

Sex and Size: The Influence of Grammatical Gender on Object Perception in English and German

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by

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Abstract

Does language affect the way we perceive the world? Do speakers of different languages perceive the world differently? If language does indeed affect thinking and perception, as recent studies have suggested, speakers languages that inflect nouns for grammatical gender, such as German, might perceive masculine nouns such as ‘skirt,’ ‘frog’ and ‘spoon’, which do not exhibit biological gender, as more masculine. Feminine nouns ‘fork,’ ‘table’ and ‘door’ might be perceived as more feminine, and neuter nouns ‘knife,’ ‘house,’ and ‘ship’ might be perceived as genderless.

In this study, speakers of German and English were asked to make similarity judgments about pictured objects under timed conditions. It has already been demonstrated that the grammatical gender of words may affect perception to some degree (Boroditsky, et al., in press), and this study sought a partial replication of those results. In addition, to further test whether knowledge of grammatical gender affects the perception of objects, the present study included diminutive nouns (e.g. tummy, droplet, blankie, etc.), which are all grammatically neuter, formed from masculine, feminine and neuter base words in German in order to determine whether words such as ‘drop,’ whose roots are masculine in German (*der Tropfen*), would still be perceived by German speakers as masculine, or whether they would be considered more feminine because of cultural associations of ‘smallness’ with femininity.

Keywords: Psycholinguistics, Linguistic Relativity, Gender

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Does language affect the way we perceive objects? Do those who speak different languages perceive the world differently? Do speakers of languages with grammatical gender group words into categories that speakers of languages without grammatical gender do not?

1.0 Introduction:

For beginning English-speaking students learning German, the concept of grammatical gender is one of the biggest challenges. In English there is only one word for ‘the’ and with a few exceptions, such as the common reference to ships as ‘she’ inanimate objects in English are referred to with the pronoun ‘it.’ Because German marks all articles and pronouns for gender, there are three equivalent German articles *der*, *die*, and *das* and three equivalent pronouns *er*, *sie* and *es*. This difference in languages means that German speakers have one less thing to learn in English, but for English-speakers the concept of grammatical gender is torturous.

This paper builds upon a series of psycholinguistic experiments conducted by Boroditsky et al. (in press) to explore the extent to which grammatical gender in the language one speaks affects the perception and classification of nouns denoting both animate and inanimate objects, and also the extent to which grammatical gender and semantic associations conflict in the minds of speakers. Supporting data were collected from a cross-language experiment conducted on English-speaking Americans and German-speaking Germans. An introduction to the basic issues

will be discussed in chapters 2 and 3. The basic structure of German grammatical gender will be discussed in chapter 4. The experiments will be presented in chapter 5.

2.0 Why Would Anyone Think Grammatical Gender Affects the Way We Think?

When I lived in Germany, while talking about the seeming arbitrariness of the genders of German nouns, a German neighbor of mine told me a story that made me feel better about the tough time I was having getting the genders of German nouns right. He said that when he was little, he thought that it was strange that some pieces of furniture were neuter and even more bizarre that still others were masculine. He explained further, that as a child, he had thought that everything at home should be feminine because that is where his mom was all day. Couches and laundry were feminine, that made sense, but he sat on *easy chairs* with his mother and read *books*. He ate lunch with his mother at the *table*. These nouns, he said, should not have been masculine, because they had to do with his mother. Thus, genders of these objects conflicted with his ideas about them. Because this thought alone could never be thought by a child growing up with English as a first language, it suggests that meta-knowledge of language was affecting his thoughts already at a very young age.

Like all native adult speakers of German, he now uses the gender of words perfectly, but it may surprise no one that his experience with certain objects has affected the way he thinks about them and perhaps has weakened the bond between an object and the biological representative of the noun class to which it belongs. That is, masculine objects that are associated with a living space where a child spends a great deal of time with his mother may become less masculine in the mind of the child, or maybe, phrased another way, the feminine qualities of the noun become more salient.

If it is experience in a given culture that affects one's ideas about words and more generally about language, then each culture has its own influence on words and language. Might

a German child whose father is a rug-salesman establish a stronger association between rugs and men than between rugs and women? In this example, the language the child speaks is irrelevant. The meaning of the word is influenced by personal and cultural experiences. The same would be true if a Spanish child grew up in the same situation; “rug” might be assigned more masculine qualities.

But what about the words that hold no special meaning for a speaker? What about *light*, *puddles* and *shoes*? Surely not every word that a child utters or experiences has a special significance or association with a person. These *nothing-special* words are the words that are interesting because if they do not produce bias by the association with a person of biological gender, then they can be more objectively tested for an association with grammatical gender.

It can be said that there are two competing types of associations that vie for the spotlight in the minds of speakers. The first association is grammatical gender and the other is the semantic associations a speaker has with a word. Because these associations can color the item differently, both must be studied. The question is: when a speaker thinks of a word or sees an object, which of the two contending associations wins?

3.0 Linguistic Determinism and Linguistic Relativity¹

Some people have already asked questions like these about the relationship between language and thought. Among the earliest scholars to study this idea was Johann Herder, who thought that reason was relative to language we speak. Herder's optimism led him to believe that societies could learn from one another, one continuing from where the other left off.

Wilhelm von Humboldt took a considerably different and somewhat Darwinian interpretation of the relationship between language and culture, contending that "language is as much prison as emancipator." He argued that those 'civilized' societies who were blessed with 'complex' languages could express more 'complex' thoughts and were thus naturally superior. Those cursed with inadequate languages were naturally inferior.

This dichotomized and culture-centric view of language and culture has largely been abandoned by contemporary scholars. However the constructive view of cultural equality that Herder worked with was carried on by Franz Boas in his work done in the late 1800s and early 1900s. Boas' work was influential on later scholars who investigated linguistic differences. As Collins has observed,

"Boas' disdain for unilineal evolution as an explanation for cultural phenomena, and his concern that it was used as an intellectual palliative for the political and racist debasement of peoples, brought him to a view of *historical particularism*, the idea that we cannot understand cultures as simply being either 'ahead' or 'behind' on the cline of progress from savagery to civilization. Rather, each culture must be understood in its own terms, subject to and a result of the vagaries of its own history and the particular twists and turns of cultural response to the environment and unique cultural and physical resources available."

With this approach to cultural difference, Sapir, a student of Boas, came to believe that language and thought influenced, maybe even *determined* each other. "Human beings do not live in an objective world alone, nor alone in a the world of social activity as ordinarily understood,

¹ The information in this section draws from the fuller presentation in Collins (2006).

but are very much at the mercy of the particular language which has become the medium of expression for their society” (cited by Whorf in Blount, 1995:64).

Benjamin Lee Whorf, a student of Sapir, spent the bulk of his linguistic career working on the theory, which has come to be known as the Sapir-Whorf hypothesis. The theory proposes in its strongest version that language *determines* the nature of one’s thoughts. According to this view, one’s language shapes one’s world view. His work with Linguistic Determinism set the stage for much debate in linguistic and anthropological circles. Whorf’s hypothesis was based on his field work with the Hopi Indians, who he observed had no words that referred directly to time (Whorf, 1956). Whorf suggested that therefore the Hopi did not experience the passage of time in any way similar to speakers of languages that have such terms. Numerous researchers have disputed this view, showing that the Hopi language does include words and phrases that refer to time of day (sunrise), season (harvest) and human aging (child, old man). Thus, although the Hopi language does not have words for hours of the clock or months of the year, the Hopi people do experience the passage of time. Such findings have been used to reject the strong form of Linguistic Determinism—the notion that language determines (and thus sets limitations) on thought--and most current scholars write the strong version of the theory off as racist, or just another way to marginalize and discriminate against other cultures.

Although the strong version of linguistic determinism as been discredited, a weaker version of the theory, *Linguistic Relativity*, which contends that the language one speaks does not determine but merely *affects* perception has some support. Under this theory, the perceptions of speakers of different languages are not confined to the words and grammar that they know, but rather, the world as they see it is affected by the words and grammar they use to describe it. One way to explore the influence of language on perception is through grammatical gender.

4.0 Grammatical Gender

Although monolingual English speakers may find it strange, many languages have a grammatical system that divides nouns into gendered categories. In most European languages, nouns are divided into categories called *masculine* and *feminine* and sometimes *neuter*. Some languages have more noun categories though, extending the system to include such classifications as *vegetative* or *animate* (Corbett, 1991). The genders of the words seem to have little or no correspondence to the meaning of the words, and many language textbooks as well as language scholars argue that gender assignment in gender-marked languages is arbitrary.

Whereas words for family members in German generally reflect biological sex, the word for child, *Kind*, is marked as grammatically neuter, the word for ‘door’ is grammatically feminine (*die Tür*) and the word for ‘table’ is grammatically masculine (*der Tisch*). That is to say, some inanimate objects, which have no biological sex, are marked grammatically as masculine and feminine. Similarly, some animate objects that have a sex, even humans, are marked as neuter.

Because German nouns often do not show their gender in their form, it can be said that German has a moderately covert system of gender. In certain instances, morphology can offer a clue to a noun’s gender. For example, nouns that are formed from adjectives by adding the suffixes *-heit* or *-keit* are always feminine and nouns that end in *-er* are predominantly masculine. Diminutives in German are formed by adding either *-chen*, or *-lein*² to the noun stem (which could be feminine, masculine or neuter.) By adding the suffixes, and often changing the vowel in the root of the word slightly, the word undergoes a gender transformation. The suffixes *-chen* and *-lein* make all diminutives neuter. The root word *Tropfen* ‘drop’ is

² These suffixes vary across dialect regions. Sometimes *-chen* appears as *-kin* and *-lein* as *-le* or *-el*. In all forms, though, the diminutive is neuter.

masculine, but *Tröpfchen* ‘droplet’ is neuter. Similarly, the German word *Rippe* ‘rib’ is feminine, but *Rippchen* ‘riblet’ is neuter. Neuter root words, of course do not undergo a transformation of gender when diminutized.

The genders of nouns vary over different languages. Take, for example, the word for *sun*. In Spanish, it is masculine but in German it is feminine. The word for *moon* is feminine in Spanish, but masculine in German. Because of these inconsistencies, grammatical gender is often thought of as an arbitrary way of classifying nouns. Remnants of grammatical gender still exist in English. It is not uncommon for an English speaker to refer to a ship as *she*. However, the gender of this word also varies across languages. In German the word for *ship* is neuter and in French, it is masculine.

