# Sex, Syntax, and Semantics

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**Abstract**

Many languages have a grammatical gender system whereby all nouns are assigned a gender (most commonly feminine, masculine, or neuter). Two studies examined whether (1) the assignment of genders to nouns is truly arbitrary (as has been claimed), and (2) whether the grammatical genders assigned to nouns have semantic consequences. In the first study, English speakers' intuitions about the genders of animals (but not artifacts) were found to correlate with the grammatical genders assigned to the names of these objects in Spanish and German. These findings suggest that the assignment of genders to nouns is not entirely arbitrary but may to some extent reflect the perceived masculine or feminine properties of the nouns' referents. Results of the second study suggested that people's ideas about the genders of objects are strongly influenced by the grammatical genders assigned to these objects in their native language. Spanish and German speakers' memory for object--name pairs (e.g., apple--Patricia) was better for pairs where the gender of the proper name was congruent with the grammatical gender of the object name (in their native language), than when the two genders were incongruent. This was true even though both groups performed the task in English. These results suggest that grammatical gender may not be as arbitrary or as purely grammatical as was previously thought.

## Introduction

Does the language you speak shape the way you understand the world? Linguists, philosophers, anthropologists, and psychologists have long been interested in this question. This interest has been fueled in large part by the observation that different languages talk about the world differently. However, despite the interest and controversy, definitive answers are scarce. This paper briefly reviews the empirical history of this question and describes two new studies that demonstrate both the role of semantic constraints in shaping language, and the role of language in shaping habitual thought.

The doctrine of Linguistic Determinism—the idea that thought is determined by language—is most commonly associated with the writings of Benjamin Lee Whorf. Whorf proposed that in so far as languages differ, their speakers too may differ in how they perceive and act in objectively similar situations (Whorf, 1956). What has been called the strong Whorfian view—the idea that thought and action are *entirely* determined by language—has long been abandoned in the field. Particularly effective in undermining the strong view was work showing striking similarity in color memory despite wide variation in color language (Heider, 1972; but see Lucy & Shweder, 1979; Kay & Kempton, 1984).

Although the strong linguistic determinism view seems untenable, many weaker but still interesting formulations can be entertained. Several lines of research that have looked at domains other than color, have found cross-linguistic differences in thought. Unlike English speakers, speakers of classifier languages like Yucatec Mayan and Japanese were found to attend to the substance of an object more so than to its shape, and were also more likely to extend novel labels based on the substance than on the shape of a given example (e.g., Imai & Gentner, 1997; Lucy, 1992). When asked to reconstruct an array of objects, speakers of Tzeltal (a Mayan language that relies primarily on an absolute framework for describing spatial relations) were likely to preserve the positions of objects with respect to cardinal directions (so that the Northern-most object was still the Northern-most), while English speakers (who rely heavily on relative spatial descriptions) tended to preserve the objects' positions relative to themselves (so that the left-most object was still left-most) (Levinson, 1996).

Studies of conceptions of time have also revealed cross-linguistic differences (Boroditsky, 1999). English and Mandarin speakers talk about time differently—English speakers predominantly talk about time as if it were horizontal, while Mandarin speakers commonly use both horizontal and vertical metaphors to talk about time. This difference between the two languages is reflected in the way their speakers think about time. A collection of studies showed that Mandarin speakers tend to think about time vertically even when they are thinking for English (Mandarin speakers were faster to confirm that March comes earlier than April if they had just seen a vertical array of objects than if they had just seen a horizontal array, and the reverse was true for English speakers). Another study showed that the extent to which Mandarin-English bilinguals think about time vertically is related to how old they were when they first began to learn English. In another experiment native English speakers were taught to talk about time using vertical spatial terms in a way similar to Mandarin. On a subsequent test, this group of English speakers showed the same bias to think about time vertically as was observed with Mandarin speakers. This last result suggests two things: (1) language is a powerful tool in shaping thought, and (2) one's native language plays a role in shaping habitual

thought (how we tend to think about time, for example) but does not completely determine thought in the strong Whorfian sense.

