel.

Comparably, in the vocal-auditory channel, some things are available to audition, to hearing, which are not available to speech. The main one, which is going to be important, is that you can hear the location of an object. A bird twittering over there or a bird flying through the air along a certain path, you can hear it. You can hear locations, sites and paths. But you can't do this vocally. Dummies can supposedly throw their voice, can make their voice sound like it's coming from over there or sound like it's moving, but it can't really be done. If it could, the language would have a nice available parameter for representing paths and sites and space, but it doesn't. Similarly, there are aspects of things that can be done vocally that you can't hear, like you can make all sorts of motions inside your mouth, but if you don't breathe them out, you can't hear them.

Let's switch to the next one, which is iconicity. Again the upshot is going to be that the manual–visual channel can be highly iconic, whereas the vocal-auditory channel is highly uniconic, in terms of relevant iconicity. The reason for going to some length on what sign language can do, is that it's an existence proof, it shows that we have the cognitive capacity to represent and to convey concepts through a system which is massively parallel and massively iconic. This system could have been used as the main communicative channel. It wasn't, but it is a kind of existence proof for its cognitive feasibility. That's one of the main reasons for going through this.

The advantage to iconicity is that if you've got a communication system which is iconic, it can directly represent the concept that it's standing for. Its very own form will automatically represent the content, and that's an advantage because without that, you have to independently develop symbols. You have to have a whole new cognitive kind of phenomenon which is symbols, which is where one kind of thing represents another kind of thing, or one form represents a concept that it is unrelated to, they have no commonality across them, and that might be cognitively costly. If there is an extensive system of communication, it means you've got to have a whole additional cognitive

system, a set of symbols of unrelated things, and a whole set of premises for encoding and decoding. You have to encode an idea into a set of unrelated symbols, and the hearer has to decode them back into the concepts. All this could be cognitively costly. That's why I say presumably it's an advantage to have as much iconicity as possible.

Spoken language doesn't have it and that's another disadvantage. This whole section of the talk is to demonstrate the limitations on the vocal-auditory system which is why it was inadequate as it was constituted back in the early hominid days to the task at hand. That's why there was a bottleneck. Let me describe what I think iconicity entails, because there really hasn't being a good analysis of iconicity. It calls for some kind of closer analysis, and here is one. First of all, I would distinguish between minimal iconicity, and a strong iconicity with additional correlating features. Minimal iconicity is when you've got two things which I'll called a form and an entity, where one aspect of the form represents some aspect of the entity, and that aspect is identical across the two. You've got iconicity if some aspect of the form is identical to some aspect of the entity which it represents, and then you can see that that aspect of the form is iconic of that aspect of the entity. For example, the English word *way* can refer to 'at a great distance'. If I say *it's way over there*, I mean it's over there at a great distance between me and it. Spoken language does have just a bit of iconicity in this case. You can say *it's waay over there*, the vowel extended, *It's waay over there*. The aspect of the form is increased vowel duration, and that represents increased extra distance. *Waay over there* is further than just *way over there*. So we've got iconicity. The iconicity is that there is a particular dimension, namely increased quantity along some parameter, and in this case it's along the parameter vowel duration. It's increased there, and it's increased here in terms of the referent, where it's increased distance of separation in space. Furthermore, this increased duration represents that increased separation. That's minimal iconicity.

In addition, you want covariation as part of strong iconicity. The first part is if you've got covariation. That's the addition to it. For example, covariation means you've got several different versions of this aspect, and several other different versions in the entity, and they correlate. I'm calling that covariation. For example, if I say *it's waay over there*, this link correlates with that. This duration correlates with that length. If *it's waaay over there*, that extra vowel duration correlates with that extra increased length, much, much longer.

Another one is that they are proportional. It could have been simply that there are several different varied versions of this aspect, just different lengths. It could be that the shorter length one corresponds with the longest one of the spatial length. They wouldn't have to correspond. But if they correspond in

line, short, medium and of an extra vowel duration: *way, waay, waaay*, forming a line, then they are proportional to each other. If that is in fact iconic with the shorter extra length, middle extra length, and longest extra length, then they are also in agreement in terms of proportionality. And if they do it in step instead of reverse, that they are in fact directly proportional. That's the third one. They have proportional directness. It could be that the longer you say the vowel, the shorter the extra length is, but no, it's the longer the vowel duration, the longer the extra distance. So they are covariant, coproportional and codirect in their proportionality.

In addition, you can have cogranularity. By granularity, I mean if something is either continuous or discrete. In this case they are also cogranular. The vowel duration can be increased in length continuously, and that corresponds approximately with a continuous increase in extra length of separation, extra distance. So they are cogranular, and in particular, they are cogradient. There are other cases where they are not the same form of granularity. You can say *The bird flew up, up and away* or *The bird flew up, up, up and away,* or *The bird flew up, up, up, up and away*. Actually, Superman did that—that's the phrase from Superman's comic books. Here on the language side, the form side, it is discrete, how many *up*s we use in it. It's discrete, but it's referring to a gradient degree of distance. You've got a disconnect: these two forms are not iconic with respect to this parameter of granularity, whereas the *waay* example is.

Finally, they can be codimensional. If you've got all of these, you have the strongest degree of iconicity. It turns out the example *it's way over there* lacks this codimensionality. That's because *way* exists in the dimension or the domain of vowel duration in time, whereas the entity it is referring to refers to the domain of distance in space. So they are not codimensional. They lack that iconicity. Maybe for example, if you use the word *loud*, and say it louder and louder to refer to how loud something was. *He spoke loud, he spoke LOUD*, like that, then you have all of these things plus being codimensional. Because the very loudness you're using is in the same dimension or domain as what it is referring to. That's the strongest degree of iconicity you can have. That's by way of characterizing iconicity.

Sign language has an enormous amount of iconicity and it's often of the strongest type. Almost all those 30 parameters, I give you for sign language, all but two of them, are really iconic, and many of them have the strongest form. For example, if I indicate that something is moving up like that in this classifier subsystem, it's strongly iconic in all six ways. If my hand moves up, it indicates that the object I'm referring to has moved up. It doesn't mean that it moves down. It doesn't mean that it moves in a circle. It doesn't mean that it got brighter. It means all the same things. Furthermore it's even in the

same dimension, because both the form and the referent are in space, they share a domain. So it has the strongest form of iconicity. Furthermore, all the different 30 parameters are relevant. It turns out that relevance is important in the realm of iconicity. Something could be iconic but of low communicative relevance. It turns out that spatial aspects of objects are of a high degree of relevance in communication. People are often talking about objects located or moving through space, so it has a high degree of relevance, by contrast with, let's say, the temperature of objects. People seldom talk about the temperature of objects. Of all the properties of things that are around, the locations and paths of objects are relevant to communication, but the temperature is low. Why should that be? It's a separate question which can be investigated separately; it's not part of this investigation. It turns out that all these 30 things that I just showed for sign language are in fact relevant. Other things that might be relevant to communication in sign language such as degree of pressure, color and texture, cannot be readily represented in this classifier subsystem. So that's by contrast; it's a case of things that are more or less relevant for communication, I presume, but are not readily represented.

By contrast, let's switch to spoken language. It has extremely little iconicity. First of all, it has several forms of iconicity, but they just simply aren't of much relevance to communication. For example, timbre, one of the parameters of spoken language, is strongly iconic. For example, I can change my voice to sound like some other person's timbre or way of talking, I can imitate George Bush, but it's seldom relevant to communication. I mean I guess it could have been, but it doesn't come up much. So, here is a form of available iconicity which is not relevant.

Secondly, and here is a part which is kind of curious to me, there are forms of iconicity which spoken language does have, and which are extremely relevant, but curiously don't get used in the language system. I don't know why, but I can show how they might have been used. For example, the temporal parameters of rate and duration could have been used, such that you could speak faster for something that moves faster, and slower for something that moves slower, in an iconic way. If language had been arranged in such a way, you could have slowly said *The pen lay on the table, rolled to the edge and fell off* [with varying tempo]. But it doesn't exist. Similarly, you could have had an iconic system of duration. How long you took to say something, the pauses in between, could have been iconic with the duration of the thing you're referring to. For example, you could have said *I came in the room... sat down... and fell asleep*. You could have had durational extent built into language, iconic with the thing it's representing, but that never works its way into the system. Why? I don't know, possibly because language put all its eggs into the one basket of

phonetic quality and just ignored the other parameters which were available to it for use in conveying additional dimensions of conceptual content.

Finally, spoken language doesn't have available to it all sorts of aspects which are iconic. In particular, it lacks any means of representing objects moving through space. Precisely because, as I indicated, you can't throw your voice and speak the way that indicates where the objects are. You can in sign language, you just indicate where something is. You can't do it vocally. You could hear it but you can't produce it vocally. So, in spoken language, that channel is simply missing out on one of the great relevant parameters for communication, for things that people want to talk about. By this analysis, you can see that the vocal-auditory channel really is rather low in its available relevant iconicity. That's another limitation that produced the bottleneck.

All this has been by way of showing how the vocal-auditory channel was highly limited. It created the bottle of the bottleneck. In that metaphor, it prevented the speedy, subtle communication of different concepts, and it didn't change in terms of evolution. It had to stay the same. There is no way to overcome these limitations within spoken language, within that channel. But as a means of getting around that limitation, it developed this other thing which I will talk about next, namely digitalization or digitalness. It developed digitalness as a means to compensate for these limitations which it couldn't overcome by the nature of the entity. This whole section has been to bring into relief what these limitations were by showing another channel that we, as humans, have available and in fact use in the deaf community. It would have been viable, it's cognitively feasible, but for whatever reason it didn't get hit on as the channel for evolving for the communicative capacity.