English, a member of the West Germanic family, once had a grammatical gender system, whereby nouns were divided into *masculine*, *feminine* or *neuter*. A complex English gender system has been documented as late as 1150 AD. The English system employed morphology for some of its gender assignment, but other assignment methods are still unknown. Today, there are only a handful of nouns like *ship* that can take a gender in English but most English speakers refer to them simply as *it*. The tiny bit of gender that remains consistent in English is reflected in the pronouns *he*, *his*, *him*, *she* and *her*, which are used almost exclusively for humans but can sometimes also be used for larger animals though (cats, dogs, lions, etc). In these instances, the relationship between gender and sex is almost isomorphic (i.e. a speaker cannot correctly use ‘she’ to refer to a male animal/human or ‘he’ to refer to a female animal/human. Overwhelmingly, though, inanimate nouns are simply *its* in English (Corbett, 1991).

It has been documented (Curzan, 2003) that in many languages neuter declensions have been very similar to masculine declension, differing in only one or two cases. It is therefore

logical that the two genders would collapse into masculine. The neuter gender is an interesting case because, as cited by Steinmetz (2001), with the exception of Icelandic, Faroese and Greek, in most Indo-European languages that retain the neuter gender, it is “either extinct, evanescent or drastically realigned and in decline.” In the West Germanic languages (German, Flemish, Dutch, Afrikaans, English, Icelandic³ etc.) that still employ the neuter gender, it ‘flourishes’ only in Icelandic and Faroese.

Steinmetz (2001) attributes the uneven presence of the neuter gender in West Germanic languages on something which he coined the Great Gender Shift. He claims that originally in the West Germanic family, the neuter gender was the default gender for words; it was the unmarked noun class. Unless a word was marked semantically⁴ or by phonetic shape, Steinmetz contends, the gender was usually neuter. The Great Gender Shift caused the original neuter-based system to emerge as a masculine-based system in German, yielding a masculine default for nouns. Because, as he writes, the new masculine-based system of West Germanic marginalizes neuter nouns, it is remarkable that any neuter nouns survived. The shift never reached Iceland, which is perhaps why, as Steinmetz (2001) suggests, the neuter gender remains the default gender in Icelandic. There are many corresponding words that are neuter in Icelandic, but masculine in German, which he uses as evidence for the shift.

Steinmetz (1986) argues against the notion that gender in German is arbitrary and presents evidence for a high degree of consistency and for the hierarchical structure of grammatical gender in German, *masculine* > *feminine* > *neuter*. His analysis finds that the default gender for nouns in German is masculine. If there is a feminine affix, such as the suffixes *-ung*,

³ Icelandic is traditionally classified as a West Scandinavian member of the North Germanic family; however Steinmetz classifies it as a member of the West Germanic family.

⁴ The use of ‘semantic’ assumes that there are groups of similar types of nouns that all have the same gender. See the Köpcke and Zubin discussion later in this section for more on this.

-heit, *-keit*, *-e* or *-in* for example, the word is marked as feminine, (e.g. *die Blume*, ‘the flower’, where *-e* is a feminine suffix); if there is a neuter affix such as the suffixes *-chen*, *lein*, or *-nis*, or the prefix *Ge-*, the word is marked as neuter (e.g. *das Geschwister*, ‘the sibling’, where *Ge-* is a neuter prefix). Some words, however, can have affixes that are associated with more than one gender, for example, the suffix *-nis*, is associated with feminine nouns (*die Finsternis*, ‘the darkness’, ‘the eclipse’) and also with neuter nouns (*das Geheimnis*, ‘the secret’). To address words that have elements associated with both genders, he uses a point system to tally the total number of tokens for each gender.

According to Steinmetz’s hierarchy, if a word has both a masculine affix and a feminine affix, the word will be masculine because there is one masculine point and one feminine point and the masculine is higher on the hierarchy (1masculine 1feminine 1neuter=m). For example, in the word *Finsternis* ‘darkness’, the suffix *-nis* can be either feminine or neuter, but because feminine is higher on the hierarchy, the word is feminine and not neuter (0m1f1n=f). In another example, if a word has one feminine affix and two neuter affixes, the word will be neuter (0m1f2n=n). For example, in the word *Geheimnis* ‘secret’, *Ge-* is a neuter prefix and *-nis* can be either feminine or neuter. Because there are two neuter elements, the word is neuter.

The consistencies in the German gender system reported by Steinmetz indicate that the gender of German words may not be arbitrary at all. Corbett asserts that languages undergo gender shifts much in the way that they undergo semantic shifts and sound changes. A given language starts out with a gender system and as dialects of this language form, each creates its own set of rules for reassigning gender.

Other evidence for consistency in gender assignment in German has been done at the level of phonology. A corpus analysis prepared by Zubin and Köpcke (1984) found great

predictability between sound patterns and gender. For example, among their many patterns they found for example with high degrees of accuracy, was that words with word-initial [kn], [d/t+r] [S+K⁵] clusters were predominately masculine. Words ending in [__(K)+f/x/C+t] and [__u:/ü+r] were predominately feminine. Words ending in [__et] were predominately neuter.

Zubin and Köpcke also noticed a consistency in the assignment at the level in German nouns. Most category superordinates, words at a high level of categorization, are neuter. For example, the superordinates, *das Tier* ‘the animal,’ *das Fahrzeug* ‘the vehicle,’ *das Möbel* ‘the furniture,’ *das Obst* ‘the fruit’, etc. are all neuter. They have many sub-categories, e.g., *das Tier* ‘the animal’ has subcategories such as *der Fisch* ‘the fish,’ *der Vogel* ‘the bird.’

Zubin and Köpcke present other semantic category patterns based on the form of the object. They point out that long objects are predominately classified as masculine, e.g. *der Pfeiler*, ‘the arrow’ *der Stab*, ‘the staff’ *der Pfosten*, ‘the stake’, etc. Flat or thin objects are predominately feminine, e.g. *die Platte*, ‘the disk’, *die Fläche*, ‘the plain’ *die Ebene*, ‘the layer’. Sharp or pointed objects are predominately feminine, e.g. *die Spitze*, ‘the summit’, *die Klinge*, ‘the blade’, *die Schneide*, ‘the blade’ *die Nadel* ‘the needle’ and *die Zinke* ‘the prong’. Hollow objects such as *die Schlucht*, ‘the canyon’, *die Grube*, ‘the mine’, *die Gruft* ‘the vault’ are also feminine.

Corbett (1991) extended the work done by Zubin and Köpcke, asserting that there are two ways to assign gender to a word. The first way is by *semantic principles*, where the noun’s meaning determines its gender and a noun’s gender can shed light on a word’s meaning. The assignment of natural gender falls under this principle. The second way is by what he calls *formal principles*, by which morphological and phonological structures play a part in determining gender (e.g. words ending in *-o* are masculine, words ending in *-a* are feminine in

⁵ K= consonant

Spanish). Formal systems are always related to semantic systems, and as stated several times in Corbett's *Gender*, **there is always a semantic core.**

Sometimes the two rules for the two systems conflict, as in the Russian word *djadja* 'uncle'. By the semantic rule, the word should be masculine, but because of its declension, by the formal rule, feminine. In cases like this, the semantic rule always prevails; *djadja* is masculine. He writes, "In a sense, all gender systems are semantic in that there is always a semantic core to the assignment system."

Although the gender of a word in compound words in German is usually dependent on the gender of the compound (known as the *Last Member Principle*, or *LMP*), it has been demonstrated that the semantic meaning of a word can outweigh the LMP. The German word *der Mut* 'courage' is masculine, so when compounded with another word to make, for example, *die Anmut*, 'charm', it is expected that the compound would also be masculine because of LMP, however, in many cases compounds with *-mut* are feminine.

Zubin and Köpcke (1984) observed that the majority of the *-mut* words that are feminine show introversion (e.g. *die Demut* 'humbleness'), while the ones that are masculine (e.g. *der Mißmut*, 'displeasure,' *der Freimut* 'frankness,' *der Übermut* 'mischief') express extroversion. They tested their claims with an experiment, in which German-speaking subjects were asked to rate a series of *-mut* words on a semantic differential scale designed to assess degree of introversion/extroversion. The scale consisted of anchor word pairs such as *leise-laut* 'quiet-loud,' *traurig-froh* 'sad- happy,' *klein-groß* 'small-big', etc. They found that the feminine words were rated to be more introverted than the masculine and vice-versa. This work validates the ideas of ancient philosophers that the gender of a word reflects its 'essential properties.' Could it

be that words expressing introversion were being thought of as more feminine, thus explaining the irregular assignment of feminine?

Corbett sums up the situation nicely,

“We have seen how in some languages the meaning of the noun always or virtually always determines its gender (as in Dravidian languages). In other languages the role of semantics is more restricted. In both cases *it is important to bear in mind that the world view of the speakers determines the categories involved and that the criteria may not be immediately obvious to an outside observer.*” (Corbett, 1991: 32, emphasis mine)

It is equally important to acknowledge that semantic associations are made through cultural acquisition and thus cannot be separated from each other. That is, a language’s semantics is based on the culture in which it is spoken.

5.0 Experimental Work with Grammatical Gender

It has been argued that as children acquire a language that marks gender, they have no reason to not try to make meaningful distinctions between objects based on grammatical gender because other grammatical distinctions (e.g. plural inflection) *are* meaningful (Boroditsky et al., in press). As Boroditsky et al. explain, a long line of philosophers have argued that grammatical gender is merely a reflection of the ‘essential properties’ of the object. It is not unlikely that children too might try to make a relationship between the grammatical gender of an object and its ‘essential properties.’ In German, objects are referred to with the same gendered pronouns that are used for people. Using the same pronouns for objects and animals that are used for men and women day after day may build an association between biological gender and grammatical gender. Whorf (1956) referred to this correlation as *habituality of thought*, which, he contended, affects perception. There is a logical reason that such correspondences might exist, which can be explained with a simple logic formula: if A=B and B=C, then A=C or with an example from German if

$TÜR_{('door', feminine)} = SIE_{(feminine\ pronoun)}$ and $SIE_{(feminine\ pronoun)} = FRAU_{('woman')}$ then $TÜR_{('door', feminine)} = FRAU_{('woman')}$.

With the number of times each pronoun is uttered during the course of one’s lifetime, it is possible that such associations between grammatical gender and biological gender are made.

