

Grammatical Gender and Cognition: How Language May Shape Thought and Culture

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Introduction

1.1 Introduction

Grammatical gender is a peculiar characteristic of language. Not every language utilises it, and those that do, do not necessarily agree upon noun categorisations or which nouns belong to which categories. Where English has no grammatical gender, Spanish has masculine and feminine, and German has both in addition to the neuter. In Spanish, the sun is grammatically masculine, and the moon is grammatically feminine; in German it is the exact opposite. The grammatical gender in Spanish is often, but not always, marked morphologically as a suffix of the masculine /-o/ or the feminine /-a/, and is also reflected in the definite and indefinite articles. Some words in Spanish refer to naturally gendered objects, such as “el chico” (the boy) and “la chica” (the girl), whereas in other cases the grammatical gender has no direct relation to the word, such as “casa” (house) or “mesa” (table). Some words even fall out of the traditional categorisation structures, and appear irregular, such as “la mano” (the hand) or “el agua” (the water). Apart from this already confusing view on grammatical gender, its origins also remain a mystery. Some postulate that grammatical gender in language may have derived from our ancestors’ sexualising nature through mythology, such as gods of thunder or river spirits and so forth (Fortson 2004, 22-27; Wheeler 1899, 529). Others believe it to have been developed because of a morphological advantage (Wheeler 1899, 530-543). To have grammatical gender inflected in morphological roots can help create several words within the same semantic frame of work, for instance, in Spanish there are “cerezo” (cherry tree) and “cereza” (cherry). Some have even found minor benefits to grammatical gender, for example a faster recognition of words in speech (Lew-Williams and Fernald 2007). On the other hand, speakers of other languages seem to do just fine without noun classifications. Today, grammatical gender may be perceived solely as a peculiar and arbitrary feature of language.

However, in the field of linguistic relativity, grammatical gender may have quite a different role to play. Linguistic relativity, also often known as the Sapir-Whorf theory, states that speakers of different languages may think differently due to linguistic influences on thought. The name of

the theory is derived from two linguists who have written on the subject – without working together and without conducting experiments and studies. They have simply established the foundation for proceeding linguists to continue to build upon. The notion of this idea of linguistic relativity is that we know that different languages operate quite distinctly, with their many systematic and structural features. Moreover, semantics and connotations influence thought, cognition, and perception. Thus, speakers of different languages may ultimately think differently from one and another. This perception of the connection of language and thought has been discussed for centuries (Boroditsky and Phillips 2003), but today linguists distinguish between two versions of the theory: a weak and strong. The strong version, also called linguistic determinism, is ignored as it lacks evidence. The weak version, which in contrast does not state that language completely dominates thought, instead advocates for the possibility of language having minor impacts on thought, influencing cognition to a certain degree. One reason that the question of linguistic influence on thought is so difficult to answer is that the question itself is so abstract. What exactly is meant by thought or cognition? The definitions are vague, so dividing the element of language and thought into sub-categories may come in handy. The terms *speaking*, *thinking*, and *thinking for speaking* (Slobin 1990; Boroditsky, Schmidt, and Phillips 2003) differentiate between the different processes in cognition. *Speaking* refers to the actual action of producing language, whereas *thinking for speaking* refers to the more complex and subconscious processes of producing language. This can include considering plurality and person when conjugating verbs in English, in contrast to Danish. Finally, *thinking* refers to other isolated non-linguistic thought structures.

Over the course of a few decades, numerous studies and experiments have helped research on this concept, amounting to an outstanding array of examples of how language may affect cognition. Some of these have looked at vocabulary of colour throughout various languages and speakers' abilities to categorise colour, some have studied time and aspect in syntax, vocabulary of spatial directions, and many more (Boroditsky, Schmidt, and Phillips 2003). Then, of course, there is the grammatical gender being its own feature of language. This leads us to the impending question and thesis statement to follow.

1.2 Thesis statement

Does grammatical gender have any impact or influence on thought or cognition?

Methodology and theory

2.1 Methodology and theory

To answer this question, we must establish an overview of previous similar studies that have attempted to answer the same question. In this section we will go through some of the relevant methodology and theory required to elaborate the experiment for the data to be researched in this study.

