Space-to-time mappings and temporal concepts

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Abstract

Most research on metaphors that construe time as motion (motion metaphors of time) has focused on the question of whether it is the times or the person experiencing them (ego) that moves. This paper focuses on the equally important distinction between metaphors that locate times relative to ego (the ego-based metaphors Moving Ego and Moving Time) and a metaphor that locates times relative to other times (SEQUENCE IS RELATIVE POSITION ON A PATH). Rather than a single abstract target domain TIME, these two kinds of temporal metaphor metaphorize different kinds of temporal concept—perspective-specific vs. perspective-neutral temporal concepts. Recognition of this distinction enhances the explanatory potential of conceptual metaphor theory (Lakoff and Johnson 1980). An example involves the interaction of deixis and the temporal reference crosslinguistically of vocabulary with the spatial meanings IN-FRONT and BEHIND. More generally, this approach refines our ability to describe the temporal concepts involved in motion metaphors of time. Such temporal concepts are present not only in the target domains, but also in the source domains of motion metaphors of time, where we find space-to-time metonymy, which may play a role in motivating the metaphors. In order to distinguish such metonymy from metaphor, we need to characterize metaphor as a mapping across frames rather than domains.

Keywords: *space; time; semantics; frames; polysemy; typology; metaphor; metonymy; deixis; perspective; psychology; Wolof, Japanese.*

1. Introduction

Mappings from space to time are inherently fascinating because they seem to portray the abstract and ephemeral in terms of the concrete and

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permanent. They are interesting theoretically because of the impressive amount of structure that is mapped from space to time, and they are among the most productive and inferentially consistent of all the kinds of metaphors that have been studied (see e.g., Gentner 2001; Lakoff and Johnson 1999; Núñez and Sweetser 2006). Spatial metaphors for time are also pervasive crosslinguistically.[1] This paper proposes several ways in which our understanding of space-to-time metaphors can be refined.

In research on motion metaphors of time, two types are usually distinguished: Moving Ego and Moving Time (e.g., Clark 1973). In the Moving Ego metaphor, ego (the linguistically represented experiencer of time) moves relative to stationary times (e.g. *We are approaching the new year*). In the Moving Time metaphor, times move relative to ego (e.g. *The new year is approaching*). In both cases, ego plays a central role in the metaphorical motion event, and both metaphors construe temporal experience from ego's perspective.

However there is a third type of motion metaphor of time which has been largely overlooked (exceptions are Moore 2000, 2001, 2004; Núñez and Sweetser 2006; Svorou 1988; Traugott 1975, 1978, 1985). This type is neutral regarding ego's perspective. An example is *A reception* followed *the talks*. While this type is ordinarily analyzed as Moving Time, it lacks the role of stationary ego relative to which times move, and in fact relates two times to each other independently of ego's perspective. Let us call this metaphor SEQUENCE IS RELATIVE POSITION ON A PATH (or SEQUENCE IS POSITION for short) and contrast it with traditionally conceived Moving Time which will now be called *Ego-centered Moving Time* (see Section 2).

The distinction between perspective-specific Moving-Ego/Moving-Time (the ego-based metaphors) and perspective-neutral SEQUENCE IS POSITION corresponds to the distinction between tensed and tenseless facts which has been recognized in philosophy since 1908 (Jokic and Smith 2003; Le Poidevin 1998; McTaggart 1993[1908]) and is analogous to the linguistic contrast between tense constructions (which are perspective-specific/deictic) and adpositional constructions (which are perspective-neutral). The recognition of SEQUENCE IS POSITION will allow the conceptual theory of metaphor (e.g., Lakoff and Johnson 1980, 1999) to be more responsive to linguistic data involving temporal perspective, as will be discussed in connection with crosslinguistic IN-FRONT/BEHIND vocabulary and deixis in Section 2.

The recognition of SEQUENCE IS POSITION opens the way to more precise description of the target domain of motion metaphors of time than has previously been available. Whereas previous accounts (e.g., Lakoff and Johnson 1999) have assumed a single overarching abstract concept of

TIME as the target domain, the current analysis posits relatively concrete temporal concepts instead. These temporal concepts emerge in source-domain experiences of motion, since the experience of motion necessarily involves time (Section 3). Once we recognize time in the source domain we can no longer characterize motion metaphors of time as mappings across *domains* (cf. Engberg-Pedersen 1999). Rather, these metaphors need to be characterized as mappings across *frames* (Fillmore 1982a, 1985). Metonymy, by contrast, is a within-frame mapping and may motivate metaphor in some cases (see Section 4 and e.g., Barcelona 2000a; Dirven and Pörings 2002). These observations go beyond space-to-time mappings and are potentially relevant to correlation-based conceptual metaphors in general (see Grady 1999 on correlation-based metaphors.[2]).

As we said, motion metaphors of time do not really "portray the abstract and ephemeral in terms of the concrete and permanent". In a sense, they portray time in terms of one of its spatial manifestations: translational motion. However, an understanding of motion metaphors of time lies not in abstract concepts like MOTION and TIME, but in the interplay of spatial and temporal aspects of specific scenarios of motion.

Before we continue, a brief note on the data: throughout Sections 2 and 3, in addition to English examples, I illustrate the discussion with examples from Wolof (a Niger-Congo language spoken by about 8 to 9 million people in Senegal and The Gambia, West Africa).[3] I additionally use Japanese examples in a limited area where the data have been made available to me. Section 2 also uses other crosslinguistic data from published sources. The crosslinguistic data allow me to plausibly claim that the principles I discuss are not limited to a particular language or language family; however, no claims of linguistic universals are made.

2. Perspective and the IN-FRONT/BEHIND opposition

This section reviews the Moving Ego and Moving Time metaphors and then proposes dividing Moving Time into two metaphors: Ego-centered Moving Time and SEQUENCE IS RELATIVE POSITION ON A PATH. Next we will see a motivation involving metaphor and deixis for a crosslinguistic tendency for IN-FRONT to correspond with "earlier" and BEHIND with "later" in temporal IN-FRONT/BEHIND vocabulary.

2.1. *Moving Ego and Moving Time*

2.1.1. *The Moving Ego metaphor.* The Moving Ego metaphor is exemplified below in Wolof and in English (see the translation of the Wolof). I do not propose any substantial modification to existing descriptions of

Table 1. *The Moving Ego metaphor (Clark 1973; Moore 2000; cf.* Moving Observer *in Lakoff and Johnson 1999 Chapter 10; Núñez 1999) Example:* When we get a little *farther down the road,* we can set up a time to meet.

SOURCE FRAME RELATIVE MOTION		TARGET FRAME EGO-CENTERED TIME
Space ahead of ego	⇨	Ego's future
Ego's "here"	⇨	Ego's "now"
Ego's arrival at a place	⇨	Occurrence of a time
Co-location	⇨	Simultaneity
Space behind ego	⇨	Ego's past
Change in degree of proximity	⇨	Change in degree of immediacy of the expected or remembered time

Moving Ego (e.g. Clark 1973; Lakoff and Johnson 1999; Núñez and Sweetser 2006).

(1) Wolof
Li *ci* *gannaaw*, *xam* *nga* *paase*
REL LOCPREP back know PERF.2 go.beyond
nañ *ko.* *Léegi* *ñungi* *dem*
PERF.1.PL 3.OBJ now 1.PL:PRSNTTV go
ci *kanam*.
LOCPREP front
'That which is in back, you know we've passed it. Now we're going ahead.'
(The speaker is explaining his metaphorical orientation to temporal experience, with the past behind him and the future in front, in which he is metaphorically moving forward.)[4]
(Moore 2000. s L, Ba:109 taped interview)

Moving Ego expressions typically relate the moment of speech to some other time; see Table 1. In the table the arrow is read "maps onto". I use the terms source *frame* and target *frame* instead of source and target *domain*. There are important differences between *frame* and *domain*, as we will see in Section 4. However, until the term *frame* is discussed in Section 3, it will not be a problem for the reader who is unfamiliar with that term to think of the mappings in terms of domains. The phrase *a time* is used in its ordinary meaning of "moment or period of/in time". This sense of the count noun *time* may be provisionally defined as "when an event can happen or a state can obtain" (Moore 2000: 86; cf. Evans 2005). For example, in *We are getting close to Easter*, "Easter" is a time. The phrase *occurrence of a time* gives us a way of talking about the change of state that results in our being able to say that it is or was a certain time. For

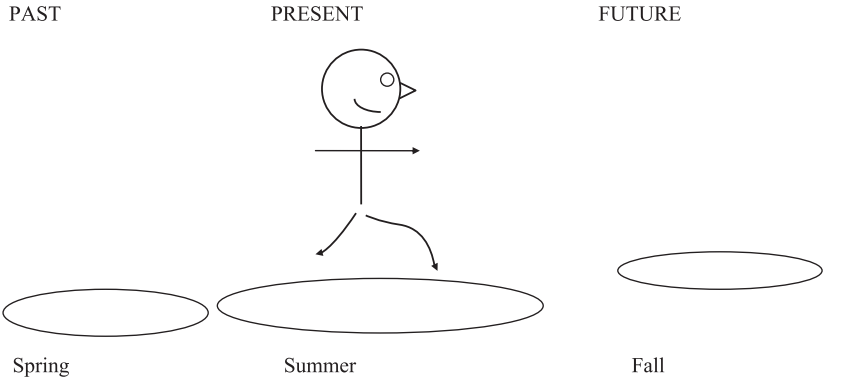

Figure 1. *The Moving Ego Metaphor. (Examples:* We're in summer. We're headed for fall. Spring is behind us.*)*

example, speaking of a situation in which one could say *it is Tuesday*, I would say, in the technical terminology of this paper that Tuesday "occurred". In general in motion metaphors of time, if there is *co-location* (i.e. being at the same place), it maps onto simultaneity.

The Moving Ego metaphor is represented graphically in Figure 1.

2.1.2. *Ego-centered Moving Time.* As mentioned in the introduction, Ego-centered Moving Time is generally called simply *Moving Time*. It is exemplified in (2–3) below.

(2) *Christmas is coming*.

(3) *Tabaski mungiy ñów*
Tabaski 3:PRSNTTV:IMPF come
'Tabaski is coming.' (Tabaski is a major holiday.) [Positive Black Soul]

As suggested in the introduction, Ego-centered Moving Time is structurally very similar to Moving Ego. A comparison of Table 2 and Table 1 reveals that each submapping of Table 2 (Ego-centered Moving Time) has a counterpart in Table 1 (Moving Ego). In both metaphors, a distal entity with which ego will become co-located maps onto a future time, ego's becoming co-located with an entity maps onto the occurrence of a time, and so on (see Lakoff 1993; Núñez 1999; Núñez and Sweetser 2006). What the two metaphors crucially have in common is that they both presuppose an ego-based frame of reference in both the source frame and the target frame.

Figure 2 is included as an aid to visualizing Ego-centered Moving Time.