Boroditsky et al. also look for the correspondence that echoes Whorf’s ideas on the habituality of thought. “Needing to refer to an object as masculine or feminine may lead people to selectively attend to that object’s masculine or feminine qualities, thus making them more salient in the representation (Boroditsky et al., pg. 5).” According to this line of thinking, an object with masculine grammatical gender might be perceived as having more masculine qualities than if it had feminine grammatical gender.

A good place to start an investigation of gender perception is with children's literature. Not only is analysis of literature valuable because it examines usage as opposed to data collected through laboratory conditions, but it can also offer a clue about the input children are getting through the books they read. A study conducted by Mills (1986) aimed to analyze the assignment of gender to objects and animals in children's literature. The texts analyzed consisted of fifty English and fifty German children's books. In her analysis, Mills worked with texts that assigned sex to objects and animals by giving proper names to the referents. Any text that assigned sex exclusively on the basis of a grammatical rule was excluded.

Mills divided the referents in English into four groups. The term "common" is Mills' classification for nouns that refer to both male and female counterpart.

- Inanimate (e.g. airplane)
- Animate
 - Common and/or male (e.g. dog, cockerel)
 - Common and/or female (e.g. cow, vixen)
 - Common (e.g. elephant)

Mills classified German referents in a more complex way, first along grammatical lines, then by animacy and finally by sex or commonness⁶. The categories looked like this:

- Masculine
 - Inanimate
 - Masculine (e.g. bus)
 - Feminine (e.g. scissors)
 - Neuter (e.g. car)
 - Animate
 - Masculine
 - Common and/or male (e.g. bear)
 - Common (e.g. frog)
 - Feminine
 - Common and/or female (e.g. goose)
 - Common (e.g. dragonfly)

⁶ 'Commonness' means that one word, which is itself gendered, can be used to represent both masculine and feminine members of the pair. For example, the word 'cow' can be used for a steer (masculine) or a cow (feminine).

- Neuter
 - Animate (e.g. chicken)

In her analysis of the children's literature, Mills found that for English referents, 81% of objects/animals were personified as masculine. This, Mills explains, reflects the widespread usage in English of the pronoun *he* as a common gender pronoun.

For the German children's books, objects and animals tended to be personified according to grammatical gender (e.g. a *table*, which is masculine in German, was named *Tommy*; a bridge, which is feminine in German was named *Margaret*). However, as with the English data, there was a general trend toward the use of more male referents. This means that there were more grammatically feminine objects and animals given masculine names than there were grammatically masculine objects and animals given feminine names.

Of all items analyzed, sixty-nine percent of the objects and animals in the German literature were personified as male in writing. This can, however, be attributed to the larger number of grammatically masculine referents. Despite the global trend toward the attribution of masculine sex to objects, referents in German tended to be personified according to the grammatical gender of the noun.

	Masculine Name	Feminine Name
Grammatically Masculine item	90%	10%
Grammatically Feminine item	32%	68%
Grammatically Neutral item	59%	41%

Table 5.1. Breakdown of sex assigned to objects though proper names in Mills' literature study results.

As we see in Mills' study, it is evident that early input children are getting about the relationship between grammatical and natural gender reinforces the previously stated hypothesis that grammatical gender may bias perception towards natural gender.

For further insights into this question, Mills turned to experimental conditions. In one study (1986), English- and German- speaking children and adults were asked to produce proper names for ten toys, six of which were animate and four of which were inanimate. The toys were selected so that there were three grammatically feminine toys, three grammatically masculine toys, and four grammatically neuter toys (according to the gender of the nouns). The following words were employed in this study:

- Masculine
 - Bear
 - Elephant
 - Ball
- Feminine
 - Cat
 - Mouse
 - Clock
- Neuter
 - Horse
 - Pig
 - Car
 - Book

Mills found that the younger the age of the subjects, the more likely they were to produce names that coincided with their own gender. That is, boys would give the majority of the stimuli masculine names and girls would give mostly feminine names. This effect was strongest in English speakers and occurs in all age groups (ranging from age 3- adulthood).

Mills summarizes the effects of grammatical gender as such:

“There is a significant effect of the sex assigned and the individual toy. In German, this effect is related to the grammatical gender of the noun referring to the toy. Taking into consideration the influence of the subject's own sex, it can be seen, that across all age groups, the feminine gender nouns are related to a

predominant choice of the female sex for the corresponding toy; the masculine gender nouns were related to a predominant choice of the male sex for the corresponding toy,” (Mills, 1986: 128)

Furthermore, the neuter nouns were more often personified as masculine than feminine, though, as the author points out, it might be expected that the choice of sex would be split evenly between masculine and feminine. The high degree of consistency between grammatical gender and natural gender of the names produced by subjects reflect a correspondence between the two in the minds of speakers.

These results show that to German speakers, grammatical gender plays an important role in the personification of toys. But are these results a product of the grammatical system of German? Does this work for other languages?

For more information on the perception of attributes in objects of biological and grammatical gender, we turn again to Boroditsky et al. (in press), who investigated the influence of noun gender categories on object perception. In an experiment conducted with English speakers, the subjects were taught several made-up nouns in a made-up language that had a grammatical gender system consisting of the categories *oosative* and *soupative*. Much like in Spanish or French, the two categories corresponded to biological gender; where a man was *oosative*, a woman was *soupative*. These gender-sex correspondences were counter-balanced across subjects so that for some subjects, a woman was *oosative* and a man was *soupative*. Stimuli consisted of word pairs that were divided into opposite categories (e.g. the words *sun* and *pot* were *oosative*, the words *moon* and *pan* were *soupative*, etc.).

After subjects had successfully memorized the labels and *oosative/soupative* distinction for several objects, they were asked to give descriptive adjectives for each object. The adjectives produced by the subjects were then rated independently by a separate group of English speakers

for their feminine or masculine qualities. The results of the study show that English speakers produced adjectives that corresponded to the gender of the human with which the object shared a noun class (e.g. for subjects that were taught an *oosative/soupative* distinction that corresponded to masculine/feminine, objects categorized as *oosative* were described with adjectives rated to be more masculine and objects categorized as *soupative* were described with adjectives rated to be more feminine).

Could it be that in an effort to memorize the *oosative/soupative* distinction, subjects looked for correspondences between the objects and the biological gender of the human included in the same category? And if so, might the masculine or feminine qualities of an object become more salient as Boroditsky et al. (in press:13) suggested? Here, English speakers might be compared to children who are acquiring a language with a gender system. If English speakers are making such associations, it is not unreasonable that children learning their first language might be doing the same thing.

An early study of grammatical gender's effects on perception by Sera et al. (1994) supports Boroditsky et al.'s findings. In their cross-language investigation with monolingual speakers of Spanish and English, they studied the effects of grammatical gender on speakers' evaluations of objects. Subjects were presented with a series of pictures, with some of the pictures accompanied by spoken labels, and they were asked to respond to each picture by circling either M or F, representing *masculine* or *feminine*.

The results of this study indicate that Spanish speakers were more likely than English speakers to classify nouns according to the grammatical classification of the Spanish language. These results may be taken as evidence that Spanish speakers are affected by the grammatical

gender system of their language, whereas English speakers cannot have such biases because they do not divide their nouns into grammatical gender classes.

A more careful look into the methodology of this experiment casts a shadow of doubt over the interpretation of the results. The subjects were asked directly whether the pictured object was *masculine* or *feminine*. The possibility that subjects might interpret the directions to mean “is this noun masculine or feminine in your language” was not controlled for and thus the possibility arises that the subjects might have classified the pictures whether intentionally or unintentionally along the grammatical lines of their language.

While the results of this study appear to support the theory of linguistic relativity, the flawed research practices call into question the reliability of the data from which the conclusions were drawn.

Expanding upon the foundational work of Sera et al., Boroditsky et al. (in press) presented German-English and Spanish-English bilinguals with a set of English nouns that referred to inanimate objects marked for morphological gender (e.g. indicated by the article that precedes the noun) in the subjects’ native languages. Half of the English nouns were in the feminine noun class (*die Brücke*, ‘the bridge,’ *la mesa* ‘the table’) and half were in the masculine noun class in German and Spanish (*der Tisch*, ‘the table,’ *el puente* ‘the bridge’). Thus, nouns were chosen that alternated gender classes between German and Spanish. The study was conducted in English and each speaker was prompted to name three English adjectives that described each noun. The perceived femininity or masculinity of each of the generated adjectives was then categorized by an independent group of native English speakers. Boroditsky et al. found that English nouns that would be in the feminine noun class of the speakers’ native language were described with adjectives rated to be more feminine (the *beautiful* bridge) and

nouns in the masculine noun class in the speakers' native language were described with adjectives rated to be more masculine (the *hard* table). Thus, for example, feminine adjectives used to describe a feminine noun in German (*beautiful*) were contrasted with masculine adjectives (*hard*) for the same noun in Spanish and vice versa.

This finding is quite interesting because it suggests that a speaker's perception of even inanimate objects can be influenced by subtle differences in the gender assigned to them by a particular language and that speakers of languages that have gender marking for nouns actually think of words as belonging to separate categories. Moreover, because each language divides nouns into different classes, the effect of the gender on the perception of the word would vary over languages. For example, a German speaker might think of a door (a feminine word in German) as having feminine characteristics and a table (a masculine word in German) as having masculine characteristics, whereas a Spanish speaker would do the opposite.

Do German speakers actually associate a door with biological gender? A potential problem with this line of thinking is that it does not take into account that the labels for noun classes 'masculine' and 'feminine' themselves reference gender, and in many languages some or all of the noun classes are explicitly called 'feminine' and 'masculine'. This could lead to the words being simply associated with the name of the noun class, and not actually being perceived as having more feminine or masculine qualities. This is not to say that noun class name, having been associated with a particular object for the speaker, cannot itself affect perception. This study, however, was not designed to control for this.

Another related problem is that nouns with biological gender belong to the same category as objects with no biological gender. It seems logical that if a German-speaking subject is asked whether 'door' is more feminine or more masculine, having nothing else to factor into the

decision, the subject would make the selection based on grammatical gender and choose feminine.

Testing how feminine or masculine words are thought of by German speakers is difficult. If, because of task design, subjects are able to adopt a conscious strategy for responding to the target words, then it is possible that the grammatical gender of the noun class will weigh into the subjects' decisions about the words. Though the ability to categorize words according to categories of grammatical gender certainly indicates knowledge that German speakers can bring to bear in thinking about words given the right conditions, the question becomes whether or not this knowledge is as available and as salient as other aspects related to the semantic representation of the word.