One of the earliest studies invented meaningless nonsense words in Italian, which followed the language's structure of inflecting grammatical gender in morphology (Ervin 1962; Sera, Berge, and Pintado 1994). Participants then had to categorise said nonsense words as belonging either to the noun classification of masculine or feminine. The problem with this kind of experiment is that it does not allow for a subtle, indirect process of perception and conceptualisation. The participants are aware of the purpose of the study, and thus can answer without proper cognition and intuition. They simply gave answers that they deemed to follow the structure of success criteria for the study. In the late 1980s and early 1990s, several studies regarding grammatical gender surfaced, leading to a change in the perception of grammatical gender as being completely arbitrary. Studies showed children's ability to follow grammatical gender rules and the connection between grammatical and semantic gender (Sera, Berge, and Pintado 1994), by showing Spanish participants pictures of imaginary creatures with made-up names and asking about their colour – an adjective and a factor that is influenced by grammatical gender in the Spanish language. While it did indicate clear connections between the morphology of grammatical gender and conceptualisation, it did not show any evidence for conceptualisation being indirectly influenced by semantics of grammatical gender.

However, relevant to the experiment conducted in this study, there is the article "Grammatical and Conceptual Forces in the Attribution of Gender by English and Spanish Speakers" (Sera, Berge, and Pintado 1994), which was the first of its kind to elaborate an experiment of assigning male and female voices to images of various objects to test for indications and evidence for linguistic relativity. The experiment that they conducted showed an array of pictures to participants, Spanish speakers, and English speakers, explaining to them that they wanted to make an animated movie, where the objects would be animated and talk to each other. As the participants were then shown the images, they were asked whether the object presented should be played with a man or a woman's voice. What separates this method from previously conducted experiments, is the ability to cover direct connections with grammatical gender. The answers produced by participants should then not follow morphological cues; instead, they ought to follow semantic cues in their conceptualisation of the images. This would in return advocate for an indirect influence between language and thought, which is in this case the conceptualisation of

objects. The study looked for two different indications: one of the hypotheses they investigated was the difference between the Spanish-speaking and English-speaking segment, that Spanish speakers would to a higher degree choose voices that correlated with the grammatical gender of the objects. The other hypothesis was derived from recent theory and research of the time, which pointed to a tendency of assigning masculine qualities to artificial objects and feminine qualities to natural products. This notion of a universal conceptualisation of gender in objects had already been discussed by an anthropologist (Ortner 1979; Sera, Berge, and Pintado 1994) and investigated in an experimental study (Mullen 1990; Sera, Berge, and Pintado 1994). Utilising these two inquiries help to distinguish between grammatical and cultural perception of objects, answering the question of which factors influence thought: those of language or those of folklore, mythology, and culture. The study confirmed its two hypotheses; both that “language and thought are not always independent functions but closely related agents that jointly shape human experience” (Sera, Berge, and Pintado 1994, 290) as well as both segments being influenced by this universal gender conceptualisation, stating that “English speakers were systematic in their classifications, honouring an artificial-male/natural-female conceptual division” (Sera, Berge, and Pintado 1994, 287).

Over the course of the 2000s, several studies emerged: continuing the investigation of the grammatical gender. Boroditsky has especially contributed to a large degree in recent findings regarding the subject. In an experiment including Spanish and German speakers, they found a tendency for participants to ascribe feminine and masculine qualities to nouns (Boroditsky, Schmidt, and Phillips 2003). This was conducted by means of asking participants in each segment to give adjectives that they deemed to fit the given nouns, and then having a third segment rate said adjectives as being respectively masculine or feminine. Some examples of their findings include the German masculine keys, being described as “hard, heavy, jagged, metal, serrated, and useful” (Boroditsky, Schmidt, and Phillips 2003, 70) and Spanish feminine keys being described as “golden, intricate, little, lovely, shiny, and tiny” (Boroditsky, Schmidt, and Phillips 2003, 70). They also found connections between grammatical gender and depictions of abstract ideas as personified gender in art (Segel and Boroditsky 2011), concluding that their analysis could “predict the gender of personification in art 78% of the time” (Segel and Boroditsky 2011, 2). To illustrate this idea, it would mean a German painter would to a higher degree depict death as male, whereas a French painter would depict death as female, due to their respective language’s rules of grammatical gender.