Table 2. *The Ego-centered Moving Time metaphor. (Example: Winter is* coming*.)*

SOURCE FRAME RELATIVE MOTION		TARGET FRAME EGO-CENTERED TIME
An entity moving toward Ego	⇨	A time in Ego's future
Ego's "here"	⇨	Ego's "now"
Arrival of the entity at ego's location	⇨	Occurrence of a time
Co-location	⇨	Simultaneity
An entity moving away from Ego	⇨	A time in Ego's past
Change in degree of proximity	⇨	Change in degree of immediacy of the expected or remembered time

In the source frame (RELATIVE MOTION[5]) of Moving Ego and Ego-centered Moving Time, to say that both metaphors presuppose an ego-based frame of reference means that all spatial relations are determined relative to ego. Let me be clear that what is said here pertains only to the subpart and the construal (Langacker 1987) of the frame of RELATIVE MOTION that is relevant to the mappings. On the construal that is relevant to Moving Ego, any location is determined according to whether ego is moving toward or away from it. Additionally, if ego is at a location, she is also moving away from it (see Figure 1). Analogously on the construal that is relevant to Ego-centered Moving Time, the location of an entity is determined according to whether it is moving toward or away from ego. Additionally, if an entity is at ego's location, it is also moving away from her (see Figure 2; cf. Lakoff 1993; Lakoff and Johnson 1999).[6]

The target frame (EGO-CENTERED TIME) of Moving Ego and Ego-centered Moving Time presupposes an ego-based frame of reference, in that the future and past are defined relative to the present (i.e., ego's

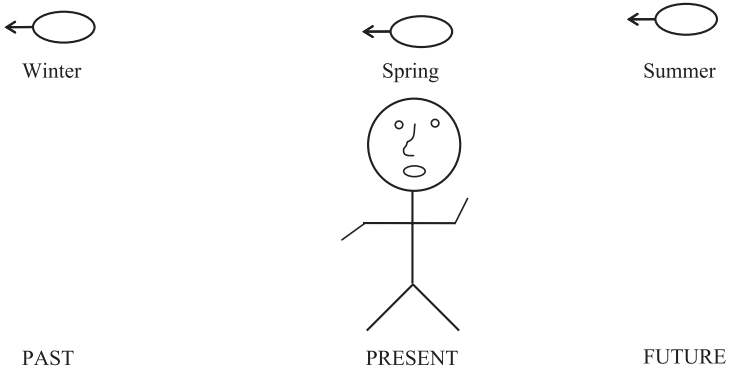

Figure 2. *Ego-centered Moving Time. (Example:* Spring is here, summer is coming, and winter is gone*.)*

"now"), and any time must be either past, present, or future. Expressions that instantiate ego-based metaphors are thus typically deictic. (Traugott 1975: 208 calls this temporal semantics *tense*.) *Deictic* expressions are those whose reference is anchored in the situation in which they are uttered (or in an imagined counterpart situation) in such a way that the meaning of the expression depends crucially on that situation (see Bühler 1990 [1934]; Fillmore 1982b; Hanks 1990). For example, *now* is a deictic word because its reference depends entirely on *when* it is said. The expression *Christmas is coming* is deictic because it is used to talk about the temporal status of Christmas relative to "now". *Deixis* is a linguistic phenomenon. I use the term *perspective* to talk about the underlying cognitive phenomenon of how the conceptualizer (i.e., speaker and/or addressee who is understanding an utterance, Langacker 1987) situates herself relative to what she is conceptualizing. For example, an ego-based frame of reference is a cognitive structure in which the conceptualizer takes ego's perspective (which may actually be her own); that is, understands an utterance relative to ego's "here and now".

In the literature (e.g., Clark 1973: 50; Haspelmath 1997: 59; Lakoff and Johnson 1999: Ch. 10), the Ego-centered Moving Time metaphor has been assumed without argument to be the central case of Moving Time, and to motivate a range of linguistic expressions, including those for which the notion "now" is not relevant. However, this latter kind of expression is better analyzed as instantiating SEQUENCE IS RELATIVE POSITION ON A PATH.

2.2. *Sequence is relative position on a path*

While considerable attention has been devoted to the Moving-Time/Moving-Ego contrast (Boroditsky 2000; Clark 1973; Fillmore 1997 [1971]; Fleischman 1982; Gentner 2001; McGlone and Harding 1998; etc.), the contrast between Ego-centered Moving Time and SEQUENCE IS RELATIVE POSITION ON A PATH has barely been noticed (but see Moore 2000, 2001, 2004; Núñez and Sweetser 2006; Traugott 1975, 1978, 1985). In SEQUENCE IS POSITION, times/events are portrayed as physical entities moving single file on a path (Svorou 1988). SEQUENCE IS POSITION is exemplified below.

(4) a. The sound of an explosion *followed* the flash.
b. In another development, Kuwait's government said it is sealing off nearly a quarter of the country ... as U.S. and Kuwaiti soldiers train *ahead* of a possible conflict.
(*San Francisco Chronicle*, 2 November 2002, p. A12. Italics added.)

Table 3. *Sequence is relative position on a path. (Example: An announcement* followed *dinner.)*

SOURCE FRAME Ordered motion		TARGET FRAME Succession
Moving entities at different points on a (one-dimensional) path	→	Times in sequence
An entity that is ahead of another entity	→	A time that is earlier than another time
An entity that is behind another entity	→	A time that is later than another time

(5) Wolof

Yoor-yoor,	*moo*	*topp*	*si*	*suba.*
midmorning	3.SUBJ.FOC	follow	LOCPREP	early.morning

'Midmorning follows early-morning.' (*si* is a variant of *ci*.) (Moore 2000. sf N) (For an example of Wolof *jiitu* 'go ahead' see (15) below.)

The mapping of SEQUENCE IS RELATIVE POSITION ON A PATH is given in Table 3. In stating the mapping I use the terms *earlier* and *later* to designate temporal relations with no necessary dependence on the moment at which they are considered (i.e., they do not depend on a concept of "now"). An *earlier* time is a time that is before some other time, and a *later* time is one that is after another time. (In a deictic framework: a past time is *earlier* than "now", and a future time is *later* than "now".) *Sequence* is defined as the occurrence of an event or the obtaining of a state before or after another event or state.

SEQUENCE IS RELATIVE POSITION ON A PATH is represented graphically in Figure 3.

SEQUENCE IS RELATIVE POSITION ON A PATH presupposes a field-based frame of reference.[7] In a field-based frame of reference, the relation between Figure and Ground is understood in terms of a system of coordinates that encompasses both the Figure and the Ground, but does not

Figure 3. *Sequence is relative position on a path. Example:* An explosion followed the flash. (The concepts EARLIER and LATER are independent of the concepts PAST and FUTURE. However, in the above Figure, if the explosion were happening now, the flash would be in the past.)

depend on ego's perspective. Before we continue, let me clarify some terminology: following Talmy (2000: 320), I use the term *Ground* to designate a time, place, or object relative to which the time or location of another entity is determined, and the term *Figure* to designate the entity whose time or location is in question. So for example, in a sentence like *Fido followed George to the store*, George is the Ground because he is the entity relative to which *Fido's* location is determined, and *Fido* is the Figure. In a sentence like *A reception followed the talk*, the talk is the Ground and *a reception* is the Figure.

In the source frame of SEQUENCE IS POSITION, the field-based frame of reference is based on the direction in which the entities are moving (see Figure 3; cf. (28) in Section 4.2; Haspelmath 1997: 59; Talmy 2000: 204): Since all the entities are going the same direction on the same path, the position of an entity vis à vis any other can be determined according to whether it is going ahead of or following that entity. This determination remains constant no matter what perspective the motion scenario is viewed from.

In the target frame, the frame of reference is provided by a sequence of times (cf. McTaggart 1993 [1908]; Núñez and Sweetser 2006). That is, a time is determined relative to another time.[8] Because the field-based frame of reference is *perspective neutral*, it is equally compatible with deictic and nondeictic expressions. As we have seen, this contrasts with Moving Ego and Ego-centered Moving Time, which are *perspective specific*.

2.2.1. *The distinction between Ego-centered Moving Time and SEQUENCE IS RELATIVE POSITION ON A PATH.* Introspectively, our understanding of time includes both our orientation towards the past and future, and the knowledge that events happen in sequence. However, not all of this is metaphorically represented in every temporal predication. For example, in (6a–c), only sequence is expressed metaphorically with *follow*, despite the fact that the scenario in question is conceptualized from different perspectives, as shown by the different tenses. (In the terminology of Traugott 1975: 208, examples (6a–c) exemplify expressions of *sequencing*.) SEQUENCE IS RELATIVE POSITION ON A PATH predicts the fact that *follow* is not interpreted deictically in (6), whereas Ego-centered Moving Time does not predict this.

(6) a. A reception *follow*ed the conference.
    b. A reception will *follow* the conference.
    c. A reception always *follow*s the conference. (e.g., every year)

Before presenting further details of my argument, let me be explicit about a background assumption. I am assuming that when postulating a conceptual metaphor, it is desirable to postulate the mapping in which the

source-frame semantics and pragmatics most directly predicts the target-frame semantics and pragmatics (cf. Grady 1997a). In other words, I am making the provisional assumption that the experience of the source frame directly motivates the way the target frame is talked about. This is not to deny that that the metaphorical expressions could be motivated by a less direct relationship to the underlying conceptual metaphor, or that there could be intervening factors that cause a phenomenon to be talked about in ways that do not directly reflect how it is conceptualized. But the above assumptions constitute a reasonable starting point that can be modified as data comes to light. Now we return to the details of the argument.

Since SEQUENCE IS POSITION does not involve any particular perspective, there is no need for whoever is conceptualizing the past or future sentences in (6a–c) above to set up a fictive point of view or shifted deictic center (cf. Banfield 1982; Croft and Cruse 2004: 59; Fillmore 1982b; Langacker 1991: 266; Talmy 2000: 71). By contrast, in order to make sense of a past-tense Ego-centered Moving Time sentence like (7) below, you have to imagine a fictive "now" in the past, relative to which Christmas is in the future; i.e., (7) is deictically anchored in a fictive "now".[9] The situation is analogous in the cases of *Christmas will be coming* and *Christmas is always coming*.

(7) Christmas was coming. (Ego-centered Moving Time)

A related argument that "now" does not constitute a default Ground for SEQUENCE IS POSITION involves temporal uses of the word *follow* in English. *Follow*—in contrast to *come*—is not routinely used to establish the moment of utterance as a temporal Ground. Thus, while (8a) below is fine as a way of establishing reference to future weeks without any linguistic context that establishes the present moment as Ground, (8b) is questionable in this use.

(8) a. Are you busy in the *coming* weeks? (Ego-centered Moving Time)
b. Are you busy in the *following* weeks? (SEQUENCE IS POSITION)

Examples like (8b) are typical however in situations in which the reference week is already established in context (whether or not it happens to be the week that includes utterance time). So, for example, it would be natural to say something like *I'm busy this week, but I'll be free in the* following *weeks*.

Finally, experimental evidence has recently appeared that supports the hypothesis that a field-based frame of reference is involved in the understanding of some temporal expressions (Núñez forthcoming; Núñez et al. forthcoming). Núñez et al. performed a carefully-designed experiment in which a control group and a primed group both responded to the ambiguous question *Last Wednesday's meeting had been moved forward two*

days. On what day did the meeting take place? The control group was shown an array of stationary squares, and the primed group was shown an array of squares moving from right to left across a screen.[10] In the primed group, 71 percent responded that the meeting had taken place on Monday (i.e., earlier), and 29 percent said Friday (i.e., later). In the control group, responses were 52 percent and 48 percent respectively. (Núñez et al. found that the responses of the control and primed groups are significantly different.) Thus, a movement scenario in which front/back relations were independent of ego's perspective primed a response in which temporal "front" is interpreted to mean "earlier". Note that if they had interpreted "forward" relative to their own presumed orientation in time (with the future in front), a "Friday" response should have been primed. Moreover, interpreting "front" relative to an *Ego-Opposed* strategy (see Section 2.3) should also have primed a "Friday" response.