This study attempts to account for the possibility that German-speaking subjects might create a strategy for their responses that is based purely on the grammatical gender, which is, especially in German, often based on morphology and not on semantic or cultural notions of masculinity and femininity. Another novel aspect of this study is that it examines diminutives in both English and German. As discussed above, diminutives are neither masculine nor feminine in either language, as English does not mark gender, and in German the diminutive suffix conveys neuter gender. However, in both English-speaking and German-speaking Western cultures, the diminutive has feminine associations. For this reason, we hypothesized that speakers of both languages might perceive diminutiveness as more feminine than the nouns from which they were derived.

The following experiments examine how the disparities between grammatical gender assignment and biological and semantic⁷ gender assignment are rectified. I will aim to give

⁷ Here 'semantic gender' is used as Köpcke and Zubin use it to refer to groups of words with similar meanings that all have the same gender.

supporting evidence that both cultural associations and grammatical gender are important to perception. Is it the gender of the word or the cultural associations of a word that influences its perception? As we have seen with the Mills study, the perception of gender varies across languages and it has been suggested that the presence of a linguistic gender system fueled that difference. Let's now look at how cultural similarities affect German and English speakers' perceptions of words for objects and animals, with particular attention to diminutives, a cross-cultural phenomenon. It can be said that diminutives are associated with women because of their cultural attributions of smallness and innocence.

So how do we reconcile the differences between Boroditsky et al.'s findings that grammatical gender influences object perception and my friend's observations that experiences with objects affects their meaning? A word like *der Rock* 'the skirt' is masculine in German, but clearly has an association with femininity. For a more complex investigation, I examine diminutives, which are all neuter, but may be associated with femininity because of their marking for smallness.

Perceptions of German and English diminutives and non-diminutives

6.0 Objectives

As discussed earlier, German uses gendered pronouns to refer to nouns. Feminine and masculine pronouns are regularly used for things that would be referred to simply as ‘it’ for English speakers. It seems plausible that over time German speakers may begin to associate ‘femininity’ with feminine objects and ‘masculinity’ with masculine objects. Since English lacks such a gender system for its nouns, English speakers may be more likely to think of all objects as ‘its’, whereas German speakers will divide them up into ‘hes,’ ‘shes’ and ‘its.’

This study was composed of two tasks conducted in German with native German speakers of German and in English with native speakers of English in order to better understand how the language one speaks influences the way words are perceived.

Specifically, the study sought to answer the following questions:

1. To what extent (if at all) does grammatical gender affect the perception of words?
2. How are conflicts between word meanings and grammatical gender settled?
3. How will diminutives be classified by German and English speakers?

In the first task, subjects were asked under time pressure to classify labeled pictures of objects according to their similarity with one of two possible reference pictures that represented biologically feminine concepts (*queen, ballerina, or woman*) or biologically masculine ones (*king, giant, or man*). Targets consisted of word-picture displays of masculine, feminine and neuter nouns as well as neuter diminutives in German for the German subjects and their equivalents in English for the English-speaking subjects. Directly following each response selection, subjects were asked to rate the similarity of the target and the chosen reference picture

on a scale of 1-5, with 5 being the most similar. The similarity rating task was included in order to evaluate subjects' awareness of their gender-based associations and the strength of those associations, as well as to determine whether German speakers have stronger associations between the depicted objects and biological gender than do English speakers.

It was predicted that German speakers would be biased by their meta-knowledge of grammatical gender in pairing presented target words with biologically masculine or feminine pictures. Because of the more covert noun class system of English, native English speakers would not have such biases and would classify masculine and feminine nouns more unpredictably than German speakers. Furthermore, it was predicted that for diminutive targets derived from masculine and feminine root words, German speakers would be unable to classify these words as neuter (i.e., according to grammatical gender as determined by their affixes *-chen* and *-lein*), and thus would have three possibilities for classifying the nouns: 1) according to the grammatical gender of the word's root, or 2) according to the apparent 'masculinity' or 'femininity' of the diminutives, or 3) arbitrarily with no apparent pattern. Responses of English speakers were expected to follow the pattern in 2) or 3).

The rating task should serve to indicate whether German speakers have stronger associations between grammatical gender of depicted nouns and biological gender than do English speakers. Thus, if there is a pure gender effect for German speakers we will see 100% of feminine words being paired with biologically feminine reference pictures, 100% of masculine words being paired with biologically masculine reference pictures, and neuter words will fall evenly in between. If we see purely an effect of culturally defined femininity with the diminutives, all diminutives should be perceived as feminine, and such a result would conflict with the conclusions of Boroditsky, et al. (in press).

7.0 Methodology

7.1 subjects

Thirty-six subjects participated in the German part of the experiment and 37 participated in the English study. The German subjects, recruited with assistance from staff members from the University of Tübingen, consisted of 25 females and eleven males. All were native speakers of German and students at the University of Tübingen, and they ranged in age from 19 to 31 years with an average age of 21.2 years. Every subject had studied at least one foreign language with a gender system in addition to English. Subjects were paid €10 for their participation.

English-speaking subjects, ranging in age from 18 to 43 years with an average age of 21 years, were recruited from the undergraduate population at the Ohio State University. Many had studied a foreign language (usually Spanish) in high school, but most reported low proficiency in it and other foreign languages. Three of the English-speaking subjects grew up bilingual (English-dominant) and spoke English and one other language (German or Igbo), five reported fluency in a language they had learned in school (American Sign Language, German or Spanish). None knew the goals of the study before they participated, and each participated in the study in exchange for course credit.

7.2 stimuli and tasks

Stimuli were presented on a computer display programmed with E-prime (Psychology Software Tools, Inc.). Stimuli for each language consisted of labeled pictures for nouns that were selected according to gender categories of German. The labels for nouns did not include the definite article for German words (see Figure 7.1). Word labels for the English-language stimuli were derived from the English equivalents of the German words. Target stimuli included 29 pictures of grammatically feminine nouns, 19 pictures of diminutive nouns formed from

grammatically feminine nouns, 27 pictures of grammatically masculine non-diminutive words, 20 pictures of diminutive nouns formed from grammatically masculine roots, 14 pictures of grammatically neuter words, and 15 pictures of grammatically neuter words with diminutive labels. Of these, only 15 of each category were used in the data analysis. Pictures were hand drawn and were presented in black and white. All pictures used in the diminutive condition were identical to their non-diminutive counterparts; they differed only in their labels.

Subjects first saw a picture of a target object and were asked to pair it with one of the two reference pictures located to the left and right above it. For clarity, a text label of the target was written below the picture (in German for German speakers, in English for English speakers). The paired reference pictures (*man/ woman, king/ queen, giant/ ballerina*) each represented biological gender. Left/right position of the reference pictures was counterbalanced across trials. After subjects responded to each test slide by pressing a button on a response box, they saw a slide that prompted them to give a similarity rating from 1-5, with 1=most similar and 5=least similar, for the target word and the reference picture they had selected.

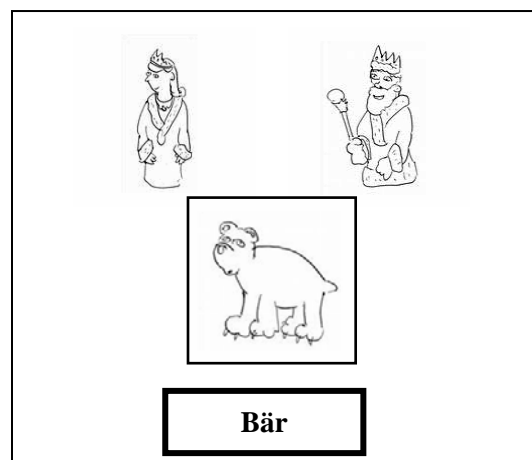


Figure 7.1. Example stimulus slide

To discourage subjects from engaging in a conscious strategy in responding, the experiment was a speeded task. Subjects were instructed to respond as quickly as possible with their best guess even if the target and reference pictures seemed unrelated. Although subjects were asked to keep their responses under four seconds, the slide remained on the screen until a response was given. This was important because in Boroditsky’s experiment, there was the possibility that subjects had enough time to engage in a conscious strategy for completing the tasks (e.g., consciously producing feminine adjectives for feminine nouns presented to them). The average response time for German-speaking subjects was 2443 milliseconds and the average response time for English-speaking subjects was 1036 milliseconds. There were no significant differences among the response times, so they will not be discussed further.

The 197 stimuli consisted of 133 test slides and 57 filler slides to discourage the adoption of strategies to respond, and seven control slides, which were included to ensure that the feminine and masculine reference pairs were perceived by subjects to be more similar to their respective gender categories than to the opposite gender. The seven controls consisted of reference pair members (*giant/ballerina*, *man/woman*, and *king/queen*) presented as targets to be matched with other members of the reference picture set, (e.g. *ballerina* was shown as a target to be matched with either *king* or *queen*). The fillers were chosen to discourage awareness of the goal of the experiment. Fillers were broken down into the following types:

Type of filler	Stimulus Example	Right Reference Picture	Left Reference Picture
One reference picture semantically unrelated to target, one semantically related to target. All same gender.	(die) Wurst ‘the wiener’	(die) Nase ‘the nose’	(die) Rippe ‘the rib’
One reference picture semantically related to target, one related to target by gender class. Mismatched genders.	(die) Katze ‘the cat’	(die) Socke ‘the sock’	(der) Hund ‘the dog’

All pictures same gender and all semantically related.	(die) Nase 'the nose'	(die) Hand 'the hand'	(die) Zehe 'the toe'
All semantically related, reference pictures of opposite gender	(das) Kind 'the child'	(der) Vater 'the father'	(die) Mutter 'the mother'
All same gender, one animate, one inanimate	(die) Hose 'the pants'	(die) Tüte 'the bag'	(die) Ente 'the duck'
All same gender, reference pictures semantically related to each other, but unrelated to target.	(der) Bär 'the bear'	(der) Bauch 'the stomach'	(der) Fuß 'the foot'

Table 7.2. Breakdown of filler stimuli included for the German experiment.