There is an interesting discrepancy between these later findings, and those on color perception. Why would there be such strong evidence for universality in color perception, but quite the opposite for spatial relations or thinking about time? One possibility is that language is most powerful in influencing thought for more abstract domains, that is, ones not so reliant on sensory experience (Boroditsky, 1999). This paper considers an extreme point along this concrete-abstract continuum—the influence of grammatical gender on the way people think about inanimate objects. We will first characterize the ways in which people's ideas about the genders of objects may be similar across cultures, and then go on to explore whether there may also be systematic language-driven differences in how people conceive of objects.

## Grammatical Gender

Forks and frying pans do not (by virtue of being inanimate) have a biological gender. The perceptual information available for most objects does not provide conclusive evidence as to their gender—conclusive gender information is only available in language (and only in those languages that have grammatical gender). The present paper examines whether (1) there are any correspondences in the assignment of grammatical gender between languages, (2) whether people include gender in their conceptual representations of objects (despite the fact that objects don't actually have gender), and (3) whether people's ideas about the genders of objects (if they have any at all) are influenced by the grammatical genders assigned to these objects in their native language.

Unlike English, many languages have a grammatical gender system whereby all objects (e.g., penguins, pockets, and toasters) are assigned a gender. Many languages only have masculine and feminine genders, but some also assign neuter, vegetative, and other more obscure genders. It has long been claimed that the assignment of grammatical gender to object names is semantically arbitrary, and has nothing to do with the conceptual properties of the referent (e.g., Bowers, Vigliocco, Stadthagen-Gonzalez & Vinson 1999). At first glance, this does appear to be the case. As Mark Twain noted, "In German, a young lady has no sex, while a turnip has, ....a tree is male, its buds are female, its leaves are neuter; horses are sexless, dogs are male, cats are female—tomcats included." Further, the grammatical genders assigned to names of particular objects vary greatly across languages (Braine, 1987). For example, the sun is feminine in German, but masculine in Spanish, and neuter in Russian. The moon, on the other hand, is feminine in Spanish and Russian, but masculine in German.

Despite wide variation in the assignment of grammatical genders, speakers across languages do share some common beliefs about the genders of objects. For example, when asked to classify names or pictures of objects into masculine and feminine, English and Spanish speakers tend judge natural objects as feminine and artifacts as masculine (Mullen, 1990; Sera et al., 1994). It is also interesting that English speakers make consistent judgments about the genders of objects, despite the lack of a grammatical gender system in English (Sera et al., 1994).

So are people's shared beliefs about the genders of objects reflected in the assignment of grammatical gender, or is grammatical gender entirely arbitrary? If the assignment of grammatical gender is not entirely arbitrary, then there may be some correspondences across languages. For example, animals or things that are easy to anthropomorphize may have stereotypically feminine or masculine qualities and so may be more likely to have consistent grammatical genders across languages. The names of animals that are beautiful and graceful may tend to be grammatically feminine, while those of aggressive and strong animals may tend to be masculine. It is possible then, that the grammatical genders of nouns may correspond across languages. Further, we should see more correspondence for nouns whose referents are easy to anthropomorphize (and are likely to have stereotypically masculine or feminine properties) than for nouns whose referents are more abstract or less human-like.

To test these predictions, we compared the grammatical genders assigned to objects in Spanish and German to the intuitions of English speakers regarding the gender of the same objects. Since English does not use grammatical gender, English speakers' untrained intuitions about the genders of objects provide a nice comparison group. If the assignment of grammatical gender is truly arbitrary, then we should see no correspondence between the intuitions of English speakers about the genders of objects and the genders assigned to those objects in Spanish and German. If, on the other hand, the grammatical genders of nouns do in part reflect the properties of their referents, then we should see a correspondence in the assignment of genders across languages, and also a correspondence between Spanish and German genders and English speakers' naive intuitions.

## Experiment 1

### Methods

#### Participants

Fifteen native English speakers (none of whom were familiar with either Spanish or German) participated in this study in exchange for payment.