To summarize, we have seen four arguments that there is a metaphor such as SEQUENCE IS RELATIVE POSITION ON A PATH that does not involve "now" as a default Ground.

2.2.2. *The SEQUENCE IS RELATIVE POSITION ON PATH metaphor in Wolof.* The pattern of temporal uses of Wolof *topp* 'follow' (see Section 2.2 example (5)) is very similar to the pattern found with English *follow*: *topp* like *follow* can be used fairly freely to talk about events that occur in sequence, and it cannot be used to establish the moment of speech as a deictic anchor, as exemplified in (9).

(9) *Ñeenti semen yii di ñów/?topp, dinaa jàpp*
four:of weeks these IMPF come/follow FUT.1 be.busy
lool. Yii ci topp dinaa gën a féex.
very these LOCPREP follow FUT.1 more VC free
'I'm going to be very busy in the four coming/?following weeks. I'll be more free in those that follow.'
(Moore 2000. df FB, JTDOC:7. constructed)

This restriction on establishing the present moment as a deictic anchor appears to be language-specific however—the French, Spanish, or Shona (Bantu) word for 'follow' *can* be used to establish the present moment as a deictic anchor. For example, the French phrase *les jours qui suivent* ('the days which follow') can be used in situations where 'the coming days' would be used in English (Benjamin Bergen p.c. March 1999).

We have now seen each of the three metaphors that this paper is concerned with: Moving Ego, Ego-centered Moving Time, and SEQUENCE IS RELATIVE POSITION ON A PATH. The remainder of the paper will mostly be a detailed examination of the latter two metaphors.

2.2.3. *SEQUENCE IS RELATIVE POSITION ON A PATH and IN-FRONT/BEHIND expressions.* SEQUENCE IS RELATIVE POSITION ON A PATH is potentially relevant to any temporal expression in which a term meaning IN-FRONT or BEHIND is used with a semantics of sequencing; e.g., the English word *before* in a sentence like *Look* before *you leap*. (*Before* can mean 'in front of'.) Terms meaning IN-FRONT or BEHIND can instantiate the SEQUENCE IS POSITION ON A PATH metaphor because IN-FRONT and BEHIND can be used to describe the positions of entities on a path (Fillmore 1997 [1971]; Haspelmath 1997; Levinson 1996). That is, when two or more entities are moving (or potentially moving) in the same direction on a path, an entity that is closer to the Goal of motion can be construed as being *in front of* an entity that is farther, and an entity that is farther from the Goal can be construed as being *behind* an entity that is closer. This is true even of entities that are featureless, such as marbles. IN-FRONT corresponds to 'earlier' and BEHIND to 'later' because the entity which is in front arrives at the goal of motion earlier than the entity which is behind. This conceptualization of IN-FRONT/BEHIND remains constant regardless of the perspective that the motion scenario is viewed from (see Sections 2.3 and 3.2.2; cf. Figures 3 and 4.)

The nonce use of *in front of* in the next example, said by way of announcing the order of tunes played on the radio, suggests that SEQUENCE IS POSITION is productive in English.

(10) In front of that we heard "*Abaniquitos*" from 1949 . . . .
[meaning "Preceding that we heard '*Abaniquitos*' . . . ." KPFA radio, Berkeley, California]

In earlier stages of English, the 'in front' and 'behind' meanings of the words *before* and *after* were more prominent and productive than they are now, as in expressions like *She rode before/after him*, meaning 'She rode in-front-of/behind him'. It is thus reasonable to assume that *before* and *after* instantiated SEQUENCE IS POSITION in English at an earlier stage, at least (see Moore 2000: 61). The words *before* and *after* have the critical property that they are *deictically neutral*—that is, they appear freely in contexts in which they are not deictically anchored (cf. Haspelmath 1997: 32). As Traugott (1975) noted and as we observed above in the case of *follow*, the temporal relation designated by *before* or *after* is the same whether it is in the future or past: *Chris stood up after she ate the pizza; Chris will stand up after she eats the pizza*. (This is analogous to the spatial meanings IN-FRONT/BEHIND in the motion scenario described above, which remain constant regardless of the perspective they are viewed from.) Additionally, the word *before* can be used to establish the moment of speech as a temporal Ground, as in *Before, I always had wine*

with dinner.[11] The semantics/pragmatics of *before* and *after* are thus consistent with what SEQUENCE IS POSITION would predict, in that they do not require deictic anchoring. The next section will look at a similar pair of words in Japanese.

2.2.4. *Japanese* mae *'front; earlier' and* ato *'space behind a moving entity; later'*. *Mae* synchronically means both 'in front' and 'earlier than' and *ato* means both 'space behind a moving entity' and 'later than' (see Moore 2000: Ch. 3; Ohara 1990, 1991). Moreover, *mae* and *ato* are deictically neutral. Example (11) shows *mae* 'front; earlier' in a context in which it is ambiguous between spatial and temporal meanings.

(11) a. Japanese
Taroo ga nageta booru wa Dan ga nageta
Taroo NOM threw ball TOP Dan NOM threw
booru yori mae ni otita.
ball from front LOC fell
'The ball that Taroo threw fell {ahead of/before} the ball that Dan threw.'
(i.e., Taroo's ball fell 'farther in the direction of motion' or 'earlier than' Dan's ball.) (Yukio Hirose)

Next we see the word *ato* 'space behind a moving entity; later' in a spatial use in (b) and a temporal use in (c).

(11) Japanese
b. *Siroi kuruma wa kuroi kuruma no ato*
white car TOP black car GEN ATO
ni tuzuiteiru
DAT follow/continue
'The white car is following behind the black car.'
c. *Syokuzi no ato de ha o migaita*
meal GEN ATO LOC teeth ACC brush:PAST
After a meal, [I] brushed my teeth.' (Almost anything could be said to happen after a meal with this construction.) (Katsuya Kinjo)

In addition to the nondeictic contexts we have just seen, *mae* and *ato* also appear in situations in which their Ground is the moment of speech.

(12) a. *Mae ni asonda koto ga aru.*
front LOC play:PAST fact NOM exist/have
''(We) have the fact that (we) played at front.''
'We have played before.'
(Yukio Hirose)

b. *Basu* *ga* *kuru* *node,* *ato* *ni*
bus NOM come because, behind DAT
sitekudasai
do:POLITE:IMPR
'The bus is coming, so please make it later.' (The situation is that one of the speaker's students has approached her at a bus stop and asked her a question.) (Kyoko Ohara)

The temporal semantics of *mae/ato* are thus consistent with what SEQUENCE IS POSITION would predict.

To conclude this section: The Moving Ego and Ego-centered Moving Time metaphors were reviewed briefly in English and Wolof. Although the topic is not discussed here, these metaphors are instantiated in essentially the same way in both languages (see Moore 2000: Ch. 2 and 3, Section 4.4, and Section 6.3). The Moving Time metaphor has been reanalyzed as two separate metaphors: Ego-centered Moving Time and SEQUENCE IS RELATIVE POSITION ON A PATH (see also Section 3). The latter has been exemplified in three languages—English, Wolof, and Japanese—with two types of vocabulary: GO-AHEAD/FOLLOW expressions (English and Wolof), and IN-FRONT/BEHIND expressions (English and Japanese). The metaphor appears to be essentially the same in these three languages.[12]

2.3. *A crosslinguistic semantic tendency*

This section describes a specific crosslinguistic pattern in the temporal meanings of IN-FRONT/BEHIND words, and argues that this tendency is better motivated by SEQUENCE IS RELATIVE POSITION ON A PATH than by Ego-centered Moving Time. (The motivation could be synchronic or diachronic.) This is a limited hypothesis about the temporal meanings of IN-FRONT/BEHIND expressions. It is compatible with the observation that the expression of temporal concepts varies crosslinguistically and within languages (see e.g., Haspelmath 1997; Janda 2002; Moore 2000: Ch. 5; Radden 2001). The hypothesis is not about *time* in general, nor does it fully explain the particular facts of any given language, though, of course, these facts need explanations. Also, the explanatory value of the hypothesis rests on a default assumption that things tend to be talked about in the same way they are conceptualized (see the discussion in Section 2.2.1).

The hypothesized tendency is stated in (13) (see also Moore 2000, 2001).

(13) *The tendency of unmarked coding in IN-FRONT/BEHIND expressions of sequence*

a. If an IN-FRONT or BEHIND expression-type means "earlier" or "later" and occurs freely without deictic anchoring, IN-FRONT will correspond to "earlier" and BEHIND will correspond to "later".
b. Where there is an expression in a language that contradicts part (a) of the tendency, the more common, less marked, way of saying "earlier" or "later" in that language will conform to tendency (a) if it employs an IN-FRONT or BEHIND expression.

The hypothesis in (13) stems from an observation made by Herbert Clark (1973: 51): according to Clark, if the Ground of *ahead* is ego, the meaning is 'future', as in (14a) below; and if the Ground is a time, the meaning is 'past', as in (14b).

(14) a. We will be in Paris in the days *ahead* (of now).
b. We will be in Paris in the days *ahead* of Christmas (i.e., in the past relative to Christmas [Clark's formulation]). (Examples from Clark 1973: 51)

Clark explains these two meanings of *ahead* by the hypothesis that *ahead* instantiates Moving Ego in (14a) and (Ego-centered) Moving Time in (14b). Now, there is a further observation that can be made about these data: the use of *ahead* is deictically anchored in (14a) but not in (14b). This fact about deixis remains unaccounted for if the generalization is stated in terms of a contrast between Moving Ego and Ego-centered Moving Time (involving the concepts FUTURE and PAST), since these two metaphors are both perspective-specific. Once we see that the contrasting metaphors are actually Moving Ego and *SEQUENCE IS POSITION*, however, the facts regarding deixis are accounted for naturally.

The contrast that we observed between (14a) and (14b) above is further illustrated by the Wolof example below. Let us state the contrast in terms of 'earlier/later' rather than 'past/future': *Jiitu* 'go ahead' in (15) below is not deictically anchored and it designates a time that is earlier than (i.e. *precedes*) its Ground (instantiating SEQUENCE IS POSITION), while *kanam* 'ahead' is deictically anchored (fictively) and designates a time that is later than its Ground (instantiating Moving Ego).[13] (In the example, below the morpheme-by-morpheme gloss, I include a literal translation in double quotes to help the reader see the structure of the original Wolof. Following that is a free translation in single quotes.)

(15) *Waxu wolof dafa bare fasõ, boo-xam-ne*
talk:of Wolof SFOC.3 be.plenty type such.that
li *ko* *jiitu* *it,* *moo*
that.which 3.OBJ go.ahead.of EMPH 3.SUBJ.FOC

lay	*xamal*	*li*	*ci*	*kanam*.
you:IMPF	know:CAUS	that.which	LOCPREP	ahead

'There are lots of ways of talking Wolof such that what goes ahead (*jiitu*) of it [a particular word or phrase in discourse] lets you know what is ahead (*ci kanam*).' i.e., '... what precedes (*jiitu*) [a given word or phrase] lets you know what is ahead (*kanam*) (of you in the discourse).' [att.] [s IN Xi:37 taped interview]

Although the discussion has emphasized nondeictic uses, the crucial point at this juncture is that the IN-FRONT = earlier/BEHIND = later semantic correspondence is *neutral* with respect to deixis, but the opposite correspondence tends to favor deictic anchoring. My claim is that this observation motivates the tendency in (13). A clarification is in order here. The reason that FRONT corresponds to 'earlier' and BEHIND to 'later' in SEQUENCE IS POSITION has to do with the motion scenario that motivates the metaphor: in this scenario, the entity that is *in front* arrives earlier and the one that is *behind* arrives later (see Sections 2.2.3 and 3.2.2.). Before I explain further, let us briefly review some previous work.