Subjects were tested in their native language with all instructions and materials presented in German or English, respectively. After completing the experiment, subjects were asked to comment on what they thought was being tested in the experiment. Comments were recorded by the experimenter in field notes. Common answers given by German speakers were “the association between words and genders.” When asked to explain, they often cited that when they saw ‘kitchen’, they thought they should pick the feminine referent picture because women are often associated with cooking and cleaning. Several participants responded that they thought the experimenter was researching gender stereotypes. There were only a few who reported that they had no idea. Although subjects may have surmised that the experiment concerned biological gender because the reference pictures consistently provided a ‘masculine’ and ‘feminine’ version of the same category (e.g. ‘king’ and ‘queen’ are male and female versions of a monarch), with the exception of one subject, they did not seem to be aware of a manipulation involving the grammatical gender of the target object picture. The responses of one exceptional German subject who guessed exactly what was being tested were excluded from data analysis. The responses from the German participants stand in startling contrast to those of participants in the English portion of the experiment, where the vast majority of subjects answered that they had no

idea what was being tested. This suggests that German speakers may be more conscious of gender.

8.0 German Results

Responses to the German picture-choice classification task are presented in Table 8.1.

		Masculine	Feminine	Total Observations	Proportion Masculine	Proportion Feminine
Masculine Root	Non-diminutive	349	192	541	0.65	0.35
	Diminutive	301	240	541	0.56	0.44
Feminine Root	Non-diminutive	230	239	469	0.49	0.51
	Diminutive	247	294	541	0.46	0.54
Neuter Root	Non-diminutive	321	256	577	0.56	0.44
	Diminutive	315	298	613	0.51	0.49

Table 8.1. Responses to the German picture-choice classification task (presented in proportions)

A 3 (gender) x 2 (size: diminutive vs. non-diminutive) repeated-measures analysis of variance was conducted on the German picture-choice data using the SuperANOVA program, with subjects as a random variable. The data were arcsine transformed before being submitted to ANOVA. Significant main effects of gender ($F(35,1)=3.94$, $p<.05$), and size ($F(35,1)=17.63$, $p<.001$), were observed, as well as a significant interaction between gender and size ($F(35,1)=6.18$, $p<.01$). The main effect of gender, shown in Figure 8.2, indicates that German-speaking subjects were more likely to match masculine target stimuli to masculine reference pictures than they were to match feminine or neuter target stimuli to masculine reference pictures.

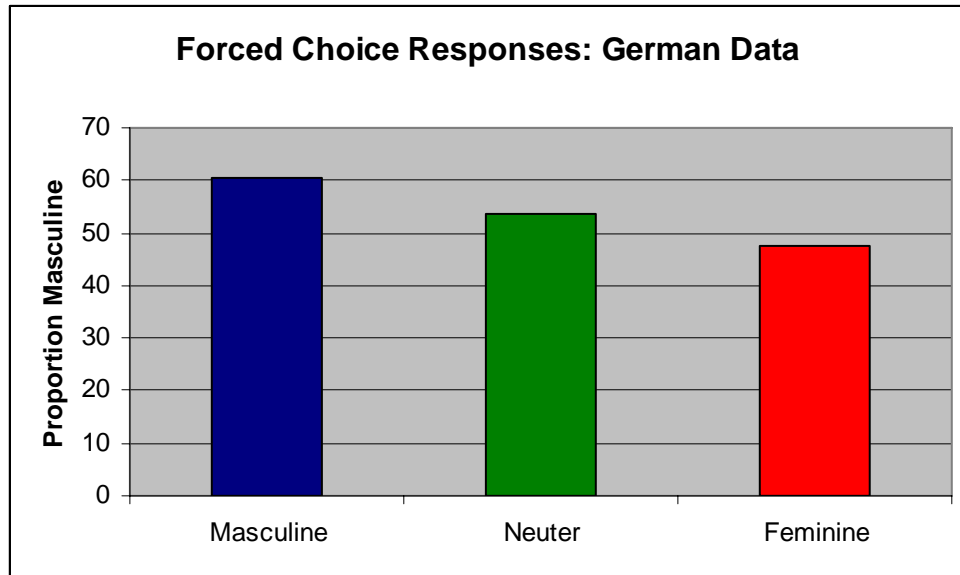


Figure 8.2. Proportion of masculine, neuter, and feminine nouns associated with masculine referents in the German forced-choice task.

Figure 8.3 shows the main effect of the diminutive suffix. Subjects were more likely to associate diminutive nouns with feminine reference pictures than they were to associate non-diminutive nouns with feminine reference pictures, which indicates a ‘demasculating’ or ‘feminizing’ effect for diminutives, regardless of the grammatical gender assigned to the associated root noun.

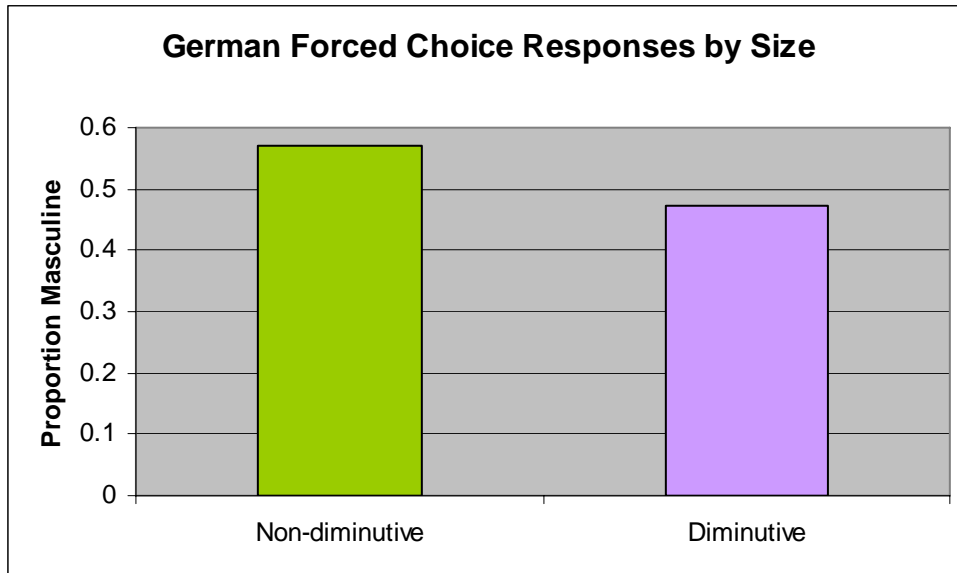


Figure 8.3. Proportion of diminutive and non-diminutive nouns classified as masculine in the forced-choice task.

Cell means for the interaction between gender and size are shown in Table 8.4.

	Count	Mean	Std. Dev.	Std. Error
Masculine Non-Diminutive	36	.400	.128	.021
Masculine Diminutive	36	.597	.158	.026
Neuter Non-Diminutive	36	.465	.142	.024
Neuter Diminutive	36	.515	.149	.025
Feminine Non-Diminutive	36	.514	.141	.023
Feminine Diminutive	36	.587	.185	.031

Table 8.4. Means for the interaction gender x diminutive-non-diminutive.

The interaction between size and gender is depicted in Figure 8.5, and suggests that the ‘feminizing’ effect for the diminutive nouns was greatest for the nouns formed from masculine roots. Planned comparisons confirmed that the difference between means for responses to masculine non-diminutive and diminutive stimuli was reliable, $p < .001$, as was the difference between responses to feminine non-diminutive and diminutive stimuli, $p < .05$. Thus, for non-

diminutive forms, grammatical gender influenced the German-speaking subjects' perceptions of words in a predictable way, but this effect did not hold for diminutives formed from masculine root words. Instead of using the grammatical gender as a basis for their decisions as they had done for the non-diminutive words, subjects appeared to have been influenced by a 'smallness' or 'feminizing' criterion with regard to the diminutives in general, and to those formed from masculine nouns in particular. However, it should be noted that the German diminutive suffixes *-chen* and *-lein* cause the resultant diminutive to be neuter. Since there was no neuter referent picture option, subjects were forced to classify the diminutives as either more similar to the masculine or feminine referent picture. In addition, though in the neuter and feminine conditions, subjects chose both masculine and feminine reference pictures at a comparable rate, resulting in performances that were close to chance, there was a numerical effect of grammatical gender in the predicted direction. Figure 8.5 is graphed on a proportion **feminine** scale in order to point out the "feminizing" effects of diminutives.

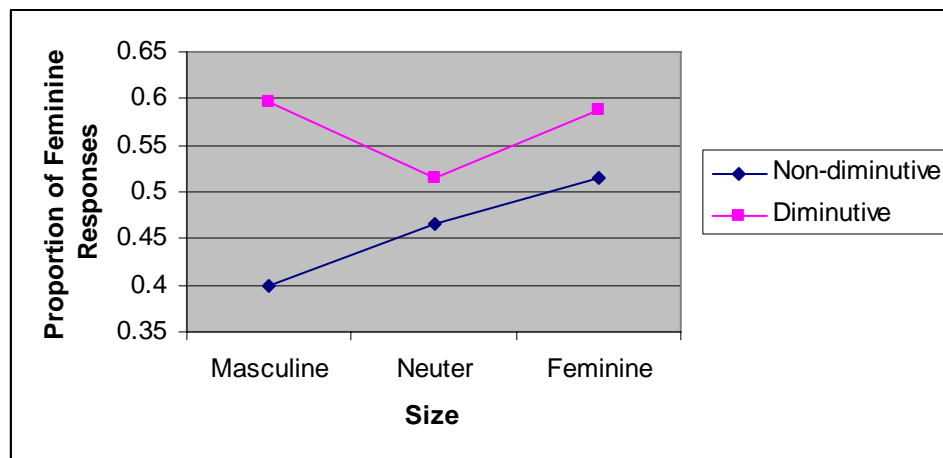


Figure 8.5. Interaction between size (non-diminutive vs. diminutive) and gender.

Average responses to the similarity rating task, in which subjects rated the degree of similarity of the stimuli to the reference pictures, are shown in Figure 8.6.