Then in another study, repeating the same methodology of the one of Sera, Berge, and Pintado, but investigating two segments of English and Polish speakers (Haertlé 2017), they came to a slightly different conclusion. The experiment had also consisted of showing images to participants and asking for voice assignation; however, whereas they did indeed find results that

indicated effects of linguistic relativity, they did not find any pointing to a universal gender conceptualisation, stating that “the second hypothesis, concerning supralanguage semantic rules influencing the perception of gender of objects ... was not confirmed in either of our experiments” (Haertlé 2017, 400).

These are only a few of the many studies on the Sapir-Whorf theory, illuminating the various methods of conducting research. Having assembled the relevant and crucial methodology and theory regarding linguistic relativity, we may now proceed to the experiment that has been elaborated for this study between an English-speaking and a Spanish-speaking segment.

2.2 Experiment and procedure

Research for the experiment was conducted by means of two surveys through the service of Google Forms. One was constructed in English and one in Spanish, each meant for their respective exclusive segment. Links to participate in the surveys were then shared in several communities, both online, digitally and through contacts. There was no payment or other reward for completing the survey. Empirical data utilised for the analysis of this study was collected within the interval of December 2022. More specifically, for the Spanish segment, answers submitted between the 2nd and the 23rd of December were processed, amounting to a total of 22 days. For the English segment, answers submitted between the 4th and 27th of December were processed, amounting to a total of 24 days. The surveys and images throughout were identical in their form and presentation, with the only difference being the language. The translation between both languages aimed to be as direct as possible. The title of the survey which was visible to the participants read: “Choose voices for various characters,” following a brief description of the aims of the survey:

We would like to make an animated cartoon for children, where various animals, fruit and objects communicate with each other. The following images represent these characters that we will use in the animation. We ask you to indicate for each image whether you think the character should be played with a male or a female voice.

This description is of course a little lie. This was implemented as it strategically serves to withhold the participants of information that could possibly alter their perceptions and conceptualisations throughout the survey.

The participants were then asked to confirm being native speakers of the respective languages the surveys were presented in. This confirmation was followed with a question of whether they spoke any other languages. They were also asked their gender, with the options of

answering: “male,” “female,” “non-binary,” “other” and “prefer not to say.” The proceeding questions consisted of assigning male or female voices to 20 images that represented various objects, such as animals and natural and artificial products. In both surveys, some of the images were followed by an in-depth question of any reason for assigning a given voice. This was done for consideration of qualitative measure and processing during analysis. The final question in both surveys asked the participants if they found any of the images particularly difficult in the process of assigning a voice. The only questions that were required to answer and were not set as skippable, were those asking of gender and confirmation as a native speaker. Knowledge of which images had been skipped – if any – is accessible. Forcing participants into assigning a voice could produce random answers and allowing the participants to answer freely encourages them to follow their intuition regarding conceptualisation. Insight in statistics of skipping images might benefit in the comparative analysis of the two segments. Finally, two hypotheses were constructed for the experiment, with the expectations of certain indications of evidence:

1. For the Spanish-speaking segment, participants will tend to assign voices to objects in congruence with the grammatical gender of the noun of the object. Despite still being influenced by several cultural and individual factors, compared to the English-speaking segment, it will be clear that their conceptualisation will to a higher degree be influenced by language.
2. For the English-speaking segment, apart from various cultural and individual factors, participants may tend to assign male voices to artificial products and female voices to natural products, following the principle of a universal gender conceptualisation.

2.3 The participants

The experiment of the Spanish segment consists of 78 participants and the English segment of 23 participants. They were all confirmed to be native speakers; however, not exclusively monolinguals. The Spanish segment consists of 37% monolinguals and for the English segment it is 21%. Most of the Spanish segment knows other languages, some of which are English (66.6%), Danish (20%), other romance languages (33%), such as French, Portuguese, Italian and Catalán, and others. The English segment also has many bilinguals who know other languages, some of which are Danish (17%), romance languages such as Spanish, French, and Italian (43%), and other languages that include grammatical gender such as Serbian, Polish and Arabic (17%). It is important to keep in mind that a fraction of each segment knows another language that may contrast in the factor of

including grammatical gender or not, e.g., Spanish speakers knowing Danish or English, or English speakers knowing Spanish or Arabic. However, they are all native speakers and the survey that they participated in is presented in their native language. In respect to their gender, for the English segment 56.5% of them answered “male” with a remaining 43.5% answering “female.” For the Spanish segment 25.6% of them answered “male,” with 73.1% answering “female” and a remaining 1.3% answering “other.” Although one might suspect a given gender of a participant might affect their choices throughout the process, previous similar studies have not found this to be a crucial factor: “Because we found no effect of gender of subject in Experiment 1, we neither controlled nor looked for effects of gender of subject in this study” (Sera, Berge, and Pintado 1994).