The next whole section is to document how digital language, in fact, is. Language, in the vocal-auditory channel has, in fact, developed an enormous amount of digitalness, as many as eight different forms of it, each with its own specific characteristics. In terms of the four-way distinction, all of them are at least discrete, all of them are at least categorical, all of them are recombinant. Some, about 3 or 4 of them, are also emergent, have an additional higher level of identity of object. Possibly language may have more than any other cognitive system, or it may not, that depends on what is the case in other cognitive systems. Presumably, if we look at two points, we can't track the evolution of it because the intervening steps are not existent. I mean those critters haven't survived, but we can look at present day language and as linguists can identify the ways in which language is digital. We can retroject back to a time when you can imagine that whatever vocal-auditory system there was, was not digital in this way. Therefore, we can presume that it has to have evolved in the course of evolution, and can speculate on possible sequences for it and on which

element came in which stage and so forth. This first section of five really recapitulates what I said at the outside. I'm sorry; I won't go through it again.

Of the four things I consider to be part of digitalness, I go into great detail about what I mean by recombination. I develop it more explicitly. It's the notion that there is some in each of eight cases where we've got digitalness in language. We've got an inventory of discrete, unitized, qualitatively categorially distinct elements. Recombination takes place by selecting a subset of them from this inventory, taking some number of them, putting them in some arrangement that has certain properties, certain characteristics that are unique to that form of digitalness.

For example, it can arrange in terms of temporal occurrence. It can arrange sequentially in adjacency to each other, contiguity, different forms of arrangement. Each one will have different constraints that govern the possible arrangements. In other words, of these eight, it turns out that language has been so exuberant in its evolution of digitalness that it evolved eight different kinds of digitalness, each with its own patterns of arrangement and constraints on them. Let's go over some of them. Much of this is familiar to linguists. It's greater news to cognitive scientists. The knowledge I'm going to go through here is largely the material studied by linguists, so I won't dwell on it, because I guess we are mostly linguists here.

I'm going to divide this into the formal portions of language and the semantic portions. First, in the formal aspect of language, there are things which are analog, as we saw that vocal dynamics are analog. Some aspects are in fact recombinant, and some of them will be emergent. We combine phonetic features in different ways to produce distinct phonemes in any given language. In any given language there is an inventory of phonetic features, and for any given phoneme in that language, some subset of those features are selected and combined to form the phoneme. It's not only an arrangement, but the phoneme has a new higher level identity which is unrelated to its features. It's an emergent unit as well, it's got the highest form of digitalness. The kind of arrangement is concurrence. The various phonetic features co-occur with each other. The constraint on them seems to be simply whether they are compatible with each other, whether you can pronounce them, move your mouth in a way that makes them feasible for pronunciation.

The next example is phonemes into morphemes, and again in any given language we've got an inventory of phonemes. In any given case, you select some number, put them in a particular arrangement, and they again constitute a new higher level entity. The morpheme as I showed with *act*, its 't', 'a' and 'k', you get *act* and *tack* and *cat*. Different arrangements make different morphemes. It's a new emergent. The types of arrangements are typically

contiguous, sequentially one after another. Although that's not necessary, so for example, in the Semitic languages, you have a triconsonantal root, whose consonants don't have to be contiguous, vowels can enter in. That's a counter example, and tones in Chinese are another counter example. They cover the entire set of segmental phonemes. But apart from that, for the most part the kinds of arrangements of the phonemes are sequential and contiguous. The constraint on their arrangement has a name in linguistics; it's called phonotactics: the rules in any given language that govern which sequences of phonemes are permitted. In English you can say *stick*, but you can't say *ftick*. It's not allowed as a possible combination.

Another demonstration that the distinction between the phoneme level and morpheme level is a higher level emergent, I just gave, the *act* and *tack* thing. Another one is that a lot of morphemes share the same sound in the initial letter like *cat* and *cold* and *cut* and *could*, but there is no apparent commonality of meanings that goes through those. That's another demonstration of their working at different levels. You might assume that there was a conceptually closer relation, a continuum, like the colors of a rainbow: red, orange, yellow. With those there is a form of continuum of the sequence. You might expect that the phonetics or the representation of them might also follow the sequence. So you might have *red, redge, reg*, moving your way down your mouth. But no, that doesn't happen. Similarly, you might have thought that if you have *rib*, referring to a kind of bone, then if you went to *rid*, it would be the color of the bone. And *ridge* would be backbone, *rig* would be whatever. But no, you don't have a continuity. There are really two autonomous systems. That's why you want to call the morpheme an emergent. There is a kind of break in that that's called 'sound symbolism', or 'onomatopoeia'. But that's other part of another discussion.

The third one is morphemes into idioms. I think most analysts wouldn't have included that, but I will. It's where you have separate morphemes, each with its own use as a morpheme, but if you put them together you get an idiom, which is a higher level unit because it has a new identity, a new meaning, and it's own right. It can't be predicted from its components, that's what idiom means; otherwise, it's compositional. Here is why it's important, by the way. I gave this talk at a conference on language evolution, and there were a number of primatologists there. I talked to one, whose name I forget, who works on a kind of monkey called the putty-nosed monkey, which makes two kinds of sounds. Let's see if I can remember them. I forgot, she gave them to me, but I don't have them. I'll make up two sounds, 'honk' and 'put'. If you go 'honk honk honk', it means I'm anxious, something like a little anxiety, something might be going on. 'Put' indicates fear, 'got to get out of this place'. But if you go 'honk, honk,

honk, put, put, put', or 'put, put, honk, put, put, honk, put, put', you get some kind of idiom. What you've said means a new thing. It means 'Let's move to the next tree'. Anyway, idioms are an ancient phenomenon in primates. I wish I could have represented this correctly, but anyway I did it schematically. An example of idioms in English is you can put whole phrases together: 'to have it in for', so *He has it in for me* means 'have a grudge against and plan revenge against the other person to repay the grudge'. That's what 'has it in for' means. There is another idiom 'have it out with', which has nothing to do with the first one. If two people have had a growing kind of disagreement between them, and they have it out with each other, it means they finally air the grievance and try to work towards an open expression of what the problem is. Each idiom is composed of distinct elements and together they give you a whole new meaning. English, in fact, has a whole system of idioms built up out of a verb and satellite, or a verb and satellite plus preposition. For example, take the verb 'to turn'. 'Turn up' means for something to get found, like *My lost cufflink finally turned up*'. I lost it, and finally it turned up at the bottom of the hamper. That means it became found. 'Turn down' is to reject, to turn down a proposal. 'Turn in' means go to sleep: *I turned in for the night*. There's no relation between any of these with 'turning'; any relation that you might see is fanciful. You might introject into it some kind of fanciful metaphorical sense, but it's not necessarily there. 'Turn out' means for something to eventuate. *He turned out to be right or wrong* means 'after some period, this is the way the actuality was'. 'Turn on', as in *She turned him on to Rilke* means 'she aroused his interest in Rilke', a German poet. 'Turn over', as in *Somebody turns stolen property over to the police* means 'to give to the authorities'.

These are active system in every language as far as I can tell, and in fact, I suspect this is one of the main systems, because without it you'd have to have a vastly greater set of distinct morphemes. Apparently there's some constraint on the number of distinct morphemes you can remember with their sounds. It seems easier to store combinations of these morphemes, each with its own new distinct meaning. Anyway, that's the third type and that's also emergent, because each idiom is an emergent new property.

I forgot to mention that all this take place within a single word or across a sentence. You have idioms within words, too. For example, *considerable* is from 'consider' and 'able', literally it could mean 'able to be considered'. But it's also an idiom, it means 'rather great'. So you can have an idiom within a complex word made up of several morphemes.

The fourth level of this is just syntax. Within the fourth level you can have morphemes or idioms or words. Morphemes or words, whether they are idiomatic or not, incorporate into whole expressions. This again is totally

recombinant. Again you have an inventory, and the extended lexicon consists of the morphemes and the idioms within it. Then you combine them into various patterns and the combination is pretty much contiguous and sequential. The constraint on this is called syntax, which you can spend your life on. Chomskian linguistics fits in that corner, that's where syntax fits, in terms of this particular kind of analysis.

That's the formal property. Semantically, you have similar kinds of things in terms of elements of meaning. Sorry, just go back to for a second, I'm saying that syntax is not an emergent thing, because the meaning of the whole expression is pretty much derivable from the meanings of its components in their particular interrelations. If you've got the interrelations, the constructions, and the meanings of the morphemes as well as the idiomatic elements within there, then you can pretty well derive the meaning of the whole sentence. It's not a distinct new identity, it's compositional.

On the semantic level, we've got, first of all, the semantic components that go into the overall meaning of any single morpheme or idiom. Again, what is the nature of the inventory? Part of my earlier work that I spoke about earlier is that there are two kinds of forms in languages. There are open-class forms and closed-class forms. The closed-class forms are grammatical types of forms, like prepositions and conjunctions and inflections. In my proposal they are composed of semantic elements which come from a relatively closed inventory of possible grammatically useable concepts. It's a relatively closed inventory, and it's universally available. All languages draw from it but you don't use any concept outside it. So it's relatively closed. In that respect, the inventory that you draw from is relatively closed, and any given closed-class form, in any given language, draws from that particular set of elements and its mode of combination is concurrent. The semantic components are realized in the same instant as you hear the morpheme, and the kind of pattern of arrangement they go into is a schema. Various linguists, including me and anybody who works on schemas, has been at some pains in characterizing how the different fundamental semantic components relate to each other in these schemas, the particular patterns of arrangement and so forth. I give one example of that, the preposition *past* in English, as in *The ball sailed past my head at exactly 3 o'clock*. I gave that example earlier; I'm not going through it now. I do provide in this handout a repeat of what I gave before, which is the numerous semantic components that go into this simple morpheme 'past' and their particular arrangement. For example, if you say *The ball sailed past my head*, it means it passed through a point to one side of the side of my head. If it didn't go past that point here, but one here, you would say *The ball sailed into my head*. If it were not horizontal but vertical you would say *The ball sailed down alongside me*. If it were in front of my head, you'd say *The ball sailed in front of my head*. If

it were here, you'd say *The ball sailed over my head*. The meaning of 'past' consists of a certain set of fundamentally identifiable components in a particular schematic arrangement. That's the semantic part, and languages evolve that too. I don't know if that exists in other cognitive systems, but it certainly exists in language.