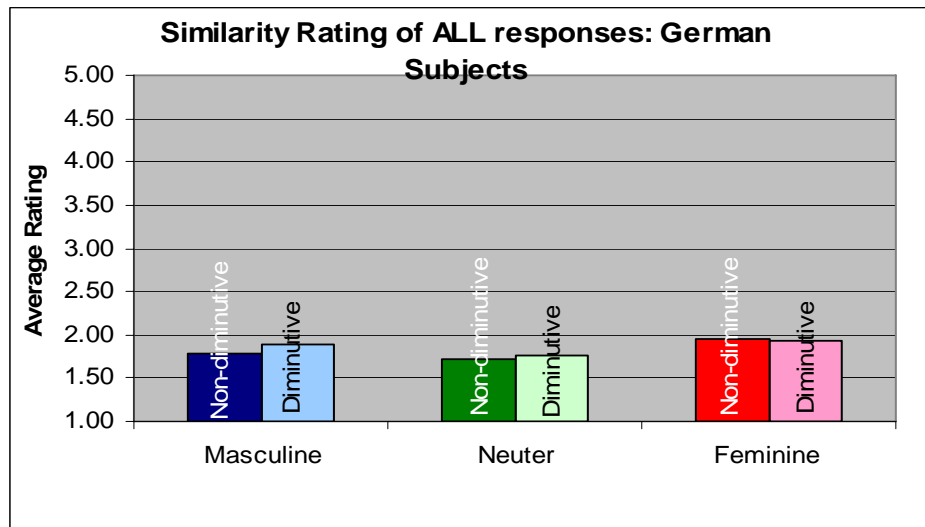


Figure 8.6. Average responses to the similarity rating task for masculine, feminine, and neuter nouns and for diminutives from masculine, feminine, and neuter roots. 1=not similar, 5=very similar.

As can be seen in Figure 8.6, subjects used the lowest end of the scale for their ratings, indicating generally that they did not find the target stimuli very similar to the reference pictures. There were no significant differences in similarity ratings for masculine, feminine and neuter target stimuli (masculine non-diminutive: 1.79, neuter non-diminutive: 1.73, feminine non-diminutive: 1.96, masculine diminutive: 1.88, neuter diminutive: 1.77, feminine diminutive: 1.93). The numeric pattern in the responses suggests that subjects found the feminine-gendered nouns and feminine-based diminutives slightly more similar to their reference pictures than the masculine or the neuter, and the neuter nouns and their diminutives the least similar to the reference pictures. The somewhat lower ratings for the neuter nouns could be expected if subjects used grammatical, gender-based criteria to make their judgments, since the reference pictures did not include a neuter option.

These results support earlier claims that grammatical gender itself may influence the associations a speaker has with any given object and because the grammatical gender of words varies from one language to another, the perceptions of speakers may also vary along these lines. However, the findings of this study also suggest that a speaker's ideas about a word are colored primarily by cultural experience. That is, the semantic associations of a word, those that reflect cultural experience, can override grammatical associations in the classification of words in the minds of a speaker. These results further show that there is another type of linguistic marking—one that feminizes. It is apparent from this study that the perceived femininity of a word increases if the object is diminutized. In the case of diminutives, the grammatical gender is less important than the semantic and cultural associations tied to the meaning of the word. This evidence points to the possibility that speakers are indexing words largely by cultural and semantic criteria and the grammatical associations affect, but do not determine the perception of the word. It is for cultural reasons that in this experiment, when the neuter grammatical category was not an option, the diminutive stimuli were more often selected to be 'more similar' to the feminine reference pictures than to the gender of the root nouns.

9.0 English Results

As Figure 9.1 indicates, the English-speaking subjects chose the masculine reference picture 57% of the time, and there was a slight decrease in the percentage of ‘masculine’ responses to target words in the forced-choice task for diminutives, which suggests a similar, though less robust, feminizing effect for diminutives in English as compared to the German data.

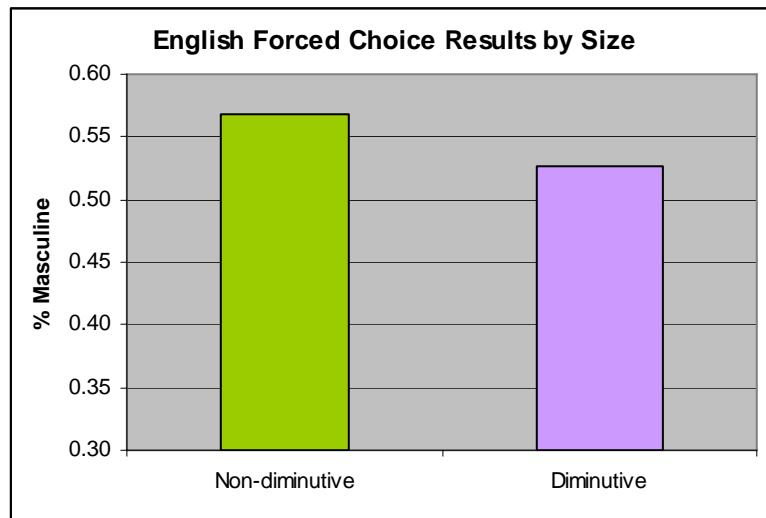


Figure 9.1. English results. Proportion of non-diminutive and diminutive nouns classified as masculine in the forced-choice task.

As the German and English word lists differed slightly in the two experiments because of the difficulty of finding matched pairs of diminutives in English for the German target stimuli⁸, a subsequent comparison was made using only the words that had appeared in the word lists of both the English and German experiments in order to control for possible confounds due to

⁸ This problem can be attributed to the high degree of productivity of the *-chen* and *-lein* suffixes in German. English diminutive suffixes, *-y*, *-ie*, *-et* and *-sie* are far less productive than their German equivalents.

inequalities in the number of inherently gendered nouns on either list. Results of the matched comparisons for English and for German nouns are shown respectively in Figures 9.2 and 9.3.

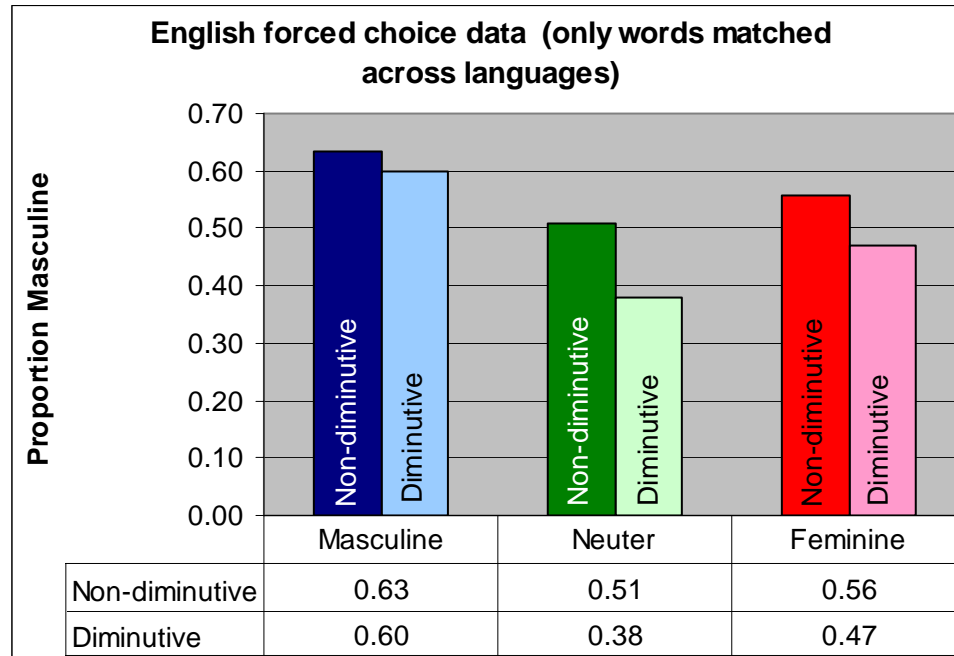


Figure 9.2. Proportion of masculine, feminine, and neuter non-diminutive and diminutive nouns associated with masculine referents in the German forced-choice task.

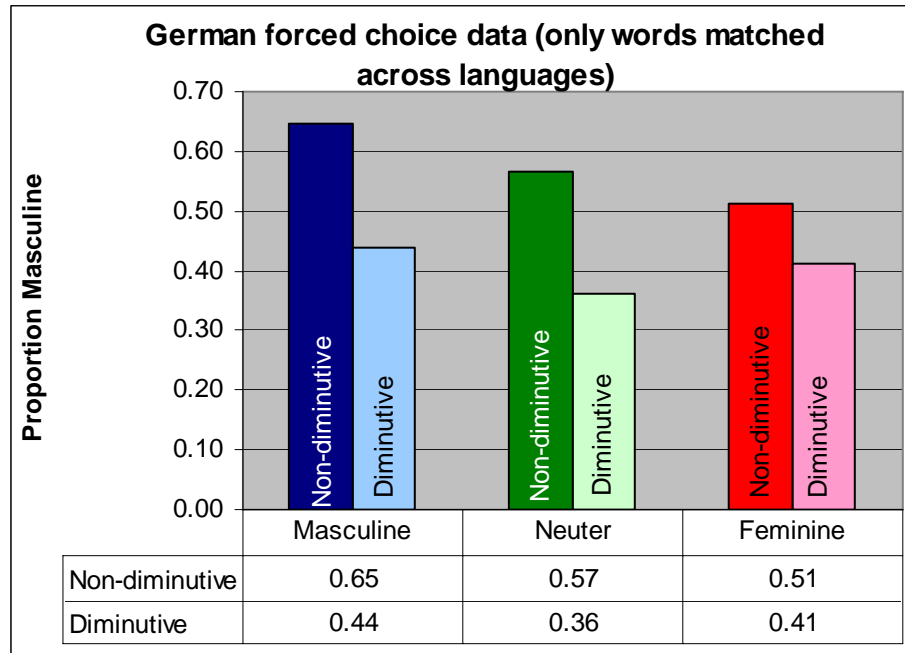


Figure 9.3. Proportion of masculine, feminine, and neuter non-diminutive and diminutive nouns associated with masculine reference pictures in the German forced-choice task

A comparison of these figures reveals the extent to which German subjects were biased by grammatical gender. The masculine non-diminutive words in German were more often associated with the masculine reference pictures than the feminine non-diminutive words. German neuter non-diminutives fall in the middle as predicted. Whereas the English words (which would be masculine in German) were also more often judged to be similar to the masculine reference pictures than either the neuter or feminine, there is a standard error of .056, as compared to German's .045. English words which would be feminine in German also seem to follow the same pattern, i.e., they were less likely to be associated with masculine reference pictures, however the standard error in these responses is much higher, .292 as compared to .082 for the German data. The higher standard error in English responses indicates that the responses

of English-speaking subjects were less consistent when compared to the responses of German-speaking subjects.

As noted earlier, the diminutive suffixes in German are much more productive than those of English. Where German has two options for diminutives, English has *at least* four. One possible explanation for the larger standard error results for English diminutives is that the forms varied so much from word to word unlike in German where *-chen* and *-lein* predictably occur.