2.4 Materials

20 images in total were chosen for this experiment, whereof 11 of them represented animals, 4 of them represented natural products and 5 of them represented artificial objects. The images used were simple and had a white background, to put the object in question in focus and to not disturb other conceptualisations.



Figure 1. Examples of images used in the experiment.

All images were captioned in their respective languages for each survey, e.g., “the book” and “el libro.” This was implemented as it helps to eliminate potential confusion surrounding conceptualisation of the image, as well as assuring that the respective languages were utilised in the process. The images were carefully picked with reason, with a clear intention of minimising potential semantic, cultural, and other factors in conceptualisation. Some objects that were deemed likeable to be categorised in a certain way due to cultural understandings related to it, therefore includes a matching pair, where its grammatical gender in Spanish vary. To fully explain this, let us look at some examples. The grammatical gender in Spanish of the given objects below will be

signified with a (m) or a (f). The image of the apple (f.) in the experiment is coloured red, which in some contexts and/or cultures can be perceived as a feminine colour. Therefore, a red bell pepper (m.) was also utilised. Note that the two objects are of different grammatical gender, yet visually appear complementary due to colouration and belonging to the category of natural products. Likewise, two birds were used: a seagull (f.) and a crow (m.). Two amphibians were used: a frog (f.) and a toad (m.). Moreover, some of the images were chosen as they represent objects with a grammatical gender that may contrast the potential semantic and cultural understandings of the object. Some examples are the bee (f.) and the ant (f.), both being grammatically feminine, yet may be perceived as male workers serving a queen in their hives. Likewise, the cat (m.) and the rabbit (m.) are both grammatically masculine yet may be perceived as feminine due to their cute qualities and connections to sex symbols in popular culture. The ship (m.) may in some cultures be referred to as female and are given feminine names, whereas the sword (f.) may be perceived as masculine due to its phallic connotations and heavily linked to warriors, a profession historically dominated by men. Being aware of these other factors that may alter conceptualisation is crucial for analysing the data. Implementing similar objects that contrast in grammatical gender and objects whose grammatical gender may contrast in semantic and cultural conceptualisation, is fundamental for comparing the results. Finally, it is essentially expected that semantic, cultural, and individual factors *will* also play a role in conceptualisation, as this is always the case with the weak version of linguistic relativity.

The empirical data and analysis

3.1 Results

The empirical data used for processing in analysis is presented below. Table 1 shows from left to right in each row: Object name, Spanish male voice percentage, Spanish female voice percentage, number of skips for the Spanish segment, English male voice percentage, English female voice percentage, number of skips for the English segment. The gender of the nouns in Spanish are underlined.

Object	Sp. M.V.	Sp. F.V.	Sp. Skips	En. M.V.	En. F. V.	En. Skips
Bee	23.1%	<u>76.9%</u>	0	56.5%	43.5%	0
Pig	<u>73.1%</u>	26.9%	0	43.5%	56.5%	0
Crow	<u>85.9%</u>	14.1%	0	87%	13%	0
Frog	46.2%	<u>53.8%</u>	0	65.2%	34.8%	0
Cat	<u>53.8%</u>	46.2%	0	21.7%	78.3%	0
Seagull	42.9%	<u>57.1%</u>	1	78.3%	21.7%	0
Ant	24.4%	<u>75.6%</u>	0	65.2%	34.8%	0
Bear	<u>84.6%</u>	15.4%	0	69.5%	30.4%	0
Rabbit	<u>57.7%</u>	42.3%	0	39.1%	60.9%	0
Toad	<u>89.7%</u>	10.3%	0	87%	13%	0
Tortoise	27.6%	<u>72.4%</u>	2	73.9%	26.1%	0
Bell pepper	<u>74.4%</u>	25.6%	0	63.6%	36.4%	1
Apple	15.4%	<u>84.6%</u>	0	17.4%	82.6%	0
Maize	<u>65.4%</u>	34.6%	0	68.2%	31.8%	1
Mushroom	<u>64.1%</u>	35.9%	0	54.5%	45.5%	1
Clock	<u>76.6%</u>	23.4%	1	73.9%	26.1%	0
Book	<u>62.8%</u>	37.2%	0	40.9%	59.1%	1
Guitar	40.3%	<u>59.7%</u>	0	56.5%	43.5%	0
Sword	39.5%	<u>60.5%</u>	2	78.3%	21.7%	0
Ship	<u>87%</u>	13%	1	52.2%	47.8%	0

Table 1. Results.