#### Materials

We constructed a list of 50 animal names and 85 names of artifacts (including vehicles, articles of clothing, and household items). Only words that had a single dominant translation (as determined by two native Spanish and two native German speakers) into both Spanish and German were included on the list.

#### Procedure

English speakers were asked to classify each object and animal on our list as either masculine or feminine. Participants were required to provide a single answer for each item.

## Results

Overall, there was appreciable agreement on the assignment of grammatical genders between Spanish and German ($r=.21$, $p<.05$). As we predicted, the two languages agreed more on the genders of animals ($r=.39$, $p<.01$), then on the genders of artifacts ($r=.10$, $p=.35$). Interestingly, English speakers' ratings of these objects showed the same pattern of correspondence. Spanish and German grammatical genders corresponded well with English speakers' intuitions about the genders of animals ($r=.29$, $p<.05$, and $r=.43$, $p<.01$ respectively), but not the genders of artifacts ($r=.04$, $p=.73$, and $r=.11$, $p=.32$ respectively). It is striking that despite a lack of grammatical gender in English, English speakers intuitions about the genders of animals corresponded well with the grammatical genders assigned to those animals in Spanish and German. These findings suggest that the grammatical genders assigned to animals may not have been entirely arbitrary, but rather may have reflected people's perceptions of the particular animals as having stereotypically masculine or feminine properties.

It appears that the assignment of grammatical genders to nouns (or at least to animal names) may not be entirely arbitrary, and may have been influenced in part by people's perceptions of the nouns' referents. But what happens once grammatical genders are assigned? Could they in turn influence people's mental representations of objects? If so, then there may be striking cross-linguistic differences in how people think about objects.

How might people's representations of objects be affected by the grammatical gender of their labels? One possibility is that in order to efficiently learn the grammatical gender of a noun to begin with, people focus on some property of that noun's referent that may pick it out as masculine or feminine. For example, if the word for "sun" is masculine in one's language, one might try to remember this by conceiving of the sun in terms of what are perceived as stereotypically masculine properties like powerful and threatening. If the word for "sun" is feminine, on the other hand, one might focus on its warming and nourishing qualities.

Even after the grammatical genders of nouns are learned, language may influence thought during "thinking for speaking" (Slobin, 1996). Languages can force their speakers to attend to the genders associated with objects by making them grammatically obligatory. When speaking a language with grammatical gender, speakers often need to mark objects as gendered through definite articles (e.g., "le" and "la" in French), refer to objects using gendered pronouns (e.g., if the word for "fork" is masculine, a speaker might say, "he is sharp"), and alter adjectives or even verbs to agree in gender with the nouns (e.g., in Russian, verbs in the past tense must agree in gender with their subject nouns). 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.

So, does talking about inanimate objects as if they were masculine or feminine lead people to think of inanimate objects as masculine or feminine? Some preliminary evidence suggests that it may (Jakobson, 1966; Konishi, 1993; Sera, Berge, & del Castillo, 1994). In one early study, Russian speakers were asked to personify days of the week (reported in Jakobson, 1966). Subjects consistently personified the grammatically masculine days of the week (Monday, Tuesday, and Thursday) as males, and the grammatically feminine days of the week (Wednesday, Friday, and Saturday) as females, though they could not explicitly say why they did so.

In another study, German and Spanish speakers rated a set of nouns on the dimension of potency (a dimension highly associated with masculinity) (Konishi, 1993). Half of the nouns were grammatically masculine in German and feminine in Spanish, and the other half were masculine in Spanish and feminine in German. Both German and Spanish speakers judged the word "man" to be more potent than "woman". Interestingly, they also judged nouns that were grammatically masculine in their native language to be more potent than nouns that were grammatically feminine. This was true even though all of the test nouns referred to objects or entities that had no biological gender (including names of inanimate objects, places, events, and abstract entities).

Converging evidence comes from a series of studies in which Spanish speakers were asked to rate pictures of objects as masculine or feminine (Sera et al., 1994). Spanish speakers consistently classified objects in accordance with their grammatical gender in Spanish. The effect was more pronounced when the pictures were accompanied by their Spanish labels. The grammatical gender consistency effect also showed up when subjects were asked to attribute a man's or a woman's voice to each picture. Finally, Sera et al. found that by about second grade, Spanish speaking children assigned voices to objects in accordance with the grammatical gender of their labels.