Note that although both the German and English speakers found the set of target objects in the masculine group to be more similar to the masculine reference picture, it cannot be said that this factor accounts for the pattern of results in the German experiment. In the German experiment, forced-choice results show the most masculine responses for masculine, the fewest for feminine, and a middle ground for neuter. In contrast, the English data show more masculine responses for feminine target pictures than for neuters.

10.0 Discussion

Although German responses were in line with the grammatical gender of the target stimuli, the data revealed a clear bias of subjects to classify stimuli as masculine. The highest proportion of feminine responses in the forced-choice task in any of the three non-diminutive categories was .50, or roughly at chance for the feminine word group. This could be a result of the dominance of masculine nouns in the language as demonstrated in Mills (1984). In her study, Mills found not only that there were more masculine gendered referents in the stories she analyzed, but also in the experimental section that grammatically feminine toys were given masculine names more often than grammatical masculine toys were given feminine names. Furthermore, grammatically neuter toys were most often given masculine names. The finding of a bias toward the masculine is also reminiscent of Steinmetz's hierarchical ordering of German gender, in which masculine is the default, unmarked gender.

10.1 Limitations and directions for future research

As stated earlier, diminutives were thought to have a correlation with femininity and the results of this experimental study add credence to this assertion. It is unclear from the present results why that is so, i.e., whether the correlation between diminutives and femininity is based on the associations speakers have with smaller objects being more feminine or whether it is perhaps based on the correspondence between diminutives and the people who use them most, women. This possibility needs to be explored in further research.

One limitation of this study lies in the meanings of the diminutives themselves. There are three translations for the word 'diminutive' in German. The first, *Verkleinerungsform*, comes

from the verb *verkleinern*, which means ‘to make smaller’ thus it denotes smallness. A second sense of the word ‘diminutive’ in German is *Verniedlichungsform*, which comes from the verb *verniedlichen*, which means ‘to trivialize.’ The third, *Koseform*, is the ‘affectionate form.’

It is difficult to know which form, *Verkleinerungsform*, *Verniedlichungsform*, or *Koseform*, the German speakers were thinking about when they were responding to the stimuli. The diminutives used in the experiment are used primarily in speech, and thus normally used in a context that could help sort out which form is being used. It was in an unnatural setting that each word was seen and evaluated by German subjects. If a German subject saw the isolated word *Entchen*, ‘duckie’, there is no sentence context, no tone of voice and no gesture that would normally accompany such a word to help the speaker know if the noun is being minimized in size or minimized in importance. English speakers may not be aware, but they too make such distinctions. To exemplify these differences in meaning I offer the following examples:

1. Small: Grandma says to the child “put the *mousie* down” and the girl releases her thumb and forefinger and sets the week-old mouse free.
2. Trivialized: A boyfriend says to his girlfriend who has climbed onto the kitchen table, “You aren’t going to let this little *mousie* scare you, are you?”
3. Familiar/Affectionate: When it’s dinner time, Jared says to his pet rodent, “Does *mousie* want some food?”

Because there are so many semantic connotations a diminutive could have based on the context in which it is spoken, it is difficult to say with without a bit of doubt, which type of diminutive speakers were responding to.

Another limitation is that diminutives differ across languages and therefore, only a handful could be matched between American English and German. In German, for example,

there is no word for ‘jammies’ and in American English, there is no single-word diminutive for *Tischlein*, ‘little table’. A study of this nature would be best suited on speakers of a variety of English that employs more diminutives, e.g. Australian English.

To revisit the story of my friend who was confused about why some pieces of furniture were masculine, we can conclude that at a young age, the semantic associations he had between objects and words outweighed the influence of grammatical gender. His story to me was consistent with my findings that diminutives would be perceived according to their cultural associations with femininity and not according to their neuter grammatical gender.

This study supports the idea that the nature of one’s language affects the perception of objects, but it does not *determine* perceptions, as evidenced by the overwhelming amount of cultural influence on the perception of diminutives.

It has been suggested by Zubin and Köpcke (1984) that grammatical gender is psychologically important to speakers. Not only does it help disambiguate anaphoric and cataphoric reference, help speakers anticipate forthcoming constructions and help the comprehension process of complex noun phrases, it is also important for lexical retrieval. To speakers of a gender-marked language, gender is an important part of comprehension and is employed in many different ways.

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Appendix I: Instructions for the Forced-Choice and Similarity Tasks

English Instructions

1. In this experiment, we will first ask you to do two things. First you will see three pictures. Look at the picture at the bottom in the center, then decide as quickly as possible which of the two pictures above it is most similar to it. You might not be sure which picture to choose. If this is the case, give us your first impression.

If you think the picture on the left is most similar, press the button on the far left labeled "L." If the picture on the right is most similar, press the button on the far right labeled "R."

We will be timing these responses, so please make them as quickly as you can. Try to keep responses under 4 seconds. You will see the amount of time each response takes following your button press.

Press any key to continue

2. The second task we want you to do is evaluate how similar the picture you chose was to the picture at the bottom of the screen. You will see a screen which will ask you to rate the similarity of the two pictures on a scale of 1-5, where 1 is least similar and 5 is most similar. Press the button on the response box with the number that matches your rating. We will not be timing this response. Please try to use the full extent of the scale. After you give us your rating, the next set of pictures will appear.

If you have any questions, ask the experimenter. Press any key to begin the practice session.

3. You will now see three practice screens.

Press any key to continue

4. How similar are these pictures?

(1 = very dissimilar) (5 = very similar)

5. Ready for the next item?

Press any key to continue

6. The practice session is over. If you have any questions, please ask the experimenter.

Review of Instructions:

First, choose the picture that is most similar to the one at the lower center by pressing the "L" or "R" button. Do this as quickly as possible. Try to keep your responses under 4 seconds.

Then, rate the similarity of the pictures on a scale of 1-5, where 1 is least similar and 5 is most similar. This is not timed.

Press any key to continue.

(repeat instructions four and five)

German Instructions:

1. In diesem Experiment bitten wir Sie, zwei Dinge zu tun. Zuerst werden Sie drei Bilder sehen. Schauen Sie sich das Bild unten in der Mitte an und entscheiden Sie so schnell Sie können, welchem der beiden obigen Bilder es ähnlicher ist. Es ist möglich, dass Sie nicht sicher sind, welches Bild Sie wählen sollen. In diesem Fall wählen Sie bitte das Bild, das Ihnen spontan ähnlicher erschien.

Wenn Sie denken, dass das linke Bild dem Bild unten in der Mitte ähnlicher ist, drücken Sie bitte die Taste unten links mit der Aufschrift "L". Wenn das rechte Bild ähnlicher ist, drücken Sie bitte die Taste unten rechts mit der Aufschrift "R".

Wir messen Ihre Reaktionszeit. Antworten Sie deshalb bitte so schnell Sie können. Versuchen Sie, in unter 4 Sekunden zu antworten. Nachdem Sie per Tastendruck geantwortet haben, sehen Sie wie lange Sie für Ihre Antwort gebraucht haben.

Weiter mit irgendeiner Taste

2. Ihre zweite Aufgabe ist es, zu beurteilen wie ähnlich das Bild, das Sie ausgewählt haben, dem Bild unten in der Mitte war. Sie werden auf dem Bildschirm eine Darstellung sehen mit der Aufforderung, die Ähnlichkeit der beiden Bilder auf einer Skala von 1 bis 5 zu bewerten, wobei 1 'gar nicht ähnlich' und 5 'sehr ähnlich' bedeutet.

Drücken Sie die Taste der response box, die mit der Nummer ihrer Beurteilung übereinstimmt. Zum Beispiel, wenn Sie denken, dass sich die Bilder sehr ähnlich sind, drücken die die Taste mit der Aufschrift 5. Für diese Aufgabe messen wir Ihre Reaktionszeit nicht. Bitte versuchen Sie, den vollen Umfang der Skala auszunutzen. Nachdem Sie uns Ihre Beurteilung gegeben haben, erscheint die Frage "Bereit für die nächsten Bilder?" auf dem Bildschirm. Drücken Sie irgendeine Taste, sobald Sie bereit sind.

Wenn Sie noch Fragen haben, fragen Sie bitte den/die Experimentsleiter/in. Drücken Sie irgendeine Taste, um die Übungsphase zu starten.

Weiter mit irgendeiner Taste

3. Es folgt eine Übung mit 3 Durchgängen
Weiter mit irgendeiner Taste

4. Wie ähnlich sind diese Bilder?
(1 = gar nicht) (5 = sehr)

4. Bereit für den nächsten Durchgang?

Weiter mit irgendeiner Taste

6. Dies ist das Ende der Übungsphase. Wenn Sie noch Fragen haben, fragen Sie bitte jetzt den/die Experimentsleiter/in.

Überblick über die Anweisungen:

Zuerst wählen Sie bitte das obige Bild, das dem Bild unten in der Mitte ähnlicher ist, indem Sie die "L"- oder "R"-Taste drücken. Tun Sie dies so schnell wie möglich. Versuchen Sie, in unter 4 Sekunden zu antworten.

Danach beurteilen Sie bitte, wie ähnlich sich die beiden Bilder sind auf einer Skala von 1 bis 5, wobei 1 'gar nicht ähnlich' und 5 'sehr ähnlich' bedeutet. Für diese Aufgabe messen wir Ihre Reaktionszeit nicht.