3.2 The Spanish segment

As expected, and as the first hypothesis stated, the Spanish-speaking segment produced results that contained congruence between voice assignment and grammatical gender of the objects in conceptualisation. As we see in the previous table, all the underlined numbers of percentages correspond with the hypothesis. This means that the Spanish speakers consistently assigned a male voice for the masculine nouns and a female voice for the feminine nouns more than 50% of the time for each respective case. Calculating the average by adding each percentage and then dividing by 20, the total number of objects, we get a percentage of 71% that represents the general tendency to assign a voice to an object in congruence with its grammatical gender. This means that 7 out of 10 times, Spanish speakers will tend to be influenced by grammatical gender in conceptualisation of objects. Moreover, the average percentage was calculated individually for each subsection of objects, resulting in a tendency of congruence for the animate objects (71%), natural products (72%), and artificial products (69%). A particularly beneficial method of visualising these numbers is through the following graph (Figure 2). It includes responses from the Spanish-speaking segment, sorted from left to right as the nouns that were mostly assigned a female voice to those that were the least; put in another way, the least perceived masculine nouns to the most. The bars have been coloured to represent the grammatical gender of the nouns, where the nuances of red represent feminine nouns and the blue represent masculine nouns. The darker colourations represent the percentage of masculine voice assignment.

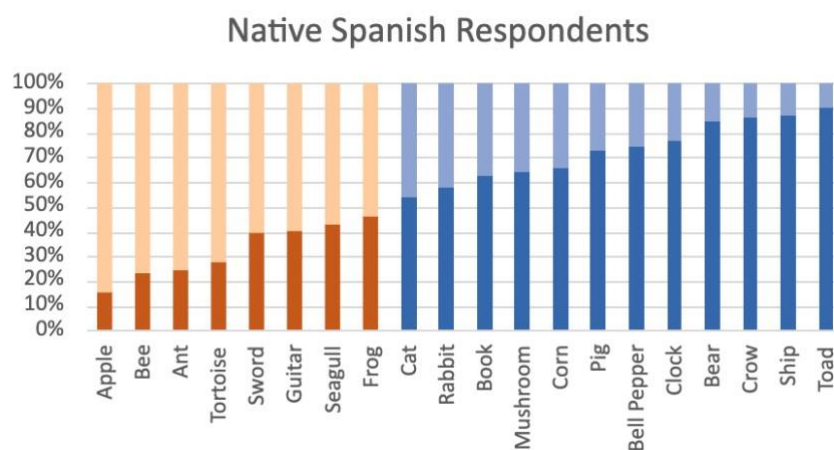


Figure 2. Spanish segment voice assignment sorted from most feminine to most masculine.

As Figure 2 shows, Spanish speakers have “successfully” conceptualised the objects, with all the feminine nouns placed as those who received the highest percentage of feminine voices. Notice that, just as hypothesised, nouns that contrast in grammatical gender, yet semantically are similar,

have been polarised. The seagull is the 7th most perceived feminine object, whereas the crow is in the 18th place. Likewise, the frog is the 8th most perceived feminine object, whereas the toad is in the 20th place. Finally, the apple and the bell pepper, both being red and natural products, have also been polarised, with the apple taking the 1st place in perception of being feminine, and the bell pepper ranking at 15th place. This indicates that a factor of linguistic relativity is taking place, and dominating over other factors, such as a potential universal gender conceptualisation or other cultural or individual factors. At the outermost sides of the table, we find nouns with high percentages of agreement, being collectively seen as either very female or very male. In the middle, however, we find what we may refer to as the ambiguous zone. This is where participants did not agree as much upon assigning voices. Here we find objects such as the cat and the rabbit, both being generally perceived as masculine in conceptualisation and being masculine nouns. As mentioned earlier, they represent masculine nouns that may be perceived as feminine, due to cultural associations of them being cute and small. Although they were indeed generally deemed to have male voices, they are the two objects within this category that got the lowest score, indicating that other cultural factors also play a role in conceptualisation. This means that grammatical gender always does not fully decide perception of objects, which is also expected, as this is what the weak version of linguistic relativity states. Likewise, we find the bee and the ant ranked at a 2nd and a 3rd place in perceived as feminine, although as hypothesised, they were expected to be perceived as male due to their nature of serving a queen in their hives. This also indicates a factor of language shaping thought (conceptualisation and perception) over other potential factors. Finally, regarding the second hypothesis, searching for tendencies of a universal gender conceptualisation, by calculating the averages we find a 45% female voice assignment for the natural products and a 61% male voice assignment for the artificial products. These numbers do not point to any overwhelming evidence for the second hypothesis.