Finally, the semantics, the meanings of individual morphemes and of idioms, then combine together into the whole meanings of sentences and of discourse in general, in a kind of compositional way. It's an issue whether or not any given lexical item is an emergent or not. There are two arguments: on the one hand, you could say 'no, it's not emergent', because after all, the meaning of a morpheme like the word 'past', is exactly and nothing more than the meaning of its components in their particular relationships. Or you can say that languages have these morphemes, they are kind of prepackaged units which don't let those components disperse. They package those units in a particular way. Maybe they do form a kind of packetted gestalt form of concepts. So maybe they should be taken as a kind of higher level, separate, new entity. I don't know.

Anyway, that gets you through the six or eight, depending on how you count, ways in which language is digital. The upshot of all this is that digitalness in language is extensive. Furthermore, it has several, possibly as many as eight, distinct kinds of digitalness, given there are different forms of arrangement and constraints on these arrangements, each of which could perhaps have evolved at a separate rate, at separate times and on a different bases. It's hierarchically structured, so within digitalness itself I have four different components that make that up, and within the formal characteristics of digitalness one sort of feeds into the next: discreteness feeds into categoriality, which feeds into recombinance, which feeds into emergentness. This hierarchical character is also very complex.

I think what I should next do is just to skip to the part of work where I show how this digitalness that we've now established in language may have overcome the bottleneck. I'm going to try and show how some of these digital things compensated for the bottle part of bottleneck. We had a noisy medium between people. How do you compensate for that? I'm presuming that the manual-visual channel is a much cleaner medium unless there's a fog or something. A visual system is such that it can discern much more finely differentiated kinds of things, whereas the vocal-auditory channel is in the medium of sound, which can be at a distance rather noisy and rather poor. How do you overcome that? It seems like digitalness has done that in several ways.

First, it does it by discreteness itself, so that you know that you've got another identity of unit instead of having to discern some degree of gradience. That would hinge on whether or not you've got the right degree of gradience.

Instead you just have to have enough to identify that I'm in this unit, or I'm in that unit. So discreteness helps. It also helps to have a relatively small, preknown, agreed on inventory between the sender and receiver, so you know that the inventory is only going to be of a certain set number and nothing outside it. All that helps you overcome the low fidelity.

One of the other things is the fact that spoken language has low parallelness; it has very few parallel parameters going on at the same time, which means that, in contrast with sign language, relatively less information can be conveyed, because you've fewer channels to convey it over. What's the way to compensate for that? Because that will slow you down, you compensate for it by having greater speed. You get greater speed by having digitalness, because if you can identify units more accurately, you can introduce them into the channel at a quicker rate. Your loss of speed over low bandwidth is compensated for by greater distinctness of the digital character. This same is true in electronic formats today, I mean, just the same logic, which evolution overcame. Let's see what time it is, we are getting late. I'm going to skip the rest of this; you get the idea of what I mean by compensations.

Very quickly go to section 9, in part 4. Since it's pretty late, I'll just give kind of a taste of what I have in mind for this. This handout represents my latest thinking, which is more advanced than the written version, but everything I've written is on my website, including this new paper I was just talking about. It's on my website; it's called *Recombinance in the evolution of language*. The question is, do other cognitive systems have anything like this kind of digitalness? Two parts of this, namely discreteness and categoriality, I think do exist in other cognitive systems with some extensiveness. For example, within visual perception, the mere fact that you can identify an object like a bottle, you just look and you know it's a bottle. The identities of objects are discrete kinds of things. They are not continuous. That's an aspect of discreteness and categoriality in vision. Maybe you have them in motor control, maybe they are discrete motions like bending at the waist, or bending at the knee, which could be considered as a discrete motor element. Maybe some part of your cognition treats it that way, I don't know; if so then we've got something similar there. Within vision, hue, namely color, like red, green, yellow, is discrete in a way that brightness or saturation is not. Usually color is defined in terms of hue, brightness, and saturation. Brightness is a gradient, brighter or fainter; saturation is a gradient; hue is not. The way our cognition treats color perception is that it treats two of the aspects as gradient, as an analog kind of thing. One of them it treats as a discrete categorial kind of thing. We've got the affective system. Certainly humans and perhaps chimpanzees could experience, if they are conscious of them, that anger is a different, categorially distinct emotion from

affection. There could be categoriality, it's not just one gradient affective system. Like hue, there may be discrete kinds of emotion, so that exists. Language would have had no problem copying that, borrowing that, tapping into that; it could have established that relation.

But you are harder to put to identify forms of recombination and emergentness in other cognitive systems. There are potential candidates, for example. There is a theory of 'geons', by a particular perception psychologist, who believes that there are distinct categories of basic fundamental visual forms. He's influenced by language in this theory, so he may be going backwards. The notion is there are different geons, like cylindrical shapes, flat shapes, whatever, and the full shape of objects can be characterized as, for example, cylinders attached to other cylinders, with a sphere attached to the cylinder, something seen in that way. If so, maybe we've got an emergent kind of thing; there may be some kind of recombinance there. Maybe that's an example.

Maybe you have examples in motor control. Maybe bending at the waist and bending at the knee combine together and give you a gestalt emergent pattern, a notion of sitting as a sitting motor pattern. Maybe we have pre-hominid examples. For example, in the mating of the stickleback fish the female does one kind of motion, and the male does another, and the female does a different one, and if you are the right species then, you go on to a succession of patterns which then say it's okay to mate. Maybe that's an example of a gestalt, of an emergent higher level thing made up of components. It's kind of hard to find definitive cases of it, whereas the language ones are so clear, so definitive and so pervasive. Much more research will be needed in this particular interface to see if language evolved it afresh or borrowed it and elaborated it all to hell. We don't know.

The last thing we'll have time for is whether or not thought coevolved with language, so that aspects of our thought are now much more digital than they were before.

This is the tenth lecture, the last one out of ten. I feel like I'm one of the early entrants in the Olympics, in particular in the decathlon, which is, you know, ten events. Maybe I'm a harbinger of further Olympics to come.

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Handout Lecture 10

PART 1: Introduction

1 Overview

1.1 Possible evolutionary sequence

1.1.1 A bottleneck

In pre-language hominids, the vocal auditory channel, as it was then constituted,
may have been inadequate as a means of transmission for communication involving
certain levels of thought and interaction

This circumstance, if regarded metaphoriclly in terms of conflicting evolutionary
pressures / forces, could be seen as a bottleneck—one consisting of a conflict between these two factors:

A) the selective advantage of communicative transmission involving increased levels of 1) thought and 2) interaction
B) limitations in the means of transmission as then constituted

As to A1): within an individual, the capacity for thought—
i.e., conceptual content (including that pertaining to affective states) and its processing—
perhaps had the near potential to increase or was already increasing, in (the range of):

– the qualitatively different kinds of concepts dealt with
– the granularity of concepts, from broad to fine
– the abstractness of concepts, from concrete to abstract
– the complexity of concepts and conceptual interrelations, from simple to intricate
– speed

As to A2): communicative interactions among individuals perhaps had the potential to increase in:

– the encoding and decoding of advanced individual thought
– speed

As to B): limitations in the vocal-auditory means of transmission may have involved:
1) relatively few independently variable parameters = low parallelness
2) little relevant iconicity
3) relatively limited distinctional capacity
4) a relatively low-fidelity medium
5) due to the preceding, relatively low speed of transmission

1.1.2 Digitalization as a resolution to the bottleneck

Proposal: the bottleneck became resolved through an evolutionary change
on the means-of-transmission side of the bottleneck;
whereas the vocal-auditory channel had been largely analog,
it now greatly increased its capacity for "digitalness", which overcame its limitations
It thus shifted from being a largely analog system to being a mainly digital system

"Digitalness" has a lesser or greater extent, cumulatively built up from 4 successive factors:
A) discreteness: distinctly chunked elements, rather than gradients, form the basis of the domain
B) categoriality: the chunked elements function as qualitatively distinct categories
rather than, say, merely as steps along a single dimension
C) recombination: these categorial chunks systematically combine with each other
in alternative arrangements, rather than occurring only at their home sites
D) emergentness: these arrangements each have their own new higher-level identities
rather than remaining simply as patterns

(Note: digitalness here does not involve binary representation / a computational model of the brain)

The most important part of digitalness in the evolution of language is—
"recombinance": where recombination is present and at least some of it also exhibits emergentness

The increase of digitalness, and especially recombinance, in the vocal-auditory channel
compensated for its low parallelness, iconicity, and distinctional capacity
and afforded greater fidelity and speed
thus allowing the transmission of advanced thought with fidelity in rapid communication

1.2 Steps in the examination

A. demonstrating the limitations in the vocal-auditory means of transmission
B. demonstrating the extensiveness of digitalness in modern language and concluding that it must have evolved with language and overcome the limitations
C. surveying other cognitive systems as possible sources for digitalness in language
D. examining whether the character of thought coevolved with digitalization in language

PART 2: Limitations in the Vocal-Auditory Means of Transmission

The following are limitations in the vocal-auditory channel perhaps overcome by
the introduction or increase of digitalness in general and recombinance in particular

The first 2 limitations of spoken language below are set in relief by contrasting
spoken language—SpL—with signed language—SiL —specifically: with one of its subsystems, the "classifier system"—SiL-CS (characterized below)

Each of these communication channels involves a specific pairing of production and perception modalities
– SpL: vocal-auditory
– SiL: manual-visual
("manual" here also includes systematic facial and bodily expression)

