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# The Influence of Grammatical Gender on Perception of Gender

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**Abstract**

A grammatical gender language is one that assigns a gender category, mainly in the forms of feminine or masculine, to a word. These can appear as suffixes (the masculine *heureux* versus the feminine *heureuse*) or definite articles (*le* or *la*). This paper explains linguistic relativity and how the theory builds ground for evidence that grammatical gender actively influences perception of gender, introduces multilingualism as a factor in play in discussions of the impact of grammatical gender on cognition, discusses the real-world applications of grammatical gender, and incorporates the recent findings on Artificial Intelligence and algorithmic gender bias due to language-learning intelligence systems imitating human use of language, examining and cross-referencing a multitude of studies conducted over the years to offer a fully rounded review and analysis of the literature.

**Keywords:** Linguistics, Grammatical Gender, Cognition, Gender

## Introduction

Grammatical gender is a classification system that uses gender to categorize words. Even though a word's grammatical gender assignment can correspond with the word's natural gender, such as the Italian masculine word *gatto* referring to a male cat, words' gender assignment is generally semantically arbitrary with there being no significant pattern or correlation between the word's natural gender and its gender assignment. It is argued among linguists whether grammatical gender affects cognition, such as altering perception of gender, and studies have been conducted in order to observe any evidence proving that knowledge of a grammatical gender language, in fact, influences cognitive processes regarding gender.

It is now assumed by many linguists that the use of grammatical gender perpetuates our thought patterns and affects our perception of gender. The alterations of our perception due to specific linguistic patterns have the risk of influencing our daily judgments and lead to gender biases due to imbalanced use of language stemming from grammatical gender systems. While we can observe the impact of grammatical gender in the real world, the effects of grammatical gender on cognition are seen to be altered in various ways when combined with other languages, suggesting that multilinguals are not influenced in the same way as monolinguals by grammatical gender. Even though this phenomenon raises questions regarding possible 'solutions', recently, it was observed that the impacts of gendered language systems were not only limited on cognition but machine learning as well. Gathering that Artificial Intelligence imitates humans to learn language, there is a new concern regarding algorithmic biases stemming from imbalanced use of language through grammatical gender.

**Linguistic Relativity**

Linguistic relativity was proposed by Edward Sapir in the 1920s, suggesting that language influences one's thoughts and can affect the way one perceives the world. Later, in the 1950s, his pupil Benjamin Lee Whorf proclaimed linguistic determinism under the notion that language shapes thought categories, causing people who speak different languages to also think differently. Linguistic determinism assumes language can alter existing perceptual and conceptual abilities and asserts there are certain ideas only people who have terms to describe them in their language can apprehend (Wolff & Holmes, 2010).

Sapir's theory of linguistic relativity is more commonly accepted in modern linguistics and cognitive science because of its less reductionist nature compared to linguistic determinism. However, linguistic relativity is still frequently opposed given its disregard or reduction of the role cultural variables play in one's thought patterns. Another inadequacy of linguistic relativity stems from the fact that no two languages express a certain instruction in exactly the same way. Boroditsky (2001) explains, in a hypothetical experiment where the question posed to participants is "Which one is the same?", one might perceive the meaning of the word 'same' to be closer to 'identical' while another as 'relationally similar'. This might lead to varying behavior across languages but due to the difference in understanding of instructions and not in thought.

Although faults exist in Sapir's theory, it is still considered moderately valid, and examples of it can be observed in Boroditsky's 2001 study evaluating Mandarin and English speakers' concept of time. Boroditsky (2001) concluded that language seems to influence thoughts concerning abstract concepts such as time more than it does ones that rely on sensory input such as color. The author found that native Mandarin speakers understand time in a, "'Mandarin' way of thinking," which is later explained to be "vertically", no matter which language they were speaking in (Boroditsky, 2001, pg. 18). Mandarin speakers expressed time via vertical terms meaning they fashion a "vertical timeline" when it comes to thought processes regarding "purely temporal relations" whereas English speakers use "horizontal spatial terms" since those dominate "English temporal descriptions" (Boroditsky, 2001, pg. 19).

In addition, Sato and Athanasopoulos (2018) explain that since the human mind is considered to be highly interactive, language might be accepted as a factor that actively modifies the "encoding of concepts and categories" (Sato & Athanasopoulos, 2018, pg. 221). While due to criticisms, such as the lack of consideration for cultural influences, it would be productive to approach Sapir's theory critically at times, it is important to recognize that language has a part in shaping thought to a degree. Acknowledging the significance of linguistic relativity is essential in discussions regarding the possible effects of grammatical language on perception of gender, since both claim that language impacts cognition.

**Grammatical Gender**

In grammatical gender languages, determiners (for example, *le* for masculine and *la* for feminine in French) are marked with gender to identify the word it is attached to. Bobb and Mani (2013) remark that children as little as 25 months old are able to incorporate determiners in their use of language. This showcases that the mental coding and consideration of words and concepts with systems of gender are established early on in childhood. Belacchi and Cubelli (2011) explain that Italian children of age 4+ exhibit a skillful understanding and use of grammatical gender without having obtained any formal

education about grammar. Observing that both adults and preschool children were categorizing animals as female/male in accordance with their grammatical gender, the authors concluded that a "gender effect" was present not only in adults but also in children due to "implicit knowledge deriving from language use". (Belacchi & Cubelli, 2011, pg. 298)

Tight (2006) investigated the extent to which prior gender connotation influences Spanish grammatical gender assignment in English-Spanish bilinguals. The participants 'correctly' assigned all words with masculine connotation to masculine grammatical gender as well as ones with feminine connotation to feminine grammatical gender, with one exception for the word *amor*. The highest accuracy (95.24%) in grammatical gender assignment was for the word *rugby* (rugby), a term both perceptually and grammatically masculine. In contrast, the correct choice of the definite article was made only 16.9% of the time for the word *cárcel* (jail), a word with a masculine connotation but grammatically feminine.