3.3. The English segment

In this section we see the average percentage of assigning male voices (59.6%) and female voices (40.4%), which seem to be random. The English speakers on average assigned female voices to natural products 49% of the time; and they assigned male voices to artificial products 60% of the time. Again, there does not seem to be any indication of a hypothesised universal gender conceptualisation. It seems instead that diverse cultural and individual factors play a larger role in the absence of grammatical gender. Let us suppose a participant taking part in the experiment owns a female cat. Upon conceptualisation of the image of a cat in the experiment, they decide to give it a feminine voice. This is an example of an individual factor playing a role. This is likely to happen

in the Spanish-speaking segment, too. However, when the participants see an image such as the bell pepper, they lack any connections to gender in conceptualisation. This is where grammatical gender may overtake as a factor for the Spanish speakers, but not for the English speakers. This is where the follow-up questions throughout the survey may help. Answers for any reason of assigning a voice for the guitar, for instance, shows us individual factors playing a role in the English speakers: “It looks like a guitar my brother owned, so male voice seemed relevant” and “my dad owns a guitar that looks like that so i associate it with him.” Likewise, representations of objects in culture, art and mythology may also influence conceptualisation; as we see for the rabbit: “I chose male voice because of Peter Rabbit” and “I chose a male voice for the rabbit, because it reminded me of the Rabbit from Winnie the Pooh.” Regarding the skips, it seemed that English speakers had a more difficult time assigning voices with a total of 4 skips out of 23 participants, amounting to a 17%. In contrast, the Spanish-speaking segment contains 6 skips out of 78 participating, amounting to 7%. This could possibly be an indication of grammatical gender as an additional factor for conceptualisation helping in the assignment of voices.

3.4 Comparing the two segments

This section serves to illuminate the differences between the responses of the two segments. Figure 3, below, shows the objects being sorted by those with the highest percentages of female voice assignments to those with the least.

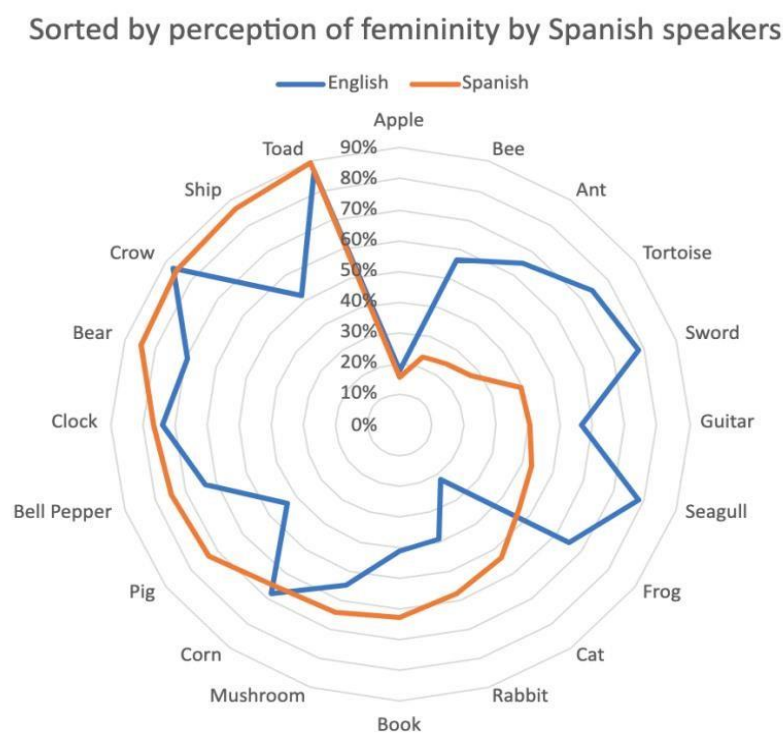


Figure 3. Comparison between both segments.