Scholars have observed previously that IN-FRONT tends crosslinguistically to correspond with 'earlier' and BEHIND with 'later' in temporal vocabulary (Haspelmath 1997; Taylor 2003: 136; Traugott 1975, 1978, 1985). The correspondence has been accounted for in two ways. First, Hill (1978) and Traugott (1975, 1985) independently proposed that the *Ego-opposed strategy* motivates this correspondence. According to this strategy, if ego is facing two objects, the closer one can be said to be in front of the farther one. So, for example, if there is a coconut between me and a boulder, I can say *The coconut is in front of the boulder* (see Clark 1973, Fillmore 1982b). Haspelmath (1997: 60) correctly rejects this explanation on the grounds that if ego were metaphorically looking into the past, the later time would be in front of the earlier one, which would be the wrong result. Also, the Traugott/Hill formulation does not motivate deictic uses of words like *before* (as in *Before, I always had wine with dinner*), or *mae/ato* such as those in (12). An additional problem for the Ego-opposed strategy in Japanese is that *ato* 'space behind a moving entity, after' is not used in spatial Ego-opposed constructions. Instead, Japanese employs the words *usiro*, *mukoo*, or *mukoogawa* (Fillmore 1982b: 41; Ohara 1990; see Moore 2000, Section 3.2 for more discussion).

The generally accepted explanation for the IN-FRONT = 'earlier'/BEHIND = 'later' pattern is that it is motivated by (Ego-centered) Moving Time (see e.g. Clark 1973; Lakoff and Johnson 1999). Haspelmath (1997:

59) explains that on the Ego-centered Moving Time construal, the earlier time is metaphorically *in front* of the later time and also farther in the direction of motion. Since this IN-FRONT/BEHIND relation is based on motion as explained at the beginning of Section 2.2.3, it is not dependent on perspective, and thus escapes the criticisms of the Ego-opposed motivation just given.

But if the IN-FRONT = 'earlier'/BEHIND = 'later' relation is structured by a perspective-neutral concept of motion, there is no reason why this concept should be attributed to a perspective-specific metaphor (Ego-centered Moving Time), given the availability of the perspective-neutral SEQUENCE IS POSITION: Whereas in Ego-centered Moving Time spatial relations are ultimately defined relative to ego, the IN-FRONT/BEHIND relation of SEQUENCE IS POSITION is independent of ego's perspective. The hypothesis that the IN-FRONT = 'earlier'/BEHIND = 'later' correspondence is structured by SEQUENCE IS POSITION posits a direct relation between the deictic neutrality of the data and the perspectival neutrality of the metaphor. The deictic neutrality of the data thus motivates this analysis independently of the observation that the IN-FRONT = 'earlier'/BEHIND = 'later' pattern occurs when a time (rather than ego) functions as Ground. This independent motivation is welcome because the appearance of the IN-FRONT = 'earlier'/BEHIND = 'later' pattern when a time functions as Ground is the primary evidence for analyzing the expressions in question as instantiating Ego-centered Moving Time or SEQUENCE IS POSITION (as opposed to Moving Ego).

2.3.1. *Evidence for the tendency of unmarked coding in IN-FRONT/BEHIND expressions of sequence.* An examination of three sources on crosslinguistic polysemy patterns reveals strong support for the tendency of unmarked coding. The sources are Haspelmath (1997), Heine and colleagues (1993), and Svorou (1988). The evidence from these sources will be discussed very briefly here. More detailed discussion can be found in Moore (2000, 2001).

In the sources examined, all of the FRONT or BEHIND vocabulary that unquestionably occur freely without deictic anchoring show the pattern IN-FRONT = 'earlier' and BEHIND = 'later'.[14] Adpositions constitute a particularly clear case because their syntactic function of relating the designation of one NP to another requires them to be deictically neutral. The three sources contain a total of thirty-two adpositions that conform to the tendency, and none that do not. English *before* and *after* are examples of adpositions that Haspelmath (1997: 61) mentions, as are Mandarin *qián* 'in front, before' and *hòu* 'behind, after' (1997: 61).[15] In addition, Haspelmath lists twenty-five other expressions from nineteen languages that

conform to the tendency, none that do not conform, and one unclear case (see note 14).

In Svorou (1988) all of the FRONT/BEHIND sequential terms discussed are adpositions. There are eight FRONT adpositions meaning 'earlier' and six BEHIND adpositions meaning 'later'. In Heine and colleagues (1993) I found seven FRONT terms, four meaning 'earlier' and three meaning 'later'. I found nine BEHIND terms, two meaning 'earlier' and seven meaning 'later'. None of these terms contradict the tendency.[16] Examples with *before* and *after* such as *Francis sang a song before/after eating the herring*, and examples with *mae* and *ato* such as (11) above illustrate the gist of the data that conform to the tendency.

I have found four exceptions to part (a) of the tendency of unmarked coding in (13): from Spanish, Hausa (see Moore 2000, 2001), English,[17] and Shona. The exception from Shona in (16) below seems to combine SEQUENCE IS POSITION (employing *-tevera* 'follow') with Moving Ego (employing *mberi* 'front') in a single image. Such examples are (impressionistically) unusual in the data I have seen.

(16) Shona
Vhiki *r-a-ka-tevera* *mberi* *v-a-ka-enda*
week CL.5-PST-REM-follow front 3PL-PST-REM-go
ku-Paris
LOC-Paris
'The following week they went to Paris.' [Daisy Rugube, p.c. 11 April 05. Tone not marked.]

Shona also has the expected (and impressionistically speaking more common) pattern in which IN-FRONT = 'later' and BEHIND = 'earlier' co-occur with (actual or fictive) deictic anchoring, as in (17) below.

(17) Shona
zvi-uya *zvi-ri* *mberi-yo*
CL.8-excellent CL.8-be front-DEM
'Good things are ahead.'
(Hannan 1987: 339; cited in Heine et al. 1993: 94)

I have not found any exceptions to part (b) of the tendency. That is, I have not found a language in which the *ordinary* deictically-neutral expression for 'earlier' or 'later' violates part (a) of the tendency.

It may have occurred to the reader to wonder how it will affect my hypothesis if any of the languages which I have included in my data happen to have a BEHIND = future/IN-FRONT = past temporal metaphor; i.e., a perspective-specific metaphor whose alignment is opposite to that of Moving Ego. In fact, such a discovery would not undermine my claim

about the tendency of unmarked coding because IN-FRONT = earlier (which would include IN-FRONT = past), and BEHIND = later (which would include BEHIND = future), are already predicted to occur in deictic contexts.

3. Source-frame and target-frame concepts

3.1. *The problem of stating the mappings*

This section investigates the temporal concepts involved in Ego-centered Moving Time and SEQUENCE IS RELATIVE POSITION ON A PATH. Previous accounts in conceptual metaphor theory have left room for further clarification of this issue in several ways. First, the conceptual structure of SEQUENCE IS POSITION has not been distinguished from that of Ego-centered Moving Time. Second, it has been assumed a priori that a concept of abstract *time* plays a role in the target frame. A third, related, problem is that target frames have not always been kept distinct from source frames. This last problem can be seen in the subpart of the (Ego-centered) Moving Time mapping which Lakoff and Johnson (1999: 142) state as "the motion of objects past the observer [= ego] ⇨ the 'passage' of time" [quotation marks on *passage* in original; the arrow is read 'maps onto']. Grady characterizes the situation as follows:

> ... [I]t is very hard to define the target concept of ... [Moving Ego and Moving Time]. What exactly is the experiential correlate of motion which becomes associated with it in the mappings? Referring to it as the "experience of time passing" is begging the question. If we could find a way to define the experience of time we could get around this objection (Grady 1997a: 117–118).

The problem in the Lakoff and Johnson quote above is that *The passage of time* is presented as a target-frame concept but *passage* belongs to the source frame (RELATIVE MOTION), and rigor demands that we avoid stating target-frame concepts in source-frame terminology. Grady implies that we need to define the experience of time so as to eliminate the need to mention the *passage* of time as a target-frame concept. I propose that we abandon the assumption that the abstract concept of *time* needs to be stated in the mapping: the abstract concept of time does not correlate in an obvious way with anything in experience, and may well be a concept that many cultures do not have (cf. Evans 2005). For example, there is no (native) Wolof counterpart to the abstract *time* that we speak of in English.

Time (as we recognize it in our academic tradition) is subject to different metaphorical construals, even within a single language, as in, for

example Moving Ego and Moving Time. But rather than trying to show how *time* is metaphorized, this paper looks at much more narrowly defined temporal concepts whose metaphorical construal may be very similar in different languages (though not in all languages). I hope to show that motion metaphors of time can be adequately described in terms of relatively concrete temporal concepts such as *times in sequence, ''now''*, and *future*. We will see that certain target-frame temporal concepts (see Tables 2 and 3) emerge fairly directly from source-frame experiences of motion, and that Ego-centered Moving Time and SEQUENCE IS POSITION each have target-frame temporal concepts that differ from those of the other. Before continuing, a few words on the notion of *frame* are appropriate, since the understanding of motion and temporal experience is structured by frames.

A *frame* is a ''coherent schematization of experience'' (Fillmore 1985: 223), a conceptual structure in which a concept fits and relative to which it can be characterized (Fillmore 1982a). It is essentially the same sort of thing as a *base* (as contrasted with *profile*) in the sense of Langacker (1987). (Frames are also similar to the *scripts* of Schank and Abelson 1977.) Frames are characterized in terms of the entities that participate in them, and the relations among the entities. It is this property of frames—they consist of specified sets of entities and relations—that distinguishes them from domains, which are not so precisely defined. Frames are instantiated in sentences and have to do with particular words or constructions. For example one can only understand the word *Tuesday* if one understands the frame of the SEVEN-DAY WEEK and how Tuesday fits into it (e.g., it is the second workday of the week, etc.) (Fillmore 1985; Taylor 2003). The frames in this paper are formulated in English and not all the details are worked out. However, it is assumed (based on examples given in this paper) that frames like the ones to be presented (in Section 4) are viable not only for English but for Wolof, Japanese, and other languages.

3.2. *Experiential motivation*

In order to facilitate the analysis that follows, I will speak of *grounding scenarios* (Moore 2000). These are particular subparts of the source frames (mentioned in Section 2.1.2) in which source-frame and target-frame concepts correlate saliently with each other, thus providing *experiential motivation* for metaphors (on experiential motivation see Lakoff and Johnson 1980, 1999; Sweetser 1988, 1990. We will come back to the topic of frames in Section 4.) Grounding scenarios are very similar to the *primary scenes* of Grady (1997a, b) and Grady and Johnson (1997).[18] This

discussion of experiential motivations will provide an avenue into the investigation of target-frame temporal concepts.

The experiential motivations presented in this section plausibly account for the appearance of the metaphors in question in a variety of unrelated languages (See references in note 1.) Impressionistically speaking, the scenarios described seem to be of a sort that could occur in any culture (and comparable scenarios have been observed in rural Africa and urban U.S.). There is, however, no claim that experiential motivations *determine* the metaphors that are found in a given language.