SiL-CS will be seen to have much greater parallelness and iconicity
which are advantageous to transmitting concepts and would have eased the bottleneck
SiL-CS thus gives an existence proof of their cognitive feasibility

2 Extent of Parallelness: spoken language vs. signed language classifier system

= the number of independently varying parameters
with the potential of representing conceptual content
that can be produced and perceived concurrently—i.e., "in parallel"—together with the degree of their use

More parameters: "broad bandwidth" / fewer parameters: "narrow bandwidth"

The advantage to greater parallelness in communication:
more conceptual content can be transmitted in the same unit of time
or: the same amount of conceptual content can be transmitted quicker

2.1 SpL has many fewer independently variable concurrent parameters than SiL-CS

2.1.1 Independently variable parameters in spoken language

Table 1. Proposed set of parameters in spoken language

A. the main parameter—a discrete recombinant system (digital)
   1) phonetic quality

B. parameters constituting "vocal dynamics"—a gradient system (analog)
   2) loudness
   3) pitch
   4) timbre
   5) vocal effects (e.g., nasality, tenseness, breathiness, creakiness)
   6) distinctness (= enunciation, from sharp clarity to loose approximation)
   7) rate
   8) duration (e.g., relative segment length, spacing between words)

The analog vocal-dynamic subsystem may be more ancient and have been carried over
as the digital system of language evolved

(Note: some vocal dynamic parameters have also entered the discrete subsystem, e.g.,
pitch → tones / loudness → stress)

2.1.2 Independently variable parameters in the classifier subsystem of signed language

Every signed language includes certain subsystems
One subsystem, involving lexical signs and their manipulations, largely behaves
like the lexical and grammatical (open- and closed-class) subsystems of spoken language
Another subsystem has no counterpart in spoken language: the (poorly named)
"classifier" subsystem, dedicated to the schematic representation of objects moving or
located with respect to each other in space
It has a large number of concurrently realized parameters that
vary independently, are generally gradient and iconic, and hence
correspond in an individualized way to the referent situation
without any pre-set combinations of values.

One contrastive example of a spoken-language sentence and a signed-language classifier expression
in English: The car drove past the tree.

In American Sign Language (ASL): dominant hand (= Figure) in "3" handshape (= vehicle)
moved horizontally across nondominant (= Ground) vertical forearm with "5" handshape (= tree)
But ASL can add successive parameters to this basic classifier expression to represent more for:
– path: curved road; uphill course
– manner: bumpy ride; swift pace
– Figure-Ground relations: distance of car from tree; approach length vs. trailing length

Table 2. Proposed set of parameters in the classifier subsystem of signed language
—many of which can be realized concurrently in a single classifier expression
itself often in conjunction with lexical signs + inflections / face + body expressions
A. Entity properties
1) identity of Figure / instrument / manipulator

2) identity of Ground
3) magnitude of some major entity dimension
4) magnitude of a transverse dimension
5) number of entities

B. Orientation properties
6) an entity's rotatedness about its left-right axis ("pitch")
7) an entity's rotatedness about its front-back axis ("roll")
8) a. an entity's rotatedness about its top-bottom axis ("yaw")
b. an entity's rotatedness relative to its path of forward motion

C. Locus properties
9) locus within sign space

D. Motion properties
10) motive state (moving / resting / fixed)
11) internal motion (e.g. expansion/contraction, form change, wriggle, swirling)
12) confined motion (e.g. straight oscillation, rotary oscillation, rotation, local wander)
13) translational motion

E. Path properties
14) state of continuity (unbroken / saltatory)
15) contour of path
16) state of boundedness (bounded / unbounded)
17) length of path
18) vertical height
19) horizontal distance from signer
20) left-right positioning
21) up-down angle ("elevation")
22) left-right angle ("direction")
23) transitions between motion and stationariness (e.g. normal, decelerated, abrupt as from impact)

F. Manner properties
24) divertive manner (e.g., quick jerks out from straight path representing bumpiness)
25) dynamic manner (e.g., different speeds of motion along a path)

G. Relations of Figure or Path to Ground
26) path's conformation relative to Ground
27) relative lengths of path before and after encounter with Ground
28) Figure's path relative to the Path of a moving Ground

29) Figure's proximity to Ground
30) Figure's orientation relative to Ground

2.2 The use of the whole range of parameters is less in SpL than in SiL-CS

To transmit more conceptual content concurrently, it is important
not only for more independent parallel parameters to be available
but also for all the available parameters to be used to a significant extent
and perhaps to a comparable degree

Not only does SiL-CS have more parameters available than SpL,
but it also uses what it has to a greater and comparable extent

Positing a category of "parameter range" for the diversity of means used in representing conceptual content in some modality
– SiL-CS has "parameter spread", using its 30+ parameters to a comparable extent
– SpL has "parameter concentration":
the main parameter of phonetic quality is used to represent conceptual content
much more than all the vocal dynamic parameters combined

E.g., in a signed classifier expression,
the Figure's type is represented by a handshape
the Figure's path by a linear hand movement
the Figure's Manner by quick hand motions outside this linear path
the Figure's angle relative to the path of motion by the angle at which the hand is held
the distance between the Figure object and the Ground object by the distance between the dominant hand and the non-dominant hand

In stark contrast, all these different aspects of a motion event are represented in SpL
by one parameter: phonetic quality (formed in turn into morphemes and expressions)

Thus, SiL-CS uses a wide range of formats to represent different kinds of conceptual content; but SpL channels its representation of most kinds of conceptual content into a single format.

Why this difference in parameter range?
Possible general principle: a modality will tend to extend its pattern of use
to virtually all the parameters available to it, as in SiL-CS
SpL then breaks this principle due to its need for digitalness, characterized below
relying on its discrete recombinant parameter of phonetic quality
disproportionately more than on its gradient vocal dynamic parameters

2.3 Unavailable parameters
To round out the analysis: parameters not used to represent some category of content—

2.3.1 Because the parameter is available to only one branch of a modality's production-perception pairing
SiL: visually perceiveable, not manually produceable: color / texture
manually produceable, not visually perceiveable: degrees of pressure
(though this parameter IS available in the manual-manual communication system of the deaf-blind)

SpL: auditorily perceiveable, not vocally produceable:
– the locations and paths of sound emitting objects
since a speaker cannot "throw his voice", as some think ventriloquists do
– many sounds, e.g., rustling leaves, thunder claps, cacophony,
vocally produceable, not auditorily perceiveable: mouth formations without breath

2.3.2 Perhaps due to constraints on neuromuscular control (as it has evolved in humans)
SiL: angle at which elbows are held; SpL: respiratory direction / accompanying whistle

2.4 In sum
As a joint production-perception modality, SiL-CS, by contrast with SpL,
has available to it more independently variable parameters for representing conceptual content
and puts a greater proportion of its parameters to actual use
hence has the capacity to transmit more content faster

3 Extent of Iconicity: spoken language vs. the signed language classifier system

The advantage to greater iconicity in communication:
fewer arbitrary symbols are needed to represent conceptual content
and, if extensive, an entire system of symbols is not needed
thus presumably lessening the cognitive load otherwise involved in
establishing stable symbols, encoding concepts into them, and decoding them into concepts

3.1 Characterizing iconicity

3.1.1 Minimal iconicity

Given some *form* that represents some *entity*:
an aspect of the form that is the same as an aspect of the entity,
and that also represents it, is iconic of it.

Example:
Against the background that the form: *way*
represents the entity: (the concept of) the spatial configuration 'at a great distance'—
the form *waaay* as in *It's waaay over there.*
represents the entity 'at a very great distance'
One aspect of this latter form, "extra magnitude along a scalar dimension"
— here realized as extra vowel duration—
is the same as one aspect of the latter entity
— here realized as 'extra length in the distance'—
and this aspect of the form also represents that aspect of the entity
Hence, it is iconic of it

3.1.2 "Strong iconicity"

A gradient of increasingly strong iconicity occurs with the largely cumulative addition of
the following iconic features between a form and its represented entity

a. Covariation: the form can exhibit any of a set of alternative aspects
each of which equals and represents a corresponding alternative aspect of the entity

e.g., the basic morpheme *way* can exhibit different extra magnitudes along
a scalar dimension (here, differently longer vowel durations), as in:
It's waay / waaaay / waaaaaay over there.
and these equal and represent a corresponding set of different extra magnitudes
in the entity (here, different extra lengths in a distance)

b. Proportionality: the variations that correspond across form and entity, as in (a)
are not just qualitatively different from each other
but can be ranked according to degree in a sequence of correspondences

e.g., *waay / waaaay / waaaaaay* are not just qualitatively distinct variants of *way*
but fall into the sequence just shown according to vowel duration
The same holds for the 3 extra lengths of distance in the example in (a)
and the two sequences correspond—i.e., the form and entity aspects vary proportionally

c. Proportional directness: the ordered sequences of the form's variations and of the entity's variations in (b)
both increase or decrease in correspondence with each other
i.e., their covariation is directly proportional, not inversely proportional

e.g., increasing vowel duration in *way* corresponds in the entity
to increasing length of distance, not to decreasing length of distance

d. Cogranularity: the directly proportional sequences corresponding across form and entity in (c)
are both gradient or both discrete: "cogradient / codiscrete"

e.g., vowel length increase in *way* is gradient
and corresponds to a gradient increase in length of distance in the entity
Hence the two exhibit cogranularity—specifically, they are cogradient

Example of non-cogranularity: the number of repetitions of *up* is discrete in
The bird flew up up / up up up / up up up up and away.