As the orange line, representing the Spanish speakers' answers, curves outwards in a spiral, indicating that each noun was perceived gradually less feminine, we see the blue line, representing the English speakers' answers, in disagreement with those of the Spanish speakers. This gives us a clear idea of when the two segments agree and when they do not. It also shows how English speakers tend to classify the objects in the middle, with the apple being the only true exception of being overwhelmingly feminine. When the two segments agree, for example with the apple, we may interpret this as being a product of cultural or other factors. In this case, English speakers explained their choices as being influenced by the "deep red" colouration and associations of "the Garden of Eden" mythology.

Spanish speakers explained how the apple reminded them of "elegance," "protection," "sweetness," and "the color." When the two segments disagree, we then see factors of language shaping thought come to play. Taking the case of the sword, we see English speakers explaining their choice, influenced by ideas of "cutting/violence/desire for strength" and "a device of violence and control, these are more male characteristics." In contrast, Spanish speakers explained connections to swords appearing female in mythological texts, and connotations of being "fine," "elegant," "delicate," and "a thin and sensitive object of care." We see these conceptualisations manifest in the two segments, especially with the objects in which they disagree. The sword in the English segment got a score of 21.7% female voices, whereas for the Spanish segment it got a score of 60.5%, despite its otherwise very masculine connotations. Both conceptualisations of the sword seem to make sense. The sword is both elegant and delicate, yet it is also violent and strong. Boroditsky also discusses this phenomenon, mentioning that it might stem from features of conscious language acquisition: "... 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" (Boroditsky, Schmidt, and Phillips 2003, 65). Arguably, any given object that is not naturally gendered may have both masculine and feminine attributes.

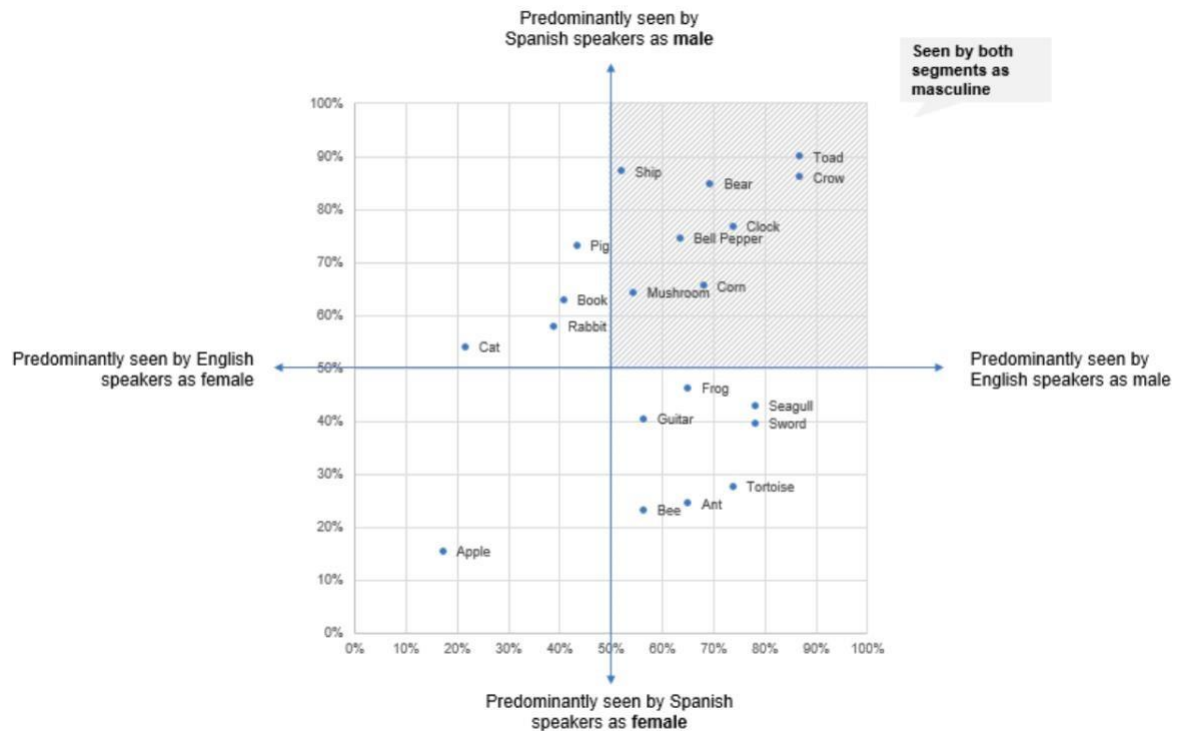


Figure 4. Responses from both segments illustrated on an x- and y- axis.