3.2.1. *The experiential motivation of Ego-centered Moving Time.* The grounding scenario for Ego-centered Moving Time consists of three parts: a moving entity's approach to ego, its arrival at ego's location, and its continued motion which takes it away from ego. In order to simplify the discussion, I describe only the approach and arrival.

(18) *Grounding scenario for Ego-centered Moving Time* (Moore 2000; cf. Lakoff and Johnson 1999)
Ego perceives an entity coming toward her and expects it to arrive at the place where she is located. After a period of time during which the entity is moving toward ego, the entity arrives, and ego's expectation is realized.

This grounding scenario can be illustrated with an example involving baseball players (cf. Tresilian 1999 and works cited therein). In the illustration, target-frame concepts are italicized. Imagine that you are a baseball player and you see a baseball high in the air falling towards you. Since you expect the ball to arrive at the place where you are, the distally located ball correlates in your experience with your expectation of its future arrival. This motivates the mapping of a distal entity moving toward you onto a *future time*. As the ball comes closer and closer to you, its projected time of arrival becomes sooner and sooner. This motivates the mapping of an approaching entity onto an *increasingly imminent* event or time. Finally, when the ball arrives at your location, your expectation is realized. This event of arrival motivates the mapping of an arrival onto *the occurrence of a time*. The arrival happens at your location, and of course it happens in your present. This motivates the mapping of ego's location onto ego's *present time*; i.e., of HERE onto NOW (cf. Grady 1997a: 118–119).

There is support from work in psychology that this is a plausible grounding scenario. Gibson (1966: 143) citing Schiff (1965) claims that "the perception of approach and the expectation of collision are not separate". Schiff found that most of his subjects, who included fiddler crabs,

frogs, chicks, and a human, responded "avoidantly and directionally" (Schiff 1965: 1) to a rapidly expanding shadow which gave the impression that it was a rapidly approaching object. This is comparable to an experience most people have probably had—flinching at something which appears to be rapidly approaching (cf. Gibson 1986). While these experiences are not actual instances of the grounding scenario, they demonstrate the plausibility of the first phase, in which a distal approaching entity is saliently associated with the expectation of its future arrival. Instances of this grounding scenario are pervasive in everyday life: estimating the time (and place) of impending potential collisions, or expecting and then experiencing arrivals, are common experiences. The grounding scenario above crucially involves a contrast between present and future. Now let us compare the grounding scenario of SEQUENCE IS POSITION.

3.2.2. *The experiential motivation of SEQUENCE IS RELATIVE POSITION ON A PATH.* The grounding scenario of SEQUENCE IS POSITION is given below.

(19) *Grounding scenario for* SEQUENCE IS RELATIVE POSITION ON A PATH
Two entities are going in the same direction on the same path and one is ahead of the other. Wherever they go, the one that is in front arrives first, and the one that is behind arrives later. (cf. Moore 2000; Svorou 1988.)

The grounding scenario for SEQUENCE IS POSITION is pervasive and salient in everyday life. It occurs whenever two entities are on the same path headed for the same goal; for example, two people going to the clerk's counter in a market. For purposes of illustration, imagine that you see one runner and then immediately another cross the finish line of a race. In addition to perceiving who was in front and who was behind, you also perceive their order of arrival. (In fact it may not be possible to separate the two perceptions. However, it is not claimed that the grounding scenario necessarily involves such rapid succession.) In the grounding scenario, the relation IN-FRONT OF is determined by direction of motion independently of ego's perspective, and correlates regularly and saliently with the relation EARLIER THAN. Speaking of this scenario one could say a sentence like *Pat crossed the finish line ahead of Kim*, in which position stands metonymically for sequence, demonstrating the saliency of the experiential correlation; see Figure 4. (The metonymy is discussed further in Section 4.)

Note that instances of sequence can be perceived (Fraisse 1963; Gibson 1975). This is possible because what people experience as *the present*

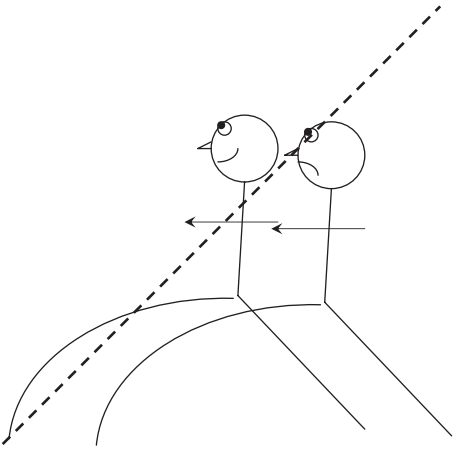

Figure 4. *Sequential arrivals of runners at a finish line in a race.*

has duration (Fraisse 1963: 71–76, 84–85; Gibson 1966, 1975; Geissler, Schebera, and Kompass 1999: 707). This experienced present has been called the *psychological* or *conscious present* (Block 1990: 5).

The phenomenon of musical rhythm can be used to demonstrate the idea of the psychological present. Rhythm is *perceived* rather than being understood as a result of mental elaboration, and since the elements of rhythm (i.e., the sounds) occur at successive instants, the present in which the rhythm is perceived must have duration (Fraisse 1963: 89). Crucially, since these successive instants occur within the present, the concept of sequence does not depend on any opposition between the present and past or future. Previous discussions (e.g., Clark 1973; Lakoff and Johnson 1999: 142) that have paraphrased sequential relations in terms of *past/future* should therefore be revised.

3.2.3. *Crosslinguistic evidence for the motivation of* SEQUENCE IS RELATIVE POSITION ON A PATH. Since it is well known that Ego-centered Moving Time is found in a wide variety of the world's languages (see references in note 1), I will assume without argument that that metaphor is crosslinguistically motivated. Here we will see evidence that the grounding scenario for SEQUENCE IS RELATIVE POSITION ON A PATH is also available crosslinguistically. Example (20) below from Wolof shows a salient experiential correlation between position on path and sequence. Evidence for this salience is the metonymic interpretation in which 'going ahead' stands for arriving first (as in *Pat crossed the finish line ahead of Kim* above).

(20) Wolof
Am *na* *ñoo* *fi* *jiitu* *bon*
have PERF.3 3.PL.SUBJ here go.ahead so
dangay *bàyyi.*
SFOC.2:IMPF leave
'There are those people who went ahead here, so leave it alone.'
'There are people who got here first so leave it alone.'
(The speaker was talking about a tradition according to which a person tied a cloth onto a tree as a way of making claim to an area in which he wished to found a community.) [att.] (Moore 2000. s IN, An:41 taped interview)

The following example shows that some Japanese speakers get a spatial interpretation of *mae* involving a metonymic relation between position and sequence in addition to the more conventional temporal interpretation. The variation is indicated by the percent sign in the translation.

(21) Japanese
Pam *wa* *Kim* *no* *mae* *ni* *haitte* *itta*
Pam TOP Kim GEN front DAT enter:TE went
'Pam went in {before/%ahead of} Kim.'

Svorou (1988)—who originally proposed this experiential grounding—adduces sentences from various languages involving IN-FRONT and BEHIND expressions in which position stands metonymically for sequence. One of Svorou's examples is given here. (Although the IN-FRONT term is glossed 'before', it is clear from the text and other examples that it has spatial uses.)

(22) Bihari
Hama *aha-sa* *aga* *pahucaba*
I you-ABL before
'I shall arrive before you.'
(Jha 1958: 324; cited in Svorou 1988: 241)

To summarize, the data in this subsection suggest that the experiential motivation of SEQUENCE IS POSITION is available to speakers of various languages.

3.3. *Space-to-time mappings and temporal concepts*

This section argues that Ego-centered Moving Time and SEQUENCE IS POSITION are associated with overlapping but distinct temporal concepts. We begin with some support from signed languages for the claim that differ-

ent metaphors of time use different frames of reference. Engberg-Pedersen (1999) reports that among the four time lines of Danish Sign Language there is a sequence line that goes from left to right in front of the signer, parallel to the plane of her chest. This is distinct from the deictic time line, which goes from back to front alongside of the signer. The sequence line presupposes a field-based frame of reference and is used to talk about times in relation to other times without relating them to any "now". By contrast, the deictic timeline is used to talk about times in relation to ego's "now", for example a recent conference in the past (Engberg-Pedersen 1999: 140). According to Engberg-Pedersen, the same general orientation of time lines is found in other sign languages including American Sign Language, British Sign Language, and Sign Language of the Netherlands (Engberg-Pedersen 1999: 141).

Writing about American Sign Language, Emmorey (2001) reports that the physical reference point of the deictic time line is the signer's body, and its default meaning makes reference to the time of utterance (Emmorey 2001: 159). Also according to Emmorey, "the sequence time line is used when signers refer to ordered events that are not related to the utterance time". Emmorey further notes that "The deictic, anaphoric, and sequence time lines all appear to have distinct temporal functions" (Emmorey 2001: 162).[19]

Furthermore, there is evidence that the metaphor structure underlying these signed expressions is similar to or the same as that found in spoken languages. For example Taub (1997: 201) describes a metaphor in American Sign Language called THE FUTURE IS AHEAD which is essentially the same as Lakoff and Johnson's (1999: 140) Time Orientation metaphor (hypothesized to partially structure Ego-centered Moving Time and Moving Ego). See also Núñez and Sweetser (2006).

3.3.1. *Differences between Ego-centered Moving Time and* SEQUENCE IS RELATIVE POSITION ON A PATH. As is well known, in both Ego-centered Moving Time and SEQUENCE IS RELATIVE POSITION ON A PATH, an entity that is farther in the direction of motion maps onto an earlier time (see Figures 2 and 3; cf. Lakoff and Johnson 1999; Núñez and Sweetser 2006). Other than this, however, motion structures temporal concepts differently in the two metaphors.[20] In Ego-centered Moving Time, entities that move relative to ego's location map onto times whose temporal status is changing with respect to ego's "now", as in *Christmas is coming/approaching/getting close* (see Table 2). The ongoing change can be a focus of attention; e.g., *As Valentine's day approaches, roses get more expensive*. And rate of change can be depicted as rate of motion as in, *The end of the semester is* fast *approaching*.

By contrast, in the source-frame of SEQUENCE IS POSITION, Figure and Ground do not move relative to each other. Correspondingly in the target frame, times are depicted as being in an unchanging relationship of sequence in which the intervals between times do not change (cf. McTaggart 1993 [1908]). For example Christmas "follows" Thanksgiving but it never "gets closer" to it.

Ego-centered Moving Time and SEQUENCE IS POSITION retain distinct Figure-Ground organizations, even when they combine in a single sentence and form a single coherent mental image as in the next example. The separate Figure-Ground organizations are shown in Figure 5.

(23) Christmas is *coming* and New Year's is *following* right behind.