Weiter mit irgendeiner Taste

(repeat instructions four and five)

Appendix II: Slides**Example English Slide List:**

Stimuli	Key 1	Key 5
	Picture	Picture
window	house	bed
doll	nose	vial
queen	man	woman
spoon	frog	chair
hand	queen	king
table	ballerina	giant
ear	roof	kid
tire	ballerina	giant
newspaper	woman	man
kitchen	toe	mother
spoon	fork	knife
table	sleep	kitchen
streamlet	woman	man
kitchen	giant	ballerina
woman	ballerina	giant
flag	queen	king
chairsie	king	queen
toe	hand	foot
spoon	table	drop
kiddie	man	woman
booklet	king	queen
roof	ballerina	giant
earsie	giant	ballerina
chick	cat	dog
board	giant	ballerina
man	giant	ballerina
vegetable	giant	ballerina
fishie	queen	king
fork	man	woman
pajamas	queen	king
kid	father	mother
bird	king	queen
toesie	king	queen
chick	ear	dog
doll	bed	nose
pot	man	woman
duck	king	queen
father	sweetheart	stream

moon	man	woman
toe	queen	king
ship	woman	man
aunt	woman	man
dinette	woman	man
horsie	woman	man
drop	man	woman
dribble	king	queen
ship	stream	ear
kitty	queen	king
sock	cat	blanket
diner	man	woman
riblet	king	queen
wienie	man	woman
mousie	giant	ballerina
rug	woman	man
girlie	queen	king
ciggie	woman	man
bridge	queen	king
pan	giant	ballerina
bread	man	woman
nose	woman	man
horse	ballerina	giant
sweetheart	woman	man
wienie	sock	mother
glass	queen	king
owl	giant	ballerina
bear	stomach	foot
owlet	ballerina	giant
sprinket	queen	king
blanket	towel	aunt
horse	horse	chick
girl	woman	toe
cat	ballerina	giant
mouse	ballerina	giant
bud	queen	king
spoon	man	woman
rabbit	mouse	sweetheart
sun	king	queen
roof	ballerina	giant
bag	queen	king
picture	man	woman
bootie	man	woman
floret	woman	man

nosie	man	woman
bear	giant	ballerina
housie	man	woman
sister	giant	ballerina
cat	woman	bag
chair	queen	king
kitchenette	ballerina	giant
woman	ballerina	giant
horse	brett	picture
glass	window	flag
dog	bear	rabbit
frog	giant	ballerina
house	giant	ballerina
table	foot	key
fish	key	table
dolly	woman	man
bite	giant	ballerina
dog	queen	king
girl	woman	aunt
key	bear	father
window	king	queen
cat	sock	dog
bird	duck	man
stream	king	queen
chickie	ballerina	giant
droplet	giant	ballerina
flower	giant	ballerina
book	chick	towel
blanket	sock	pants
hankie	queen	king
stomach	ballerina	giant
veggie	ballerina	giant
sissie	ballerina	giant
pear	giant	ballerina
broom	king	queen
kitchen	wiener	rib
towel	queen	king
dog	cat	stomach
jammies	king	queen
duck	cat	mouse
bed	woman	man
arrow	queen	king
ballerina	queen	king
fish	giant	ballerina
footsie	man	woman

foot	queen	king
spoon	chair	table
pants	bag	duck
apple	woman	man
baggie	king	queen
doggie	man	woman
earsie	king	queen
father	ballerina	giant
frog	pig	bird
cut	woman	man
froggie	queen	king
wiener	king	queen
bread	kitchen	horse
froggie	duck	fish
giant	king	queen
piggy	giant	ballerina
tablecloth	queen	king
sleep	king	queen
wiener	nose	rib
sprinkle	ballerina	giant
skirt	giant	ballerina
house	roof	window
chick	king	queen
bunny	ballerina	giant
towelette	giant	ballerina
handkerchief	ballerina	giant
sock	woman	man
spoon	drop	brett
bearsie	queen	king
mouse	flag	aunt
birdie	woman	man
duckie	man	woman
bird	sweetheart	table
book	woman	man
tummy	king	queen
flask	man	woman
boot	king	queen
auntie	giant	ballerina
husband	pig	spoon
sweetie	ballerina	giant
drop	husband	father
daddy	king	queen
aunt	sister	kitchen
spoonsie	woman	man
ear	nose	bread
key	woman	man

doll	man	woman
handsie	queen	king
rabbit	woman	man
rib	king	queen
mommy	woman	man
bread	glass	horse
cigarette	man	woman
sockie	giant	ballerina
pig	drop	bear
ship	house	ear
king	woman	man
nappie	man	woman
piece	ballerina	giant
budlet	king	queen
nose	hand	toe
driblet	man	woman
clock	king	queen
mother	man	woman
stamp	ballerina	giant
mother	woman	woman
floret	window	house
kid	ballerina	giant
bedsie	queen	king
pig	man	woman
cutlet	giant	ballerina

Example German Slide List:

Stimuli	Key 1	Key 5
Fröschlein	Königin	König
Bäuchlein	König	Königin
Hündchen	Mann	Frau
Flüsschen	Frau	Mann
Schweinchen	Riese	Ballerina
Häschen	Ballerina	Riese
Fischlein	Königin	König
Väterchen	König	Königin
Füßchen	Mann	Frau
Vögelein	Frau	Mann
Tröpfchen	Riese	Ballerina
Schätzchen	Ballerina	Riese

Bärchen	Königin	König
Tischlein	König	Königin
Stühlchen	Mann	Frau
Schläfchen	Frau	Mann
Löffelchen	Riese	Ballerina
Schlüsselchen	Ballerina	Riese
Bisschen	Königin	König
Stückchen	König	Königin
Frosch	Mann	Frau
Bauch	Frau	Mann
Hund	Riese	Ballerina
Fluss	Ballerina	Riese
Schwein	Königin	König
Hase	König	Königin
Fisch	Mann	Frau
Vater	Frau	Mann
Fuß	Riese	Ballerina
Vogel	Ballerina	Riese
Tropfen	Königin	König
Schatz	König	Königin
Bär	Mann	Frau
Tisch	Frau	Mann
Stuhl	Riese	Ballerina
Schlaf	Ballerina	Riese
Löffel	Königin	König
Schlüssel	König	Königin
Bissen	Mann	Frau
Stück	Frau	Mann
Kätzchen	Riese	Ballerina
Tütchen	Ballerina	Riese
Entchen	Königin	König
Püppchen	König	Königin
Tantchen	Mann	Frau
Schwesterlein	Frau	Mann
Mädchen	Riese	Ballerina
Zehchen	Ballerina	Riese
Würstchen	Königin	König
Mütterchen	König	Königin
Söckchen	Mann	Frau

Küchlein	Frau	Mann
Fräulein	Riese	Ballerina
Dächlein	Ballerina	Riese
Händchen	Königin	König
Rippchen	König	Königin
Fläschchen	Mann	Frau
Näschen	Frau	Mann
Blümchen	Riese	Ballerina
Mäuschen	Ballerina	Riese
Fähnchen	Königin	König
Katze	König	Königin
Tüte	Mann	Frau
Ente	Frau	Mann
Puppe	Riese	Ballerina
Tante	Ballerina	Riese
Schwester	Königin	König
Frau	König	Königin
Zehe	Mann	Frau
Wurst	Frau	Mann
Mutter	Riese	Ballerina
Socke	Ballerina	Riese
Küche	Königin	König
Frau	König	Königin
Dach	Mann	Frau
Hand	Frau	Mann
Rippe	Riese	Ballerina
Flasche	Ballerina	Riese
Nase	Königin	König
Blume	König	Königin
Maus	Mann	Frau
Fahne	Frau	Mann
Büchlein	Riese	Ballerina
Häuslein	Ballerina	Riese
Pferdchen	Königin	König
Tüchlein	König	Königin
Küklein	Mann	Frau
Brötchen	Frau	Mann
Bettchen	Riese	Ballerina
Örchen	Ballerina	Riese

Kindchen	Königin	König
Bettchen	König	Königin
Gläschen	Mann	Frau
Fensterchen	Frau	Mann
Bildchen	Riese	Ballerina
Schiffchen	Ballerina	Riese
Häuschen	Königin	König
Brettchen	König	Königin
Dächlein	Mann	Frau
Buch	Frau	Mann
Haus	Riese	Ballerina
Pferd	Ballerina	Riese
Tuch	Königin	König
Küken	König	Königin
Brot	Mann	Frau
Bett	Frau	Mann
Ohr	Riese	Ballerina
Kindchen	Ballerina	Riese
Bett	Königin	König
Glas	König	Königin
Fenster	Mann	Frau
Bild	Frau	Mann
Schiff	Riese	Ballerina
Haus	Ballerina	Riese
Brett	Königin	König
Dach	König	Königin
Fröschlein	Ente	Fischlein
Katze	Socke	Hund
Mutter	Tante	Frau
Zehe	Hand	Fuss
Blümchen	Fenster	Haus
Fenster	Haus	Bett
Küken	Örchen	Hund
Würstchen	Söckchen	Mutter
Wurst	Nase	Rib
Schwein	Tropf	Bär
Hund	Katze	Bauch
Tisch	Schlaf	Küche
Löffel	Tropfen	Brett

Glas	Fenster	
Puppe	Bett	Nase
Decke	Tuch	Tante
Vogel	Ente	Mann
Hase	Maus	Schatz
Brot	Küche	Pferd
Schiff	Fluss	Ohr
Ohr	Nase	Brot
Löffel	Stuhl	Tisch
Ente	Katze	Maus
Nase	Hand	Zehe
Küche	Wurst	Rippe
Mädchen	Frau	Tante
Decke	Socke	Hose
Hund	Bär	Hase
Frosch	Schwein	Vogel
Bär	Bauch	Fuß
Haus	Dach	Fenster
Pferd	Pferd	Küken
Mädchen	Frau	Zehe
Puppe	Nase	Flasche
Maus	Fahne	Tante
Hose	Tüte	Ente
Socke	Katze	Decke
Tante	Schwester	Küche
Küche	Zehe	Mutter
Katze	Frau	Tute
Vater	Schatz	Fluss
Tropfen	Mann	Vater
Vogel	Schatz	Tisch
Schlüssel	Bär	Vater.bmp
Mann	Schwein	Löffel
Fisch	Schlüssel	Tisch
Löffel	Frosch	Stuhl
Tisch	Fuß	Schlüssel
Löffel	Tisch	Tropf
Ohr	Dach	Kind
Buch	Küchen	Tuch
Brot	Glas	Pferd
Schiff	Haus	Ohr
Pferd	Brett	Bild

Kind	Vater	Mutter
Kücke	Katze	Hund
Löffel	Gabel	Messer
Ballerina	Mann	Frau
Riese	Frau	Mann
Königin	Riese	Ballerina
König	Ballerina	Riese
Mann	Königin	König
Frau	König	Königin
Pfeil	Mann	Frau
Besen	Frau	Mann
Topf	Riese	Ballerina
Teppich	Ballerina	Riese
Rock	Königin	König
Reifen	König	Königin
Brücke	Mann	Frau
Uhr	Frau	Mann
Gabel	Riese	Ballerina
Zeitung	Ballerina	Riese
Pfanne	Königin	König
Briefmarke	König	Königin
Tischdecke	Mann	Frau
Sonne	Frau	Mann
Mond	Riese	Ballerina
Apfel	Ballerina	Riese
Birne	Königin	König

Appendix III: Experimental Pictures