This final figure shows both segment's answers on two axes. The upper-left and lower-right categories contain the objects in which they disagree. Notice how the upper-left category includes exclusively masculine Spanish nouns and that the lower-right category includes exclusively feminine Spanish nouns. The nouns in the agreeing categories have served as control factors, and the nouns in the disagreeing categories have tested for the factors of linguistic relativity. Overall, acknowledging the presented statistics, various factors that indicate language shaping thought certainly seem to be apparent. The sheer differences in the produced results between the two segments point to influences that go beyond cultural and individual factors. By comparing these results, one might argue for the first hypothesis of this study and the weak version of the Sapir-Whorf theory, that language does in fact shape thought. At the same time, the second hypothesis and the notion of certain objects being perceived as masculine or feminine due to being either artificial or natural, has not been proven.

Discussion

4.1 Limitations

Now one of the major complications with studies like this is the lack of access to the processes of cognition of the participants. What they choose to answer for each question may not necessarily align with their conceptualisations, both conscious and subconscious. Though the captions being

present under the images helped to maintain the use of language throughout the experiment, these could unfortunately also serve as a guide for choosing voices when participants were unsure or encountered problems in decision making. This notion is also discussed in other similar studies: “Perhaps linguistic categories simply get recruited covertly for all these tasks ... This is an interesting possibility, and a difficult one to rule out empirically” (Boroditsky and Phillips 2003, 932). This would suggest that grammatical gender does not play a role in conceptualisation, but that it instead serves as a platform to rely on in quick decision making. Finally, as most of the participants for this study are not monolinguals, influences from secondary languages cannot be ruled out either.

4.2 General discussion and conclusion

Taking all these concepts into consideration, we are left with a sense of ambiguity surrounding the case of linguistic relativity. Although language and its grammatical features seem to have some impactful influences on thought, through semantic connotations in conceptualisation, several doubts remain regarding which degree language may influence thought. It certainly seems likely that the many components of language, culture, and thought may affect each other. Regarding the study about connections between grammatical gender and personification of gender in art (Segel and Boroditsky 2011), an interesting chicken-and-egg problem emerges. As we saw in this study, a Spanish speaking participant had conceptualised the sword as female, due to examples of female swords appearing in mythological texts, such as Colada and Tizona, which appear in the epic poem from the 12th century by an unknown author, *Cantar de mio Cid* (Rose and Bacon 1919). So, one might wonder, have even more antique stories and cultures described the sword as feminine, resulting in its grammatical gender being classified as feminine; or are the associations of the sword as being feminine in art and mythology a product of its already given grammatical gender? This notion of personification of gender of various objects, as they appear in cultural crafts and visualisations, seems to align with the idea that language may indeed shape thought – or at least conceptualisation, a certain type of thought. If so, is grammatical gender then a bad thing, considering it may filter and manipulate cognition? If the principle aim of language is clear communication, then one might suspect that grammatical gender forcing various semantic manifestations of objects that have no real gender, is in fact troublesome. Especially if masculine keys are seen as strong and useful, and feminine keys are intricate and tiny (Boroditsky, Schmidt, and Phillips 2003). On the other hand, grammatical gender may be seen solely as a metaphorical bridge for already existing ideas and connotations of gender to cross. Whether these characteristics then are deemed harmful or positive is a question of context, subjectivity, and other measurements outside the power of the grammatical gender. In a time where gender has taken such a controversial

role in debates, politics, and society, it is interesting to learn of the many recent studies and the ways in which grammatical gender may affect language – and ultimately culture. Further insight in the feature of grammatical gender, its origins, its hidden functions, and its influences on cognition are dependent on future research on the topic. What this study has shown is that grammatical gender may not always influence thought, yet it may serve as a covert connector between certain connotations and conceptualisation.

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