Looking further at target-frame concepts, Ego-centered Moving Time can be used to talk about not only sequence but also simultaneity, as in *Summer has arrived*, in which the Figure and Ground are objectively the same moment. This is not possible with SEQUENCE IS POSITION. A different issue is that sequence within the present can be conceived of in SEQUENCE IS POSITION but not in Ego-centered Moving Time, since Ego-centered Moving Time is concerned exclusively with relations between "now" and other times. (The *other time* may be a role [in the sense of Fauconnier 1994(1985)] whose value is the same as that of "now", as we have just

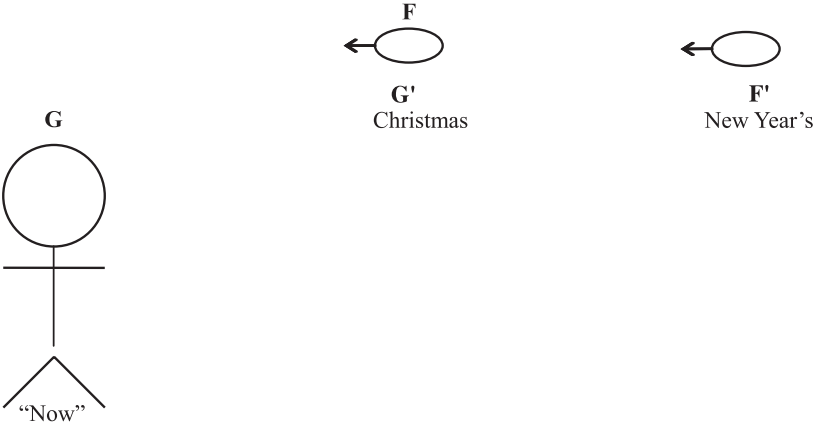

Figure 5. *The Figure-Ground organization of Ego-centered Moving Time and* SEQUENCE IS POSITION, *with the two metaphors depicted together in a single coherent image. The Figure and Ground of Ego-centered Moving Time are indicated with F and G; those of* SEQUENCE IS POSITION *are indicated with F′ and G′. (Linguistic examples: A reception will* follow *the* coming *conference. Christmas is* coming *and New Year's is* following *right behind.)*

seen in the case of *Summer has arrived*). Because Ego-centered Moving Time is concerned with relations between "now" and other times, it is not possible to form a non-spatial mental image of the concepts depicted by this metaphor (e.g. *the future*). By contrast it is possible to form a mental image of sequence that does not depend on a metaphor—one can imagine a light flashing sequentially or two sounds occurring in sequence. Table 4 compares Ego-centered Moving Time and SEQUENCE IS RELATIVE POSITION ON A PATH, summarizing observations made throughout the paper. In each cell where relevant, corresponding information is stated once for the source frame (SF), and again for the target frame (TF).

In addition to the perspective-neutral concepts that we have been focusing on, SEQUENCE IS POSITION can also portray perspective-specific con-

Table 4. *Comparison of Ego-centered Moving Time and SEQUENCE IS RELATIVE POSITION ON A PATH*

Ego-centered Moving Time	SEQUENCE IS RELATIVE POSITION ON A PATH
Relations are determined relative to SF: ego's "here" TF: ego's "now" (i.e., the relevant frames of reference are *ego-based*).	Relations are determined relative to SF: direction of motion TF: sequence of occurrence (i.e., the relevant frames of reference are *field-based*).
Temporal relations are *past*, *present*, or *future*. (i.e., the Ground is "now".)	Temporal relations are *earlier than* or *later than*. (i.e., the Ground can be any time, including "now".)
SF: The Figure moves relative to the Ground. TF: The relationship between the temporal Figure and Ground changes.	SF: Neither the Figure nor the Ground moves relative to the other. TF: The relationship between the temporal Figure and Ground does not change.
In the source frame, the Figure is a moving entity and the Ground is a place. The Ground may be the Goal of motion.	In the source frame, the Figure and Ground are both moving entities. The Goal of motion is not mapped.
May explicitly depict (as metaphorical motion) ego's experience of continuing change during the present moment. (i.e., continuing change may be construed relatively objectively, in Langacker's 1987 terms.)	Does not explicitly depict ego's experience of continuing change.
Depicts sequence or simultaneity. Does not depict sequence during the present.	Depicts sequence only. May depict sequence during the present.
Depicts temporal phenomena which cannot be perceived and for which a mental image cannot be formed except with spatial imagery.	Depicts a temporal phenomenon which can be perceived, and for which a mental image can be formed without spatial imagery.

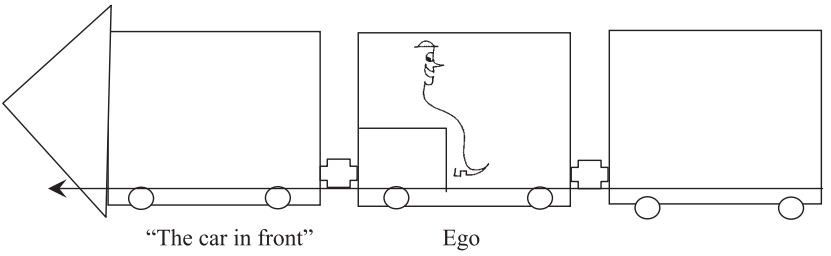

Figure 6. *A situation in which the field-based* FRONT *is opposite to ego's bodily front. (Cf. Fillmore 1997[1971]; Talmy 2000: 204.)*

cepts in cases where ego's "now" functions as the Ground in a field-based frame of reference; e.g., *Before, I believed everything she said* (see Section 2.2.3). In these cases, by hypothesis, the IN-FRONT relation does not depend on ego's metaphorical orientation, but on a series of moving entities, one of which maps onto "now". A physical analogue to this would be a situation in which I was riding a train while facing the back of the train, and spoke of a car that was closer to the front of the train as *the car in front*. It is in front of me, but FRONT is not determined by my bodily orientation (cf. Talmy 2000: 204). This schema, represented in Figure 6, may be relevant to Aymara, a language of the Andes which is convincingly argued to have a FUTURE-IN-BACK/PAST-IN-FRONT metaphor (Núñez and Sweetser 2006).

To summarize, much of the contrasting conceptual structure of Ego-centered Moving Time and SEQUENCE IS POSITION has been described, using temporal concepts that are present or implicit in the source frames. The description does not appeal to the abstract concept *time*, suggesting that this concept is not needed in a basic description of these metaphors. *Time passing* remains a problem for future research: shall we look for a nonmetaphorical definition, or is the concept itself created by the Ego-centered Moving Time metaphor?

In the next section, we look at further ramifications of the observation that temporal phenomena are present in the source frames of motion metaphors of time.

4. Metaphor, metonymy, and frames

4.1. *The close relationship between metaphor and metonymy*

An examination of the relationship between metaphor and metonymy leads to the conclusion that the metaphor/metonymy distinction should

be stated in terms of frames, at least in the case of motion metaphors of time. A close relationship between metaphor and metonymy has been noted in previous work, some of which has suggested that metonymy may motivate the emergence of metaphor, a position which this paper supports (Barcelona 2000b; Goossens 1990, 1995; Heine et al. 1991a, b; Kövecses and Radden 1998; Lakoff 1987; Lakoff and Johnson 1999; Radden 2000, 2002 etc.; Taylor 2003: 138; cf. C. Johnson 1999a, b). Sometimes, the reason for the close relationship is that the correlation in experience that motivates the metaphor also motivates a metonymy (Radden 2002). For example the correlation between elevation and quantity that motivates the metaphor QUANTITY IS ELEVATION (AKA MORE IS UP) as in *Prices are rising* also motivates the metonymy ELEVATION FOR QUANTITY as in *The water level is up* (said in order to convey that a quantity of water has increased, for example the water supply in a dam) (cf. Lakoff and Johnson 1980; Radden 2002).

Typically in cognitive linguistics, metaphor is defined as a cross-domain mapping as opposed to metonymy which is defined as a within-domain mapping (Lakoff and Johnson 1980). The fact that the source and target domains (e.g., ELEVATION and QUANTITY) of a metaphor can participate in a metonymy raises a problem for the use of the notion *domain* in making the distinction between metaphor and metonymy.

This problem can be further illustrated with the case of KNOWING IS SEEING (e.g., *I see what you mean*), which has been discussed by Feyaerts (1999: 319; 2000: 62–63), C. Johnson (1999a, b), and Radden (2002). Example (24) below (adapted from C. Johnson 1999b), which comes from the source frame of KNOWING IS SEEING, has combined simultaneous interpretations (Emanatian 1992; C. Johnson 1999b; Moore 2000; Norvig 1988).[21] That is, there are two distinct interpretations of (24), but a hearer need not resolve the ambiguity in order to understand the sentence. On one interpretation, I visually perceive the object that is in the box (and I interpret *what's in the box* as a free relative). On the other interpretation, I see a situation that could provide the answer to the question *What's in the box?* Visual perception of the thing in the box stands metonymically for knowing what that thing is (C. Johnson 1999b).

(24) I see what's in the box. (Metonymy: combined simultaneous interpretation)

Taylor (2002: 196) defines *domain* as "... any knowledge configuration which provides the context for the conceptualization of a semantic unit". Since in order to understand what SEEING is, you have to understand that it involves both visual perception and gaining knowledge, there must be a *knowledge configuration* that involves both KNOWING and SEEING (cf.

Goldberg 1990 [cited in C. Johnson 1999a]; Johnson 1999a, b; Sweetser 1990). The combined simultaneous interpretation of (24) is evidence for such a knowledge configuration. In the terminology of Croft and Cruse (2004: 25), a concept such as SEE simultaneously presupposes a combination of domains called a *domain matrix* (see Langacker 1987). In the case of SEE, some of the domains in the matrix would be PHYSICAL OBJECT, VISUAL PERCEPTION, and KNOWLEDGE. KNOWING is thus in the domain matrix of SEEING. KNOWING IS SEEING would then be classified as a metonymy by the definition of Croft (1993), according to which a metonymic mapping is a mapping that "occurs within a single domain matrix, not across domains (or domain matrices)" (Croft 1993: 348), as opposed to metaphor, which is "a mapping between two domains that are not part of the same matrix" (Croft 1993: 348); cf. Lakoff and Johnson (1980).

My proposal is that motion metaphors of time should be characterized as a mapping across frames, as opposed to metonymy, which is a within-frame mapping.[22] In fact, many authors already characterize metonymy in terms of the frame, schema, or idealized cognitive model (Frame: Koch 1999: 146, 2001: 202; Taylor 2003: 129. Schema: Lakoff and Turner 1989: 103. ICM: Radden and Kövecses 1999: 21). Definitions of metonymy and metaphor in terms of frames are given below (cf. Koch 1999; Radden and Kövecses 1999: 21; Taylor 2003: 125).

(25) a. Metonymy is a mapping from entities or relations (A) in a conceptual frame to other entities or relations (B) in the same frame (where the frame itself counts as an 'entity or relation in the frame'), such that naming A can evoke reference to B.
b. Metaphor is a mapping from entities or relations in a frame (the source frame) to entities or relations in another frame (the target frame).

In that cognitive linguists have always recognized that the source and target domains of metaphors are structured by frames, my proposal makes explicit what has already been assumed and is consistent with most if not all metaphor analyses in cognitive linguistics (e.g. Grady 1997a; Lakoff and Johnson 1980, 1999; Núñez and Sweetser 2006; Sweetser 1990).

KNOWING and SEEING can be recognized as separate frames since the entities that participate in the KNOWING frame are a knower and a proposition that is known, whereas the SEEING frame has someone who sees, light, and a thing seen. The fact that the person who sees also knows what she sees is not a problem for this formulation as it is for a formulation in terms of domains. The crucial difference is that the

characterization of a frame requires an explicit statement of the entities and relations involved, but that of a domain does not.

I now illustrate my proposal in detail with the example of SEQUENCE IS POSITION. Example (26) below has a combined simultaneous interpretation that is analogous to that of (24). In (26), on the relevant interpretation in which Pat and Kim both take a single path to the well, Pat is ahead of Kim on the path when she gets to the well, and she also gets there first. Pat's position on the path stands metonymically for her time of arrival. This is a metonymy (rather than a metaphor) because there is a single motion event that involves both the physical AHEAD relation and a sequence of arrivals.