Although results of these studies are suggestive, there are serious limitations common to these and most other studies of linguistic determinism. First, speakers of different languages are usually tested only in their native language. Any differences in these comparisons can only show the effect of a language on thinking for that particular language. These studies cannot tell us whether experience with a language affects language-independent thought such as thought for other languages, or thought in non-linguistic tasks.

Second, comparing studies conducted in different languages poses a deeper problem: there is simply no way to be certain that the stimuli and instructions are truly the same in both languages. This problem remains even if the verbal instructions are minimal. For example, even if the task is non-linguistic, and the instructions are simply "which one is the same?", one cannot be sure that the words used for "same" mean the same thing in both languages. If in one language the word for "same" is closer in meaning to "identical," while in the other language it's closer to "relationally similar", speakers of different languages may behave differently, but due only to the difference in instructions, not because of any interesting differences in thought. There is no sure way to guard against this possibility when tasks are translated into different languages. Since there is no way to know that participants in different languages are performing the same task, it is difficult to deem the comparisons meaningful.

Finally, in all of the tasks so far, participants were asked to provide some subjective judgment (there were no right or wrong answers). Providing such a judgment requires participants to decide on a strategy for completing the task. When figuring out how to perform the task, participants may simply make a conscious decision to follow the grammatical gender divisions in their language. Evidence collected from such subjective judgments cannot tell us whether gender is actually part of a person's conceptual representation of an object, or if (left with no other criterion for making the subjective judgment) the person just explicitly decided to use grammatical gender in answering the experimenter's questions.

The present study improves on the previous studies in two important ways. First, both Spanish and German speakers were tested in English. This allows us to test whether experience with a language affects language-independent thought (here, thinking for other languages). Second, participants were tested in a memory task and at test were asked to provide the right answer (not a subjective judgment). The present study examined the ways in which previous knowledge (experience with Spanish or German) interfered with participants' ability to correctly perform the task.

In this study, participants were taught proper names for objects (e.g., an apple may have been called "Patrick") and were tested on their memory for these object—name pairs later in the experiment. First, we were interested in whether English speakers would be better at remembering female names for objects that another group of English speakers had rated as more feminine (and male names for objects rated more masculine). Second, we were interested in whether Spanish and German speakers would be better able to remember a proper name for an object if the proper name was consistent with the grammatical gender of the object name in their native language. All objects were chosen to have opposite grammatical genders in Spanish and German (e.g., the word for "apple" is feminine in Spanish, but masculine in German). So, we predicted that German speakers would be better at remembering a proper name for "apple" if the name was "Patrick" than if it was "Patricia". The opposite should be true for Spanish speakers. Since the experiment was conducted entirely in English, this is a particularly conservative test of whether grammatical gender influences the way people think about objects.

## Experiment 2

### Methods

#### Participants

Twenty-five native Spanish speakers, sixteen native German speakers, and twenty English speakers participated in the study in exchange for payment.

#### Materials and Design

A set of 24 object names (e.g., apple, arrow) and 24 proper names (e.g., Patricia, Patrick) was constructed (see Appendix A). The object names were chosen such that half were grammatically masculine and half were grammatically feminine and the grammatical gender in Spanish and German was opposite for each object name (if an object name was grammatically masculine in Spanish, it was grammatically feminine in German and vice versa). A separate group of 30 English speakers rated the 24 objects chosen for this experiment as masculine or feminine.

Half of the proper names were male and half were female; male and female proper names were chosen to be similar to one another (e.g., Alexander, Alexandra). This was done to increase the difficulty of the memory task. All of the materials used including the instructions were in English. For each participant, the computer randomly arranged the object names and proper names into object—name pairs, and presented them in a random order.

Spanish, German, and English speakers completed the same experimental task. Participants read the following instructions "For this experiment, we have given names to a bunch of objects. For example, we may have decided to call a chair 'Mary'. You will see objects and their names appear on the screen (e.g., chair—Mary), and your task is to try to memorize the name we have given to each object as well as you can. Your memory for these names will be tested later in the experiment."