but it shows directly proportional covariation with a gradient:length of distance in the entity

e. Codimensionality: the aspects of a form and the corresponding aspects of an entity are
in the same qualitative dimension / domain

e.g., covariation in *way* and in distance are not codimensional because one is in temporal duration while the other is in spatial length
thus, this form and entity are:
covariant, coproportional, proportionally direct, and cogradient, but not codimensional
But if the form *loud* can be uttered with increasing loudness to represent
increasing loudness in the entity referred to by the form,
then this form and entity have all 5 forms of strong iconicity, including codimensionality

3.2 SpL has a much lesser extent of relevant iconicity than SiL-CS

"extent" = the number of distinct forms of iconicity both available and in use in a modality
—distinct forms of iconicity perhaps = number of independent parameters that have iconicity
"relevant" = relevant to communication: involving referential areas that occur
in communication more frequently, more pervasively, or more ramifiedly
(for reasons that themselves can be separately examined)
e.g., the motion and location of objects more than their temperature

3.2.1 The extent of relevant iconicity in the classifier system of signed language

a. Parameters available and relevant

In SiL: of the 30 parameters in Table 2 for the classifier subsystem,
all but the first two are iconic with the conceptual content they represent,
all these 28 are available, communicatively relevant, and in use

E.g., particular placements/motions of the hand(s) correspondingly represent an entity's:

rotatedness about its left-right axis [6], locus in space [9], motive state [10],
path contour [15], path length [17], vertical height [18], manner of motion [24],
rate of motion [25], Figure's proximity to Ground object [29]

Most of these hand movements have the strongest iconicity with their referents:
covariant directly proportional cogradient codimensionality
they are codimensional because both form and represented entity are in the same domain: space
E.g., greater motion of the dominant hand upward represents greater motion of the Figure object upward
not, say, greater motion downward / more circular motion / more beauty
Greater speed of the dominant hand can represent greater speed of the Figure
not, say, slower speed / larger size / brighter color

b. Parameters unavailable though relevant

Parameters that are iconic and seemingly moderately relevant, but not available to SiL
because they are not in the production-perception pairing seen above:
only visual, not manual: texture / color; only manual, not visual: pressure

3.2.2 The extent of relevant iconicity in spoken language

a. Parameters available but of little relevance

In SpL: of the 8 parameters in Table 1, all but the first—i.e., all the vocal dynamic parameters
can be iconic, some strongly so
but they are largely of little communicative relevance, hence in little use

E.g., a speaker can use timbre [5] to represent other people's voices
with covariant directly proportional cogradient codimensional iconicity
but this is not of pervasive relevance to communication

b. Parameters available and relevant but not in use

Curiously, both temporal parameters, rate [7] and duration [8],
can be strongly iconic and COULD be relevant
but they are not used to represent rate / duration for depicted events

Attempted example of using vocal rate to represent rate of motion:
uttering the 3 phrases below successively faster iconically with the depicted speeds:
The pen lay on the table, rolled to the edge, and fell off.

Attempted example of using duration in speech to represent duration in occurrence:
inserting successively longer pauses between the phrases below
iconically with the successively longer intervals between the depicted events:
I entered, sat down, and fell asleep.

The reason for not taking advantage of the available temporal iconicity?
Perhaps due to the commitment SpL, in evolving, took to the single format
of the phonetic quality parameter [1] to represent conceptual content

c. Parameters unavailable though relevant

Parameters that are iconic and relevant, but not available to SpL
because they are not in the production-perception pairing seen above:

only auditory, not vocal: the location / path of a (sound-emitting) object

Thus, SpL simply lacks any iconic means for representing highly relevant spatial properties
that SiL-CS has in abundance

3.3 Why the SpL/SiL difference in extent of relevant iconicity?
Possible general principle: a modality will tend to extend its pattern of use
to virtually all the relevant iconicity available to it
Basically, this is done by both SiL and SpL (with that SpL exception for temporal iconicity)
But, as a modality, SiL simply contains more, especially the many spatial parameters

4 Other Limitations
The following are further possible limitations in the vocal-auditory channel
that digitalness may have compensated for

4.1 Limited distinctional capacity
Within the vocal-auditory channel, vocal production may be relatively limited in
the number of readily distinguishable sounds or short sound complexes (such as calls) it can make
—perhaps less than manual production in the manual-visual channel
If each sound or complex were to holophrastically represent a single concept,
the channel could not represent the large inventory of basic concepts within advanced thought
Digitalization—specifically, recombinance—may have overcome this

4.2 Low Fidelity of the medium
The transmission of information from one point in a brain to another largely is effectively analog
but it involves multiply parallel pathways, with much redundancy , over short distances
in a medium dedicated to such transmission, hence with less noise
Accordingly, it has relatively high fidelity
It can thus afford to be largely analog

However, vocal-auditory communication between separate organisms involves few pathways over long distances in a noisy common medium
Accordingly, it has relatively low fidelity
Digitalization may have overcome this

PART 3: Demonstrating the Extensiveness of Digitalness in Spoken Language

Whereas SpL has little parallelness and relevant iconicity—much less than SiL-CS
it has extensive and elaborated forms of digitalness
— much more than SiL-CS (as periodic contrasts below show)
This level of digitalness would seem to have evolved with spoken language
How it surmounted the limitations in the means of transmissioncan be shown

5 Characterizing digitalness

5.1 Digitalness can be lesser / greater—comprised of four cumulative factors

the extent of digitalness = the cumulative extent along 4 successive factors
Each factor has a less digital pole and a more digital pole
and each successive factor builds only on the more digital pole of the preceding factor

1) state of discreteness (granularity)
   a. gradience vs.
   b. distinctly chunked elements
2) state of categoriality—applying only to distinct chunked elements [1b]
   a. simply discrete steps along a parameter vs.
   b. qualitatively distinct categories with separate identities in their own right
3) state of recombination—applying only to qualitatively distinct categories [2b]
   a. occurring solely with their own identities at sites relevant to those identities vs.
   b. also combining systematically in alternative arrangements with respect to each other
4) state of emergentness—applying only to alternative arrangements [3b]
   a. simply patterns resulting from the process of arranging vs.
   b. new higher-level entities with their own identities

Note: new identities are associated with both categorial and emergent entities; the difference:
in categoriality, there is a new identity in association with discreteness
in emergentness, there is a new identity in association with an arrangement.

5.2 The factor of recombination: a finer characterization

Recombination: a system in which discrete categorial units with distinct identities
— drawn with various selections and in various numbers from an available inventory—
combine in alternative arrangements of a certain type
in accordance with a system of constraints on possible arrangements,

Note: each variable in the above formulation is spelled out in the specific cases below

5.3 The factor of emergentness: a finer characterization

Emergentness: a cognitive system in which the different combinations of 5.2
represent new higher-level entities with their own separate novel identities.

These identities bear no systematic relation to the identities or arrangements
of the component units that make up the combinations,
and they bear no systematic relation to each other due to
any commonalities among the identities or arrangements of those component units.

Hence, the higher-level identities are not predictable from the components' identities or arrangements
—that is, they are "arbitrary"

5.4 "Recombinance" is based on both recombination and emergentness

I distinguish recombination and recombinance

Recombinance is a system in which recombination exists
and in which some forms of the recombination exhibit emergentness

6 The Forms of Digitalness in Spoken Language: Discreteness and Categoriality

6.1 Gradient

In vocal-dynamics, parameters 2–8 (in both production and perception)

Compare SiL-CS:
- many of the parameters, e.g., locus of a hand within sign space,
- contour or length of a path of motion, distance between Figure and Ground

6.2 Discrete but not categorial

Only low-pertinence cases, e.g., the phoneme count of morphemes

Compare SiL-CS:
- size of an object represented by a classifier, commonly in 3 discrete values
- e.g., handshapes for a small / medium / large planar disk
- these are just chunked steps along the single parameter of size, not independent categories

Note: it is mainly this case in SiL-CS that has justified
- my establishing a distinction between discreteness and categoriality
- since most other relevant cases are both discrete and categorial

6.3 Discrete and categorial

Phonetic quality (parameter 1) is perceived categorically as distinct types of entities
- (and perhaps also produced categorically as distinct types of entities?)

e.g., sound series from exaggerated [b] through [p] heard as either "b" or "p",
- with the switch occurring at one point in the continuum

Compare SiL-CS:
- handshapes for Figure / instrument / manipulator / Ground represent discrete and
- categorically distinct types of entities (hence the term "classifiers")

Thus, the handshapes, e.g., for 'ground vehicle' vs. 'aircraft'
- cannot be gradually morphed one into the other to represent a series of hybrid machines
- that progress in design from a ground vehicle to an aircraft

7 The Forms of Digitalness in Spoken Language: Recombination and Emergentness

Applying only to the discrete categorial entities of the "categorial" pole above,
recombination is extensive in spoken language
— both formally and semantically (treated separately below)
Formal recombination occurs on 4 levels, roughly one feeding into the next
features → phonemes → morphemes → idioms → expressions
Semantic recombination occurs on 2 levels, roughly one feeding into the next
semantic components → morpheme meanings → expression meanings
Any unit at each level is composed of units from the prior level(s)
Each kind of recombination has its own
a) type of arrangement
b) set of constraints on the arrangements
Some of the levels of recombination also exhibit emergentness

7.1 In the formal structure of spoken language

7.1.1 **Non-recombinational**—as a foil against which to compare the recombinational types

vocal-dynamics parameters 2–8 (not phonetic quality, parameter 1)
these are realized independently, without entering rearrangements relative to each other,

7.1.2 Phonetic features → phonemes: recombinational and emergent

A. Description
Phonetic features with certain identities, drawn with a certain selection in a certain number
from a language's phonetic inventory—itself a subset of a universal inventory—
combine to constitute a higher-level entity, a phoneme, with a particular new identity
Different combinations of phonetic features constitute different phonemes

B. Arrangement properties
1) type of arrangement: cooccurrence (of the features comprising the phoneme)—the simplest type

2) constraint on arrangements: compatibility (of the cooccurringphonetic features with each other)