(26) Pat got to the well ahead of Kim. (Metonymy: combined simultaneous interpretation)

The sequence of arrivals and the relative positions on the path in (26) are understood according to a single configuration of background knowledge, in which an experience of motion entails a correlated and proportional experience of time (cf. Evans 2005: 62). In other words, the domain matrix of MOTION includes TIME (cf. Engberg-Pedersen 1999; Lakoff and Johnson 1999: 151–152). The metonymy in (26) is thus a space-to-time mapping within the domain matrix of MOTION. This metonymy—RELATIVE POSITION ON A PATH FOR SEQUENCE—contrasts with the SEQUENCE IS RELATIVE POSITION ON A PATH metaphor, exemplified again in (27).

(27) The action signals a tougher stance against armed factions in Haiti *ahead* of fall elections.... (SEQUENCE IS RELATIVE POSITION ON A PATH)
(San Francisco *Chronicle* 22 Mar. 05; italics added.)

The example in (27) is a metaphor and not a metonymy because, while the word *ahead* evokes a frame of physical motion, there is no actual motion involved (Dirven 2002).

4.2. *Within- vs. cross-frame mappings*

In order to see in more detail how the notion of frame can be used to distinguish between a space-to-time metonymy and a space-to-time metaphor, let us compare the RELATIVE POSITION ON A PATH FOR SEQUENCE metonymy with the SEQUENCE IS RELATIVE POSITION ON A PATH metaphor. The frame that structures the metonymy, and is also the source frame of the metaphor, is ORDERED MOTION. A characterization of this frame is given in (28). The entities that participate in a frame are referred to as frame *elements*. (The frames included in this paper are for purposes of

illustration and do not represent a fully worked out analysis of English. On frames, see also Fillmore and Atkins 1998; Fillmore et al. 2004.[23] For an extensive project on the frame semantics of English see the FrameNet website.)

(28) *Frame of* ORDERED MOTION (Cf. Lakoff 1987; Lakoff and Johnson 1999)
In this frame, physical entities move on a path.
Elements: – Moving Entity 1 (Figure)
– Moving Entity 2 (Ground)
– Path (consisting of an ordered set of points from beginning to end)
– Source (beginning point of path)
– Goal (end point of path)
Relations: – Entity 1 and Entity 2 move relative to a stationary path, but not necessarily relative to each other. One is ahead of the other.
– Each moving entity is located at different points on the path at different times in sequential order from beginning point to end point.
– Entities moving on the path have a FRONT oriented toward the Goal of motion and a BACK in the opposite direction. All entities moving in the same direction have the same orientation.
– Entities that are closer to the Goal of motion are IN-FRONT/AHEAD of entities that are farther from the Goal.
– An entity that is closer to the Goal of motion *arrives* at a given point *earlier* than an entity that is less far.

In the metonymy, the position of each entity (e.g., *Pat* and *Kim* in (26) *Pat got to the well ahead of Kim*) maps onto the time of arrival of that entity. It is clear that this is a within-frame mapping[24] because position and time-of-arrival are both associated with elements of the frame of ORDERED MOTION (e.g., associated with the moving entities, Pat and Kim in example (26)).

We can now see that the sequential structure of the source frame (ORDERED MOTION) of SEQUENCE IS POSITION makes that frame appropriate for mapping onto the target frame (i.e., SUCCESSION; see below). In other words, the conceptual relations that underlie the metaphor are present in the source frame, where they are available for metonymy (cf. Grady and Johnson 1997; Johnson 1999a, b). One could thus say that the conceptual metonymy motivates the metaphor (as suggested by Barcelona 2000b and

Heine et al. 1991a, b, among others), and speculate that the linguistic metonymy facilitates the emergence of the metaphor in a speech community. Let us now see how the characterization of metaphor as a mapping across frames works, using (29) as an example.

(29) Hours of eating and drinking *followed* the wedding ceremony. (FrameNet website)

Example (29) is understood relative to the SUCCESSION frame, which is characterized below.[25] In the characterization, the terms *Time1* and *Time2* are equivalent to the count noun *time* as used throughout the paper in statements of mappings (see the discussion in Section 2.1.1).

(30) *Frame of SUCCESSION*
Elements: – Time1 (Figure)
– Time2 (Ground)
Relations: – Time1 occurs earlier than or later than Time2.

In SEQUENCE IS RELATIVE POSITION ON A PATH Moving Entity 1 maps onto Time1, instantiated in example (29) above by *hours of eating and drinking*. Moving Entity 2 maps onto Time2, instantiated by *the wedding ceremony*. What the SEQUENCE IS RELATIVE POSITION ON A PATH metaphor does is map properties of the ORDERED MOTION frame—the positions of the moving entities and their IN-FRONT/BEHIND orientation—onto entities and relations in the SUCCESSION frame. The two frames are distinguished by the nature of their frame elements: physical Moving Entities in the ORDERED MOTION frame, and Times in the SUCCESSION frame.

An account analogous to the one just given could be given for Ego-centered Moving Time with an example like *The deadline is getting closer*. The source frame is RELATIVE MOTION whose elements are Moving Entity, Ground Location, Source, Path, and Goal. The target frame is EGO-CENTERED TIME, whose elements are a Time, and "now".[26] In *The deadline is getting closer*, the Moving Entity maps onto the Time, which is instantiated by *the deadline*; and the Ground Location maps onto "now", which is not instantiated by any element of the sentence (cf. Table 2 and Figure 2).

The case made here for characterizing motion metaphors of time in terms of frames may also be relevant to other correlation-based metaphors with clear experiential motivations such as STATES ARE LOCATIONS and PURPOSES ARE DESTINATIONS (cf. Grady 1997a; Lakoff 1987: 276–278). This characterization does not alter the fundamental idea of what counts as a metaphor or metonymy, which remains the same as in Lakoff and Johnson (1980).

5. Summary and conclusions

This paper makes two major claims. The first is that there are two frames of reference involved in motion metaphors of time: ego-based (perspective-specific) and field-based (perspective-neutral). The second is that motion metaphors of time need to be analyzed as mappings across frames.

Rather than a single target domain of TIME, there are two target frames in motion metaphors of time: SUCCESSION and EGO-CENTERED TIME (cf. Table 4, Section 3). SUCCESSION has to do with the idea that times occur in sequence. EGO-CENTERED TIME has to do with the experience of "now" and the constantly changing status of times relative to "now". SEQUENCE IS RELATIVE POSITION ON A PATH is a mapping from ORDERED MOTION to SUCCESSION. Ego-centered Moving Time and Moving Ego are (separate) mappings from RELATIVE MOTION to EGO-CENTERED TIME (Sections 2.1 and 2.2). We have concentrated on a reanalysis of the Moving Time metaphor and the proposal that perspectival neutrality is an independent motivation for a crosslinguistic tendency in which IN-FRONT expressions designate an earlier time and BEHIND expressions designate a later time in deictically neutral contexts (Section 2.3). More generally, the contrast between perspective-specific and perspective-neutral temporal metaphors parallels the distinction between temporal relations that are expressed linguistically with tense, which is prototypically deictic (Comrie 1985), as opposed to relations that are expressed with adpositions, which are deictically neutral (Haspelmath 1997). It is an advantage of the current approach that it reveals this parallel between metaphor and grammar. The reason for the parallel is a topic for further research (cf. Heine 1997; Lakoff 1987; Taub 1998).

The perspectival contrast is also relevant to an ongoing debate in philosophy on the question of whether both *tensed* and *tenseless* temporal facts are real (Jokic and Smith 2003; Le Poidevin 1998; McTaggart 1993[1908]). Our findings suggest that tensed and tenseless conceptualizations are equally well motivated—by different conceptual structures: perspective-specific in the former case and perspective-neutral in the latter.

It is possible at this point to offer two suggestions on what may constrain the structure of motion metaphors of time. The first has to do with the temporal structure of the source frames, and the second has to do with parallel perspectival structure in the source and target frames.

First, the correlations between spatial and temporal concepts in the source frames not only provide experiential motivation for metaphor mappings, but they also constrain them (cf. Grady and Johnson 1997;

Lakoff and Johnson 1980). For example, the frame of ORDERED MOTION supports a reliable inference that moving entities that are closer to the Goal arrive sooner than entities that are farther. This pairing of temporal and spatial structure in the source frame, together with the shared temporal structure of the source and target frames, motivates a metaphorical construal of sequence in terms of the IN-FRONT/BEHIND opposition. It also constrains this construal in such a way that the metaphorical pairing of spatial and temporal structure is consistent with how the spatial and temporal structure correlate in the source frame. For example, the entity that is closer to the goal maps onto the earlier time. Note that the temporal relations of the source frame are preserved in the target frame. The shared temporal structure of the source and target frames corresponds to the *generic space* of Fauconnier and Turner 2002 (cf. The Invariance Hypothesis and Brugman 1990; Grady 2004; Lakoff 1990; Turner 1990).

The ego-based frame of reference inherent in EGO-CENTERED TIME seems to influence the Moving Ego and Ego-centered Moving Time mappings by motivating an ego-based construal of the source frame (RELATIVE MOTION), which otherwise does not *necessarily* presuppose an ego-based frame of reference (cf. note 6). Nonetheless, the source and target frames have ego-based structure independently of each other, and this structure constrains the mappings so that counterpart maps onto counterpart in terms of that structure; e.g., ''here'' maps onto ''now''. The constraint may be stated as *Metaphor mappings respect perspectival structure* (cf. Bergen and Plauché 2005: 12; Moore 2001: 155–156).

If these suggestions are correct, structural parallels between source frame and target frame play an important role in the structure of motion metaphors of time. It is clear however that the inferential and imagistic richness of source frames such as RELATIVE MOTION exceeds that of target frames such as EGO-CENTERED TIME (Gentner 2001: 220; Lakoff and Johnson 1980). Thus, the target-frame concepts throughout this paper have been difficult to state without using metaphor. For example, (31a) below is not fully paraphrasable by a nonmetaphorical expression such as (31b), or, I would claim, by any other nonmetaphorical English expression such as #*The deadline is getting sooner* (which implies a change in the date of the deadline). Furthermore, to the best of my knowledge the contrast between (31a) and (31c) cannot be rendered in English without metaphor (The tilde is used to mark examples that are unconventional but interpretable; cf. Grady 1997a.).

(31) a. The deadline is getting closer.
b. ~The deadline is getting more imminent.
c. We are getting closer to the deadline.

Metaphor thus cannot be reduced to structural parallelism (Gentner 2001; see Murphy 1996 for a different opinion; cf. Grady 1997a).

By way of conclusion, let us look at a final example of frames and their role in metaphor and metonymy. The lexeme *follow* has purely motion uses such as that in (32a) below, which simply instantiates the ORDERED MOTION frame. However, since ORDERED MOTION has temporal characteristics (Section 4.2, ex. (28)), a temporal inference may be derived from (32a), namely that the horse got across the bridge after Francis. Furthermore, in the appropriate context, space-to-time metonymy is possible in the ORDERED MOTION frame as in example (26) above (*Pat got to the well ahead of Kim*), which instantiates the RELATIVE POSITION ON PATH FOR SEQUENCE metonymy, which is further exemplified in (32b) below.