#### Procedure

Participants were tested individually. A computer presented the experimental materials and recorded the participants' responses.

Learning: Participants learned 24 object—name pairs presented to them on a computer screen in a random order. Each object—name pair was presented on the screen for five seconds, and was automatically followed by the next pair. Each pair was presented only once.

After the learning, participants completed a five-minute distraction task unrelated to this study which was inserted to promote forgetting.

Test: Object names from the learning set were presented on the computer screen one at a time and participants were instructed to indicate the gender of the proper name that had been associated with that object name in the learning set by pressing one of two keys on the keyboard.

### Results

As predicted, English speakers remembered object—name pairs better when the gender of the proper name was consistent with the object's rated gender (86% correct) than when the two genders were inconsistent (78% correct), $t=2.17$, $p<.05$. The results suggest that people do include gender in their conceptual representations of inanimate objects. Further, Spanish and German speakers showed language-specific biases in memory. Both groups remembered object—name pairs better when the gender of the proper name given to an object was consistent with the grammatical gender of the object name in their native language (82% correct) than when the two genders were inconsistent (74% correct), $t=2.55$, $p<.01$. Since the object names used in this study had opposite grammatical genders in Spanish and German, Spanish and German speakers showed opposite

memory biases—for those objects that Spanish speakers were most likely to remember female names, German speakers were most likely to remember male names (and vice versa), $F(1, 39)=6.21$, $p<.05$. These findings suggest that people's ideas about the genders of objects are strongly influenced by the grammatical genders assigned to those objects in their native language.

## Summary

Two studies examined whether (1) the assignment of genders to nouns is truly arbitrary (as has been claimed), and (2) whether the grammatical genders assigned to nouns have semantic consequences. In the first study, English speakers' intuitions about the genders of animals (but not artifacts) were found to correlate with the grammatical genders assigned to the names of these objects in Spanish and German. These findings suggest that the assignment of genders to nouns is not entirely arbitrary but may to some extent reflect the perceived masculine or feminine properties of the nouns' referents. Results of the second study suggested that (1) people do include gender in their conceptual representations of inanimate objects, and (2) people's ideas about the genders of objects are strongly influenced by the grammatical genders assigned to these objects in their native language. Spanish and German speakers' memory for object--name pairs (e.g., apple--Patricia) was better for pairs where the gender of the proper name was congruent with the grammatical gender of the object name (in their native language), than when the two genders were incongruent. Since both groups performed the task in English, it appears that the semantic representation of gender (once it has been established) is not language-specific. These results suggest that grammatical gender may not be as arbitrary or as purely grammatical as was previously thought.

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# Appendix A

Materials used in the study:

| Proper names | |
|---|---|
| Christopher | Christina |
| Daniel | Danielle |
| Paul | Paula |
| Brandon | Brenda |
| Eric | Erica |
| Karl | Karla |
| Claude | Claudia |
| Phillip | Phyllis |
| Harry | Harriet |
| Donald | Donna |
| Alexander | Alexandra |
| Patrick | Patricia |

| | Grammatical Gender | |
|---|---|---|
| Object-names | Spanish | German |
| apple | (f) | (m) |
| arrow | (f) | (m) |
| boot | (f) | (m) |
| broom | (f) | (m) |
| fox | (f) | (m) |
| frog | (f) | (m) |
| moon | (f) | (m) |
| spoon | (f) | (m) |
| star | (f) | (m) |
| toaster | (f) | (m) |
| whale | (f) | (m) |
| pumpkin | (f) | (m) |
| bench | (m) | (f) |
| cat | (m) | (f) |
| clock | (m) | (f) |
| disk | (m) | (f) |
| drum | (m) | (f) |
| fork | (m) | (f) |
| mouse | (m) | (f) |
| snail | (m) | (f) |
| sun | (m) | (f) |
| toilet | (m) | (f) |
| toothbrush | (m) | (f) |
| violin | (m) | (f) |