7.1.3 Phonemes → morphemes: recombinational and emergent

= Martinet's (1949) "double articulacion" / Hockett's (1958) "duality of patterning"

A. Description

Phonemes with certain identities, drawn with a certain selection in a certain number

from a language's phonemic inventory

combine to constitute a higher-level entity, a morpheme, with a particular new identity,

This identity includes a particular associated concept

Different combinations of phonemes constitute different morphemes

B. Arrangement properties

1) type of arrangement: mostly sequential and contiguous

exceptions: tone is concurrent; Semitic triconsonantal roots keep sequence, not contiguity

2) constraints on arrangements: phonotactics

C. Demonstrations of noncorrelation between phoneme identities and morpheme identities

1) /k/, /t/, /æ/ → cat, tack, act

2) /k/ occurs first in cat, cut, can, cold with no systematically shared meaning component

3) phonemically unrelated morphemes represent successive spectrum colors: red/orange/yellow

not morphemes showing successive places of articulation: red/*redge/*reg

4) conversely, morphemes showing successive places of articulation: rib/rid/ridge/rig

do not represent succession of bone types: rib / *vertebra / *sternum / *clavicle

7.1.4 Morphemes → idioms: recombinational and emergent

A. Description

Morphemes with certain identities, drawn with a certain selection in a certain number

from a language's morphemic inventory—i.e., its lexicon—
combine to constitute a higher-level entity, an idiom, with a particular new identity,
This identity includes a particular new associated concept
Different combinations of morphemes constitute different idioms

B. Arrangement properties
1) type of arrangement: mostly sequential—not necessarily contiguous—locations of morphemes within a word or expression
2) constraints on arrangements: largely those of morphology and syntax
i.e., of the usual compositional kind for morphemes in nonidiomatic constructions

C. Demonstrations of noncorrelation between morpheme identities and idiom identities

1) morphemes within a word
considerable: (literal 'able to be considered' or idiomatic:) 'fairly great'

2) morphemes / words within an expression:
have it in for: 'nurse a grudge against with the intent of getting revenge on' (state)
vs. *have it out with*: 'finally air openly a implicit growing dispute with' (event)

Table 3. the English verb *turn* plus particular satellite and/or preposition
– turn up 'become found' *My cufflink turned up at the bottom of the clotheshamper.*.
– turn down 'reject' *I turned the offer down*.
– turn in 'go to sleep' *I turned in for the night.*
– turn out 'eventually be realized'
It turned out that he had been telling the truth all along.
– turn X on to Y 'rouse X's interest in Y' *She turned him on to Rilke*.
– turn on X 'suddenly attack X after being allied with X'
When he objected, his friends turned on him.
– turn X over (to Y) 'give X to the authorities Y'
They turned the stolen property over to the police.

7.1.5 Morphemes and idioms → words and expressions: recombinational, not emergent

A. Description

Morphemes and idiomatic combinations of morphemes with certain identities,
drawn with a certain selection in a certain number
from a language's inventory of morphemes and idioms—i.e., its "expanded lexicon"—
combine in different arrangements to constitute a complex word or an expression

Word formation and expression formation are treated separately here because they involve different patterns of recombination

B. Arrangement properties for:
bound morphemes (and idiomatic combinations of these) → a word

1) type of arrangement: mostly contiguous
2) constraint on arrangements: morphology

e.g., Atsugewi word consisting of:
V root: -meq'- 'for a building to move thereby losing structural integrity'
Cause prefix: miw- 'as a result of fire acting on the Figure',
idiomatic suffix chain: -tip 'out of liquid' plus -uu 'extendedly' = tip-uu 'down into hole'
deictic: -m 'thither'
→ miw-meq'-tip-uu-im "the house burned down into the cellar"

C. Arrangement properties for:
free morphemes and words (and idiomatic combinations of these) → an expression

1) type of arrangement: mostly contiguous
2) constraint on arrangements: syntax

Example incorporating the morphological idiom *considerable*
and the phrasal idiom *turn up* (see above):
Considerable evidence has turned up in their probe.

7.1.6 Comparison with the classifier system of signed language

A. Non-recombinational

The majority type: parameters 3–30 mostly occur independently of each other,
included if relevant, omitted if not,
each occupying its own designated part of the whole classifier expression,
without entering into rearrangements relative to each other

b. Recombinational

Minimal, occurring mainly for parameters 1–2
namely, dominant handshape for Figure, nondominant for Ground:
can be interchanged e.g., car passing plane vs. plane passing car

7.2 In the semantic structure of spoken language

7.2.1 Semantic components → the meaning of a morpheme or idiom: recombinational; and emerge

A. Description

Semantic components with certain identities, drawn with a certain selection in a certain number
from either an open or a closed inventory (see below)
combine to constitute the meaning of a morpheme (or idiom)
The same components can combine in different arrangements to constitute different meanings
where their type of arrangement is not simple conjunction

Components forming the meaning of an open-class morpheme (or idiom)
are largely not drawn from any defined inventory
But components forming the meaning of a closed-class morpheme
are drawn from (a language's subset of) a roughly closed universally available inventory
(see Talmy 2000, ch. 1; 2006)

B. Arrangement properties

1) Type of arrangement: concurrent and with various relationships among the components
from simple conjunction to a complexly patterned schema
sometimes including disjunction or hierarchical nesting

2) Constraints on arrangements: conceptual compatibility of components—
both locally and globally when within a schema—but otherwise little understood

C. Problem in assigning emergentness status

1) Argument that the meaning of a morpheme is non-emergent:
the overall meaning of a morpheme does, after all, largely equal the meanings of the semantic components in their particular interrelationships
2) Arguments that the meaning of a morpheme is emergent:

a. In any given language, the meaning of a morpheme is a stable "pre-packaged" assembly,
a fixed bundling of particular components in a specific arrangement
like a phoneme of the language, with its fixed featural components
and unlike an expression, whose form and meaning are constructed on the spot

In representing space, the pre-packaged spatial schemas of closed-class SpL morphemes contrast
with SiL-CS: a signer selects a conceptual category for inclusion independently of other
categories and selects a member element within each category independently of other selections

b. Cognitively, the meaning of a morpheme might have an autonomous unity,
apart from whatever semantic components may underlie it

D. Comparison with the classifier system of signed language
The 30 spatial factors represented by the SiL-CS parameters of Table 2 are not pre-packaged,
but largely vary independently in correlation with the separate factors they represent
Hence, the system contrasts with the fixed schemas of SpL morphemes

thus buttressing argument C2a above for morphemic meaning as emergent

E. Example: the overall meaning of the closed-class spatial preposition *past*
as a complexly patterned schema that equals the following semantic components
—each drawn from the indicated category— in the indicated interrelationships
(see Talmy, 2006)

Table 4. Semantic components of *past* as in: *The ball sailed past my head at exactly 3* PM.

a. There are a Figure object and a Ground object (here, the ball and my head, respectively)
[members of the "major scene components" category].
b. The Figure is schematizable as a 0–dimensional point
[a member of the "dimension" category].
c. This Figure point is moving
[a member of the "motive state" category].
d. Hence it forms a one-dimensional line, its path
[a member of the "dimension" category"].
e. The Ground is also schematizable as a 0–dimensional point
[a member of the "dimension" category].
f. There is a certain point P at a proximal remove
[a member of the "degree of remove" category] from the Ground point.
g. Point P forms a 1–dimensional line
[a member of the "dimension" category] with the Ground point.
h. This line is parallel
[a member of the "relative orientation" category[to the horizontal plane.
i. In turn, the horizontal plane is a part
[a member of the "intrinsic parts" category] of the earth-based grid.
j. And the earth-based grid is a Secondary Reference Object
[a member of the "major scene components" category].
k. The Figure's path is perpendicular
[a member of the "relative orientation" category]
to the line between point P and the Ground.

l. The Figure's path is also parallel to the horizontal plane of the earth-based grid.
[same as h/i/j above].
m. If the Ground object has a front, side, and back
[members of the "intrinsic parts" category],
then it is the side part to which point P is proximal.
n. There is a certain point Q of the Figure's path that is not one of its boundary points
[a member of the "state of boundedness" category].
o. Point Q becomes coincident
[a member of the "degree of remove" category] with point P at a certain point of time.

7.2.2 Meanings of morphemes and idioms → meanings of complex words and of expressions—recombinational, not emergent

A. Description

The meanings of morphemes and of idioms with certain identities,
drawn with a certain selection in a certain number,
from a language's inventory of morphemes and idioms—i.e., its expanded lexicon—
combine in different arrangements to constitute the meaning of a complex word or an expression

Complex word meaning and expression meaning are treated separately here
because they might involve different patterns of semantic compositionality

B. Arrangement properties for:
the meanings of bound morphemes (and of idiomatic combinations of these) →
the meaning of a complex word

1) type of arrangement: semantic compositionality within a word
—whether in or out of correspondence with any morphological compositionality
2) constraints on arrangements: internal coherence of the larger concept

E.g.: tested / retested / pretested / testable / retestable / pretestable
untested / unretested / unpretested / untestable / unretestable / unpretestable

C. Arrangement properties for:
the meanings of free morphemes and words (and of idiomatic combinations of these)
→ the meaning of an expression

1) type of arrangement: semantic compositionality over an expression
—whether in or out of correspondence with syntactic compositionality
2) constraint on arrangements: coherence of the overall conception

E.g.: The dog likes the cat, but the cat doesn't like the dog.