(32) a. A horse followed Francis across the bridge.
b. Archibald followed Theobold in line (that's why he didn't get a front row seat). (Combined simultaneous interpretation: (i) Archibald was going along behind Theobold; (ii) Archibald got to the Goal [i.e. the ticket counter] later than Theobold did. Metonymy: POSITION ON PATH FOR SEQUENCE)

Since the entities involved in (32b) all instantiate elements of the ORDERED MOTION frame, (32b) is a metonymy and not a metaphor (cf. the definition of metonymy in Section 4.1 (25)). When elements of the ORDERED MOTION frame are mapped onto events or times; i.e., onto elements of another frame, as in the case of *Tuesday follows Monday*—in which Moving Entities are mapped onto Times of the SUCCESSION frame—the result is metaphor. The crucial difference between the metaphor and the metonymy is not whether TIME is involved; the difference has to do with the nature of the frame elements.

In analyzing space-to-time metaphors, we are dealing not with distinct and homogenous domains such as SPACE and TIME, but with a complex array of experience types. When we use motion metaphors of time, we do not so much understand TIME in terms of MOTION as understand certain temporal frames (e.g., SUCCESSION) in terms of other frames (e.g., ORDERED MOTION), whose temporal properties are played out in spatial scenarios.

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1. On motion metaphors for time crosslinguistically, see, for English: Clark 1973; Gentner 2001; Lakoff and Johnson 1999; for American Sign Language: Emmorey 2001; Aymara: Núñez and Sweetser 2006; Chagga: Emanatian 1992; Chinese: Yu 1998; Danish Sign Language (and other signed languages): Engberg-Pedersen 1999; Japanese: Shinohara 1999; Romance: Fleishman 1982; Slavic: Janda 2002; Turkish: Özçalişkan 2002; Wolof: Moore 2000; Zulu: Taylor 1987. On various languages see Haspelmath 1997; Radden 2001; and Traugott 1978.
2. Correlation-based metaphors are metaphors that arise from experiential correlations. These include, for example, temporal metaphors, MORE IS UP, and most of the metaphors discussed in Lakoff and Johnson (1980) except for image metaphors. See Section 3 of this paper and Grady (1999).
3. According to the UCLA Wolof page (www.humnet.ucla.edu/humnet/aflang/Wolof/), Wolof is spoken as a first or second language by about 80% of Senegal and most of The Gambia. According to the Lonely Planet World Guide (www.lonelyplanet.com) the population of Senegal is about 10.3 million and the population of The Gambia is about 1.4 million.
4. The following conventions pertain to the examples in this paper: In brackets at the end of the example, the source is given, including the identification of the speaker, usually by an initial. A lowercase *s* before the initial means that the speaker was from Saloum in rural Senegal; *d* means that the speaker was from Dakar, the capital of Senegal; *f* means that the speaker was a female. After the speaker's initial(s) I include a notation that allows me to find the example in my field notes where applicable. For Wolof examples, the word *constructed* is included under a gloss in cases where the example in question was constructed in elicitation. If the example was attested in spontaneous speech, that is indicated with the abbreviation *att.*

   The following abbreviations are used in the glosses: 1 first person; 2 second person; 3 third person; ABL ablative; ACC accusative; ART article; AUX auxiliary; CAUS causative; CL noun class (Bantu); COP copula; DAT dative; DEM demonstrative; DIST distal; EMPH emphasis; FOC focus; FUT future; GEN genitive; HORT hortative; IMPF imperfective; IMPR imperative; LOC locative; LOCPREP locative preposition; MID middle voice; NOM nominative; NONSUBJ nonsubject; OBJ object; PERF perfect; PL plural; PRSNTTV presentative; REL relativizer; SFOC sentence focus; SUBJ subject; TE the morpheme *te* in Japanese, a verb linker; TOP topic; VC marks a verbal complement.

   The Wolof data is transcribed in the official Senegalese system (see Fal et al. 1990). In the Senegalese system, letters have approximately their IPA values except for the following: *é* tense mid front vowel; *e* lax mid front vowel; *ë* high central vowel; *a* low central vowel; *à* longer low central vowel (before complex consonants); *ó* tense mid back rounded vowel; *o* lax mid back rounded vowel; *ñ* palatal nasal; *j* voiced palatal stop; *y* palatal glide; *q* geminate [q]. In the case of long vowels, a single diacritic stands for the whole segment; e.g. *óo* = [o:]. Word-final stops are devoiced. Capital and lower case letters have the same value.
5. Frames are discussed in detail in Section 4. See note 23 on the use of frames in this paper.

6. However, the distinction that I am making between ego-based and field-based frames of reference (see below in text) would not be generally useful in spatial description (see Levinson 1996, 2003). Among spatial experiences, I only claim that this distinction is relevant to the very limited set of experiences that motivate temporal metaphor. This is consistent with the frequently-made observation that temporal metaphors typically make use of only one dimension, and also with the claim (Lakoff and Johnson 1980; Sweetser 1988, 1990) that metaphors are selective in what they map from the source domain. At the same time, I do not wish to downplay the importance of the ego-based/field-based distinction in temporal metaphor beyond the restricted class of motion metaphors of time discussed in this paper. For example, Janda (2004: 491) discusses essentially the same distinction as it relates to issues such as the interaction of tense and aspect in Russian, and the structure of gnomic expressions.
7. I am using the term *field-based* in a sense similar to that of Talmy (2000: 212). Allen and Hill (1979: 131, 141–142) also use the term similarly.
8. In the terminology of Núñez and Sweetser (2006), a time is determined relative to a *Time-Reference-Point*.
9. In this paper, I informally use the word *fictive* (cf. Talmy 2000: Ch. 2) in connection with deixis to talk about what Bühler 1990 [1934] calls "Deixis am Phantasma". See Hanks (1990) on *transposition*. In Moore (2000) I refer to transposition as *decentering* (cf. Hanks 1990).
10. A previous experiment had established that left-to-right vs. right-to-left movement did not affect subjects' response to this question.
11. The word *before* is more felicitous than *after* in deictic use, and this fact remains unexplained. Haspelmath (1997: 86) points out other asymmetries in words with similar semantics in his sample of languages. Due to lack of space, these issues will not be discussed in this paper.
12. Japanese and Wolof both have Ego-centered moving time. Wolof clearly does not use a FRONT word in SEQUENCE IS POSITION, and arguably does not use a BACK word in that metaphor either (see Moore 1999, 2000: Ch. 4).
13. A related example is *move the meeting forward/ahead* (see the discussion of Núñez et al. forthcoming at the end of Section 2.2.1.) On one analysis, this example is ambiguous between 'make the meeting earlier' and 'make the meeting later' because there is no clear indication of whether the Ground should be interpreted as ego or as the scheduled time of the meeting (Boroditsky 2000; Gentner 2001; McGlone and Harding 1998; Núñez and Sweetser 2006).
14. A possible exception (unclear case) is Basque *aurrera* 'forward' in *astelehen-etik aurrera* 'from Monday on (FUT)'. More information is needed on this, but if this expression codes future then it is not an exception since future is a deictic category (Haspelmath 1997: 160).
15. My glosses of the Mandarin are from *The Pinyin Chinese-English Dictionary* (Commercial Press 1981).
16. There is a temporal adverb *beogho*, which is a FRONT term, from More (Heine et al. 1993: 94) that means 'tomorrow' and thus conforms to the tendency because 'tomorrow' is a deictic concept. *Beogho* is also said to mean 'the following day'. This is not a counterexample if we assume that the 'following day' meaning is derived from the 'tomorrow' meaning. (Note that the word *following* is in the translation only and does not correspond to a part of the semantic structure of *beogho*.)
17. The counterexample from English is *They never saw each other again from that day* forward.

18. Grounding scenarios differ from primary scenes in that grounding scenarios lack the condition of temporal locality and the division between perception and subjective response (see Grady 1997a; Grady and Johnson 1997). What grounding scenarios crucially have in common with primary scenes is that they are both situations in which source-frame and target-frame concepts co-occur saliently.
19. At this point let me explain why I have chosen not to use the familiar construct of the timeline to explain the concepts treated in this paper. To use the timeline in this way would be to tacitly assume that it is a neutral representation of the temporal concepts discussed. In fact, the timeline is an additional cognitive device—a conceptual blend—the analysis of which lies outside the scope of this paper (see below). To use the timeline would be to attempt to illustrate one cognitive device, motion metaphors of time, in terms of another, the timeline, which would remain unanalyzed.

    Additionally, here is a specific problem with the timeline that may help the reader understand why I have not employed it in my descriptions: The timeline represents the basic fact that things happen in sequence. What the timeline does not represent so well is the constant change in which the future becomes the present which becomes the past; i.e., the experience which is depicted as motion in Moving Ego and Moving Time.

    The timeline as conceptual blend (in the sense of Fauconnier and Turner 2002) does suggest an interesting reason why motion metaphors of time are cognitively useful. In a motion scenario, time and space are experienced together. If the successive points on a path, which are reached at different times, are considered all at once, the result is a blend at which the different times (which cannot be experienced together) are represented as if they were different places that could be seen all at once (Bergson: 1999 [1923]: 34; cf. Fauconnier 1997). It could be that motion metaphors of time are cognitively useful because they make this sort of static representation possible, but this question is outside of the scope of the current paper.
20. Based on the shared metaphorical direction of motion, it would be possible to posit a schematic metaphor that would subsume both Ego-centered Moving Time and SEQUENCE IS POSITION. However, considerations of length preclude a discussion of the level of generality at which we should decide what counts as a variant vs. a separate metaphor, and I will continue to treat the two as separate.
21. Examples (20)–(22) also have combined simultaneous interpretations.
22. Barcelona (2002: 237–238) also recognizes that frames play a definitional role in metaphor. Croft and Cruse (2004: 15) have claimed that *domain* and *frame* are identical theoretical constructs. If this claim is accepted, then my proposal would be that the entities and relations of domains such as TIME need to be carefully stated.
23. Although my work follows and is deeply indebted to the work of Fillmore and associates (Fillmore 1982a, FrameNet, and other references in text), the frames that I posit are different from theirs. (For example, what is treated here in terms of the ORDERED MOTION frame would be treated in terms of the COTHEME frame of FrameNet.) The reason the frames are different is that my goals are different from theirs. Fillmore and associates are primarily interested in analyzing English lexicon, syntax, and discourse; and they generally only posit frames that are justified by direct linguistic evidence. I am primarily interested in sketching out understandings of motion and time in the way that will be most useful for the analysis of conceptual relations such as those involved in metaphor and metonymy. Thus my formulations of frames include what might be considered world knowledge rather than part of the frame semantics of a language (cf. Chang et al. 2002). Also, I avoid incorporating metaphor into the structure of a frame. Nonetheless, my frame descriptions are mostly compatible with the FrameNet descriptions. Also, whereas FrameNet aims at a complete description of English, I am not

attempting a complete description of a language or conceptual system, but only including aspects of frames that are directly relevant to the purposes of this paper. For example, there is a general frame MOTION, not discussed here (see FrameNet), that contributes structure to ORDERED MOTION and to RELATIVE MOTION.

Another thing is that I state frames slightly differently than they are stated by Fillmore and colleagues (e.g., Fillmore et al. 2004 and the FrameNet website). Whereas I state frame elements and relations, they state frame elements and a definition.

24. This is considered to be a *mapping* because it puts members of a set of spatial relations into correspondence with counterpart members in a set of temporal relations (cf. Fauconnier 1997: 1 on *mapping*).
25. The relevant frames on FrameNet are RELATIVE_TIME and TIME_VECTOR.
26. What is analyzed here in terms of EGO-CENTERED TIME would be analyzed in terms of TIME_VECTOR and DIRECTION on FrameNet.

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