8 Summary and implications of the extensiveness of digitalness in spoken language

8.1 Summary of findings

Part 3 has shown that digitalness is a highly extensive and elaborated system of organization in spoken language, specifically:

8.1.1 Digitalness in language is extensive

Digitalness in spoken language encompasses 4 levels, from discreteness to emergentness
and figures in from 6 to 8 kinds of recombination
This is much more than signed language's classifier system
and perhaps more than any other cognitive system (see section 9)

8.1.2 Digitalness in language is hierarchically structured

A. The 4 factors that make up digitalness roughly nest one within the next:
discreteness → categoriality → recombination → emergentness
B. The 4 or 5 levels of formal recombination roughly nest one within the next:
features → phonemes → morphemes → idioms → complex words → expressions

C. The 2 or 3 levels of semantic recombination roughly nest one within the next:
semantic components → morpheme meanings → complex word meanings → expression meanings

8.1.3 Digitalness in language is diverse
—cf. Jackendoff 's (2002) distinct organizing principles for different components of language
there are at least 6 and perhaps as many as 8 different types of recombination
distinguished by their different properties of arrangement
A. **Formal structure in language has 4 or 5 distinct types of arrangement properties, seen in:**
phonetic features in phonemes / phonemes in morphemes / morphemes in idioms /
bound morphemes|idioms in complex words / free morphemes|words|idioms in expressions

B. **Semantic structure in language has 2 or 3 distinct types of arrangement properties, seen in:**
semantic components in the meanings of morphemes|idioms /
the meanings of bound morphemes|idioms in the meanings of complex words /
the meanings of free morphemes|words|idioms in the meanings of expressions

8.2 How the extensiveness of digitalness may have overcome the bottleneck to language
Extensive and elaborated digitalness presumably did not exist in pre-language communication,
but it exists today, so it must have appeared with the evolution of language
hence, it may have been the mechanism that resolved the earlier bottleneck
by circumventing the limitations of the means of transmission

8.2.1 Compensating for the low fidelity of the medium
were certain aspects of digitalness:
A. the discreteness at 4 levels of organization: features / phonemes / morphemes / idioms

B. the fact that the discrete units at each level belong to relatively closed inventories
C. the arrangement properties constraining each type of recombination
These together enable the hearer to reconstitute the original signal better

8.2.2 Compensating for low parallelness
was the increased speed in the transmission of concepts
itself enabled by the increased fidelity from digitalness

8.2.3 Compensating for little relevant iconicity
was the symbolic representation enabled by recombinance, specifically:
the arbitrary association of a concept with a recombinational emergent
hence, the formation of a whole system of symbols for representing concepts,
which is not needed in iconic representation

8.2.4 Compensating for limited distinctional capacity
was recombinance, specifically:
A. The capacity to form numerous morphemes recombinationally from phonemes
each with its own emergent identity in association with a distinct concept
thus accommodating the sizable inventory of basic concepts in advanced thought
B. The capacity to form indefinitely many expressions from morphemes
thus accommodating the open-endedness of conceptions in advanced thought

8.3 Different aspects of digitalness may have entered language at different points in its evolution
The full panoply of digitalness currently evident need not have entered language all at once
Rather, different aspects of it could have entered in successive steps during language evolution

What sequence such different aspects may have entered in is not clear, but the following aspects seem partly independent of each other:

– The number of distinct holophrastic calls—all "morphemes"—may have increased to a point

that strained the hominid capacity to produce and distinguish them
nd led to a system of morphemes composed of recombinant sound units
– Such sound units, which may have at first been an idiosyncratic collection of various sounds,
may have become at least partly systematized in terms of recombinant phonetic features
– Morphemes, perhaps originally produced one at a time,
may have started to be presented in short combinations
perhaps under no constraint beyond simple contiguity—the simplest form of recombination
– More complex constraints may have then entered governing
the order and hierarchical grouping of contiguous morphemes
– Morphemes may have begun to recombine into emergent idioms
(a simple form of this might already occur in vervet communication where, apparently,
a certain call when uttered once has one significance, but when doubled has another significance)

PART 4: Sources and Concomitants in the Evolution of Digitalness in Language

9 The Origins of Digitalness in the Evolution of Language

Question: Did the digitalness in SpL, perhaps greater there than in any other cognitive system
elaborate on digitalness already present elsewhere or appear anew in language evolution?

To begin to address this question, we here undertake an initial survey of the Extent of Digitalness across Other Cognitive Systems.

Of the 4 levels of digitalness sketched above, it will be seen below that:
instances of discreteness and categoriality—the lower types of digitalness—
seem greater in number and more certain
but instances of recombination and emergentness—the higher types of digitalness = recombinance—
seem fewer in number and less certain

So language is likelier to have acquired the lower types of digitalness from other cognitive systems
and to have developed recombinance itself

In any case, though, these are the basic possibilities:
Other cognitive systems might have a) much, b) little, c) no recombinance
As the language system evolved, it may have accordingly:
a) adopted full recombinance from another cognitive system, increasing it somewhat
b) adopted minor recombinance from another cognitive system, elaborating it greatly
c) developed full recombinance newly as an innovation

Major "substantive" cognitive systems perhaps distinguishable
at least in animals with more complex nervous systems:
perception (in its various modalities) / motor control / affect /
thought (including basic inferencing / reasoning / anticipatory projection)
themselves in interaction with major "organizing" cognitive systems such as attention / memory
(as analyzed in what I call the "overlapping systems model of cognitive organization")

Further substantive cognitive systems that perhaps largely evolved as humans evolved
and perhaps coevolved with each other
language / gesture / music / culture
(see Talmy 2000, vol. II ch. 7, for arguments for the existence of a cognitive culture system)

In addition, concerning any developments in pre-existing cognitive systems as humans evolved,
a. perhaps most retained their original level of organization and complexity
e.g., perception, motor control, attention, memory
b. perhaps affect increased somewhat in complexity
(including the addition / expansion of, e.g., humor?)
c. but thought developed prodigiously, much like the new substantive cognitive systems

Since gesture, music, culture, and advanced thought may have coevolved with language,
they cannot be cited as precursor sources of recombinance in language but only as perhaps having incorporated recombinance in parallel with language
Some considerations of music appear in this vein here; all those about thought are in the next section

9.1 Discreteness and categoriality

9.1.1 **Gradient**—considered first as a foil for comparison

A. in visual perception: an object's locus in space, path of motion, speed, size, brightness, saturation
B. in motor control: a body part's locus of placement, path of motion, speed of motion, pressure exerted
C. in the affect system: the intensity of an emotional value

9.1.2 Discrete and categorial

A. In visual perception:
   1) the discrete classificatory identity of objects
      e.g., seeing a certain long thin pointed object and identifying it as a knife
      i.e., perceiving it as a) a discrete entity
      b) that is a member of a category with its own identity
   2) perhaps the vertices, edges, planes of a perceived solid object are each processed
      as discrete elements in qualitatively distinct categories
   3) perhaps hue is perceived with partially discrete categorial character in a way that, say,
      brightness / saturation are not
B. In motor control: perhaps it structurally incorporates provision for distinct units of movement (motons?)
   e.g., the movement of one leg forward in walking
C. In affect: perhaps emotions are processed in categories with qualitatively distinct characters
   rather than shading off continuously into one another

and also found:

D. in music: a scale or a melody consists of discrete notes, not of a pitch continuum.

9.2 Recombination and emergentness

9.2.1 Perhaps non-recombinant—considered first as a foil for comparison

A. In visual perception: a set of identified objects
   e.g. a fork/plate/napkin/glass viewed near each other
   At most, in a certain arrangement, constitute a place setting as a kind of higher-level unit
   But the objects don't lose their separate identities while in that combination
   And they do not combine systematically in other arrangements to form other higher-level units

B. In affect: perhaps distinct emotions do not recombine in distinctive structured patterns

9.2.2 Perhaps recombinant and perhaps also emergent

A. in visual perception:
   1) vertices/edges/planes → distinct object shapes?
   2) "geons" → distinct object shapes?
   3) contour integration: minute oriented line segments perceived from tiny receptive fields on retina → perception of larger-scale contour?

B. in motor control:
   1) "motons" → motor pattern / behavioral unit?
      a. e.g., forward bend at waist (as for leaning over)
         plus bend at knee (plus others)
         → motor pattern of sitting down
      b. in vervet monkeys: distinct behavioral complexes (in response to distinct heard calls)
   2) behavioral units → behavioral sequence
      a. innately fixed sequence: e.g., action-and-response courtship ritual
         between male and female stickleback fish

         — perhaps hierarchical, since each action itself can consist of iterated subunits
      b. learned fixed sequence based on partially recombinant innate capacity:
         e.g., mating calls in some bird species
      c. partially recombinant sequence: e.g., in mockingbird calls / perhaps aspects of whale song

C. in olfaction: particular conjunction of detected molecule segments → particular odor

and also found:

D. in music: sequence of notes (with their own identities) → melody (with its own identiy)

9.3 Variations in combination

The above cross-cognitive cases suggest that simpler patterns exist for the combination
of discrete categorial units into larger constellations—short of full-blown recombination
—and that these patterns may evolutionarily precede, and perhaps lead to, full recombination

9.3.1 Iteration

e.g., a single moton can be iterated to constitute a larger behavioral unit,
as in head-bobbing in geese (<Lorenz)

9.3.2 Fixed sequencing

e.g., the fixed sequence of behavioral units in the stickleback courtship ritual

10 Effects on thought due to the evolution of digitalness in language

In the evolution of language, was the means of transmission the only thing that changed
or did the contents and use of this transmission also change?
That is, did individual thought and communicative interaction coevolve
with the increasing digitalness in the means of transmission?

Here addressing only thought (not interaction), it seems that:
certain aspects of thought remained the same in character,
with only the representation of some of these having changed in character
while other aspects of thought changed in character
in parallel with or due to digital representation

Continuation vs. change in the character of thought or of its representation include these domains:
digitalness / crispness, / voluntariness of control and of meta-cognition

10.1 Continuation vs. Change in the Digitalness of Thought

10.1.1 Continuation of already digital aspects of thought

A. With respect to discrete and categorial aspects

1) Types of discrete and categorial concepts perhaps present in non-human cognition:
distinct concepts of—
   a. so-perceivedly specific objects or events
      or of the identity or categorial membership of any of these,
         e.g., banana / eat
   b. abstract properties, e.g., animate and inanimate
   c. roles that objects have in a so-conceived event or relationship,
      e.g., groomer vs. groomee / mother vs. child
   d. a so-perceived sequence of events; e.g.? securing a shellfish, flying up with it,
      → dropping it onto a rock → flying down to eat the exposed innards
2) Discrete-categorial aspects of language that correspond to such comparable cases of thought
   a. Individual morphemes in a lexicon that represent discrete categorial concepts as in [1a, b, c]
      e.g., *banana, eat, alive, mother*
      Constructions that represent sequences of distinct events as in [1d]
      e.g., *The bird grabbed the shellfish, flew up with it, dropped it, flew down, and ate it.*

B. With respect to recombinational aspects

1) Types of recombinational concepts perhaps present in non-human cognition:the concepts that underlie—
   a. Reordering the components of a sequence

e.g., subordinate chimp redoing sequence of visiting food locations
to mislead nearby dominant chimp <Hauser

b. Selecting and assembling components into a suitable complex
e.g., chimp connecting 2 rods to form a longer rod to reach food

c. Undoing and redoing components within a larger maneuvering of components
e.g., fish spitting out babies held protected in mouth, then eating nearby prey, then
regathering babies into mouth (<Lorenz)

2) Recombinational aspects of language that correspond to such comparable cases of thought

a. Reordering the components of a sequence as in [1a]
e.g., *I cleared the yard before I had lunch. / I had lunch before I cleared the yard.*
Selecting and assembling components into a suitable complex as in [1b] = any well-formed
sentence, e.g., I brought the groceries into the kitchen.

10.1.2 Change toward digitalness only in the *representation* of analog aspects of thought

A. Types of analog thought perhaps already present in non-human cognition
without correspondingly analog representation in language

1) Degree in the conceptual counterpart of perceiving / experiencing phenomena like
distance / speed / brightness / tactile pressure / affect

2) Locus in the conceptual counterpart of perceiving phenomena like
position in space

3) Relative proportion in the conceptual counterpart of perceiving or in assessing phenomena like
size / strength of oneself against that of another

4) Pattern in the conceptual counterpart of perceiving phenomena like
path contour / object configuration / texture

B. digital linguistic representations of analog aspects of thought

1) of analog degree as in [A1] above
e.g., by the addition of a morpheme or by the choice in the morpheme added
The moon is bright / very bright / extremely bright today.

2) of analog relative proportion as in [A3] above

An analog conception that can range over the ratio, say, of affection between a dog and a cat
can at best be linguistically represented by digital "cross-sections" of the continuum:

Table 5.
a. The dog likes the cat, but the cat doesn't like the dog.
b. **The dog likes the cat a lot, and the cat likes the dog a little.**
c. The dog and the cat like each other equally.
d. **The cat likes the dog a lot, and the dog likes the cat a little.**
e. The cat likes the dog, but the dog doesn't like the cat.

Points along the analog conceptual ratio are represented digitally through semantic and syntactic compositionality including:
a. the order of the two clauses
b. **the use of** *but* vs. *and* as a conjunction,
c. the presence vs. absence of a negative
d. the use of a reciprocal vs. a nonreciprocal construction,
e. the appearance vs. nonappearance of adverbials of quantity like *equally, a lot, a little*,
f. the assignment of the nouns to subject vs. object position

3) of analog pattern as in [A4] above

One's conceptual counterpart of a visual Gestalt

with all its components concurrently in particular interrelationships
is represented linguistically through a selection of only a few components and relationships
presented sequentially
e.g., *Bay trees stand around the pond with some blackberry shrubs growing in between.*

4) different digital linguistic representations of the same analog conception

What might be roughly the same conceptualization held by 2 individuals
—analog because continuously variable—
will be represented in 2 different digital patterns if they speak different languages
patterns with different selections of components in different relationships

e.g., English: *You tracked up my house.*
Atsugewi: m'w-ma-st'aq'-ipsnu-ik:
you by.acting.on.it.with.your.feet
[caused it that] runny.icky.material.move into.a.volumetric.enclousre hither
[each grouping of words translates a single Atsugewi morpheme]

10.1.3 Expansion/introduction of digitalness in thought where it had been modest/absent

Considering here just smaller-scale, not larger-scale, portions or stretches of thought—
the digital expansion in language perhaps brought with it or elaborated:

A. concepts set into particular relationships within larger structures, as in:

1) the embedding of one concept within another
e.g., *Our new lawyer, who had been active in the civil rights movement, has started revising our defense.*

2) the establishment of parallelisms or analogies across concepts and conceptual structures
e.g., *For Christmas, WE gave our DOG a STEAK, while THEY gave their CAT a FISH.*
3) the equating of two occurrences of the same concept
e.g., *We went to see a movie, and they did too.*

B. the recognition of component concepts within a larger conceptual whole

Even if a speaker starts with or a hearer ends up with a Gestalt conception,
both can still be aware of the component concepts and relationships as these are represented in sequence by the individual morphemes and constructions of an expression

Thus, speaker and hearer need not experience as indivisible the thoughts
represented by such earlier expressions as:
The moon is very bright today.
The dog likes the cat, but the cat doesn't like the dog.
You tracked up my house.
but can also cognize the component concepts, as their language has shaped them,
in their overt sequence and relationships

C. The sequentializing of parts of a static whole

A speaker can start with and a hearer can end up with a conception of a static whole conception
but can also experience the sequence in which its parts or described in an expression
e.g., as in the earlier expression:
Bay trees stand around the pond with some blackberry shrubs growing in between.

10.2 Continuation vs. Change in the Crispness of Thought

The proposed parameter of "crispness" with its two opposite poles: crisp vs. vague
can apply to any entity in consciousness

The characteristics of such an entity when cognized as crisp vs. vague:
- clear vs. hazy or murky as to its particular content
- evoking an experience of certainty as to the identity of its content vs. evoking uncertainty or not evoking certainty
- having well-defined, sharp boundaries vs. approximative, fuzzy boundaries
- having fine and detailed vs. coarse internal differentiation
- if involved in any change, amenable only to discrete jumps vs. also to gradient shifts
- available vs. elusive to focused attention or introspection

Within the perceptual modalities, vision and audition tend toward the crisp
smell and touch tend toward the vague
Across substantive cognitive systems, perhaps motor control tends toward the crisp,
and the affect system tens toward the vague

As digital language evolved
the older systems of communication continued on and are co-present today :
vocal dynamics (loudness, rate, pitch, etc.) / facial expressions / "body language"
and gesture either coevolved with language or elaborated on an older precursor

The content conveyed by the older systems of communication
is generally vague and murky—although gesture can range toward greater crispness
The content conveyed by the new digital system of language with its morphemes and constructions is generally crisp
It may have introduced or greatly expanded crispness in thought

Further, the content of the older systems (excluding gesture) generally pertains to affect
—a cognitive system that already tends toward the vague
while the content of the new digital system is largely conceptual, with concepts pertaining to any domain

Acts of communication among individuals in nonhuman animals species seem to be largely involuntary
e.g., vervet monkey calls seem largely to be made spontaneously on perceiving certain stimuli
(though reaction to a call can apparently be inhibited)
Possible exceptional forms of voluntary communication:
– female chimp can apparently suppress her call while mating with a lower-ranked male
– bird of certain species can sound a danger call to induce conspecifics to flee
and so give it access to a prey item (<Hauser)

In humans, certain forms / aspects of communication are also involuntary
a. certain facial muscles yielding particular expressions only fire spontaneously
b. a hearer's understanding of ongoing speech in a language he knows is an involuntary process
but the production of speech and the selection of its contents is largely voluntary

It remains to be determined whether such voluntariness is due to the rise of digitalness in language
or is a separately evolved characteristic

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Fuyin (Thomas) Li (1963, Ph.D. 2002) received his Ph.D. in English Linguistics and Applied Linguistics from the Chinese University of Hong Kong. He is professor of linguistics at Beihang University, where he organizes *China International Forum on Cognitive Linguistics* since 2004, http://cifcl.buaa.edu.cn/. As the founding editor of the journal *Cognitive Semantics*, brill.com/cose, the founding editor of *International Journal of Cognitive Linguistics*, editor of the series *Distinguished Lectures in Cognitive Linguistics*, brill.com/dlcl, (originally *Eminent Linguists' Lecture Series*), editor of *Compendium of Cognitive Linguistics Research*, and organizer of ICLC-11, he plays an active role in the international expansion of Cognitive Linguistics.

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Part I

Website for Cognitive Linguistics

1. http://www.cogling.org/
   website for the International Cognitive Linguistics Association, ICLA
2. http://www.cognitivelinguistics.org/en/journal
   Website for the journal edited by ICLA, *Cognitive Linguistics*
3. http://cifcl.buaa.edu.cn/
   Website for China International Forum on Cognitive Linguistics (CIFCL).
4. http://cosebrill.edmgr.com/
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5. http://www.degruyter.com/view/serial/16078?rskey=fw6Q2O&result=1&q=CLR
   Website for the Cognitive Linguistics Research [CLR]
6. http://www.degruyter.com/view/serial/20568?rskey=dddL3r&result=1&q=ACL
   Website for Application of Cognitive Linguistics [ACL]
7. http://www.benjamins.com/#catalog/books/clscc/main
   Website for book series in Cognitive Linguistics by Benjamins
8. http://www.brill.com/cn/products/series/distinguished-lectures-cognitive-linguistics
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9. http://refworks.reference-global.com/
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10. http://benjamins.com/online/met/
    Website for Bibliography of metaphor and Metonymy
11. http://linguistics.berkeley.edu/research/cognitive/
    Website for Cognitive Program in Berkeley
12. https://framenet.icsi.berkeley.edu/fndrupal/
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