Gender assignment is mostly dependent on the morphological or phonological qualities of the word, such as most nouns ending with *-a* being feminine in Italian (Bassetti & Nicoladis, 2015). Flaherty (2011) observed that native Spanish speakers of grammatical gender languages think of objects as masculine or feminine in accordance with the word's grammatical gender. The author suggests that "the strength of the influence of the gender marker" increases with age as "the conceptual strength of the gender tags increases" (Flaherty, 2011, pg. 19). This point supports the claim that cognition and language is interactive as one seems to affect the other.

**Real-World Applications of Grammatical Gender**

An example that illustrates how people utilize gendered language in their daily interactions is how consumers favor brands where the grammatical gender aligns with the gender connotation of the product. In their study with Spanish speakers, Yorkston and Mello (2005) altered fictitious brand names to either make them masculine with the suffix *-o* or feminine with *-a*. The authors observed that participants reported preferring *Aizo* for a beer and *Aiza* for a fruit cocktail. A wider and global example, perhaps one that is bolder and more generous in supposition, is that countries with grammatical gender languages tend to perform notably worse on the Global Gender Gap Index compared to countries using gender-neutral or natural gender languages (Prewitt-Freilino et al., 2011). It is important to recognize these situations as it shows that the effects of grammatical gender are not merely limited to linguistic studies or our minds but also play out into the world and actively alter the physical realm. This might imply impending biases concerning daily occurrences where the existence and knowledge of grammatical gender create prejudices.

**Use of Grammatical Gender Across Multilinguals**

The acquisition and use of grammatical gender across languages for multilinguals are not consistent. Sabourin (2001) summarizes findings regarding the frequent mistakes made in the L2 (second language) production of gender as being overgeneralizing of one gender marker and that it can only decrease if the actual use of the L2 increases. There is a possible "production lag behind comprehension" such as in the case of children learning their L1 (first language) where they can comprehend but can't yet produce certain linguistic concepts (Sabourin, 2001, pg. 160). Regarding the possibility of an advantage arising from having a grammatical gender L1 when learning a grammatical gender L2, White et al. (2000) reported not observing a difference in grammatical gender assignment accuracy between English and French native

speakers learning Spanish at the same proficiency level. However, Sabourin (2001) found that German native speakers performed better than English native speakers in assigning the accurate grammatical gender in Dutch. The author suggests that having a grammatical gender L1 is important for the ability to acquire grammatical gender in L2, adding that the similarity of the gender systems is also important since Dutch has historically been a three-gender language system such as German. However, the reason behind German native speakers' high-accuracy performance might also be due to the language's extreme linguistic similarity to Dutch as both West Germanic languages.

**Grammatical Gender and Bilingualism**

Sapir and Whorf claimed that learning more languages could reduce one's worldly prejudices that stem especially from L1. Bassetti and Nicoladis (2015) suggest that a native Italian, when learning German, will see that "butterfly" is masculine in German while feminine in Italian, and therefore will start to question "their perceived femininity of butterflies." Having to apply such linguistic grammar switches will then affect the speaker cognitively and this inconsistency will "affect habitual thought" (Bassetti & Nicoladis, 2015).

It is hypothesized that bilingualism may diminish the impact of grammatical gender on cognitive processes, though it also depends on the combination of the involved languages. "Positive effects" are seen if both languages have grammatical gender since L1's gender assignment weakens on words with opposite gender assignment across languages, no effects are seen if L2 has no grammatical gender and the speaker continues showing effects of L1's gender assignment, and some effects might be seen if only L2 has grammatical gender (Bassetti & Nicoladis, 2015, pg. 7). When explaining the reasoning behind why native Hungarian speakers learned Spanish grammatical gender easier than native English speakers, Kurinski et al. (2015) explained that English speakers were having to "unlearn" the implications about biological gender and gender differentiation. Since Hungarian uses the subject pronoun *o* instead of he/she in English, its speakers had no need to cognitively overwrite any prior linguistic associations when learning Spanish grammatical gender. The authors concluded that learning grammatical gender as a new concept compared to "restructuring already existing representations" was an easier task (Kurinski et al., 2015, pg. 15). Additionally, as reasoned above, Hungarian speakers with a non-grammatical gender L1 were starting to develop cognitive categorizations related to gender while they learned Spanish as L2, as was observed in their tendency to assign feminine/masculine voices to inanimate objects in accordance with the objects' grammatical gender. Similarly, Kurinksi and Sera (2011) observed that native English speakers were affected by the grammatical gender of their Spanish L2. Bassetti and Nicoladis (2015) suggest that a grammatical gender L2 might alter cognition or that "recent exposure to a gender system attracts attention," as well as that native speakers of a grammatical gender language who learn an L2 at high proficiency are less affected by L1 gender assignment compared to those at lower proficiency levels. Likewise, native speakers of a grammatical gender language who learn another grammatical gender language display the effects of the language they are more fluent in when assigning gender.

In addition, in a 2007 study by Bassetti, Italian grammatical gender was seen to affect only Italian monolingual children and not Italian-German bilingual children, showing that effects of language on cognition, specifically grammatical gender, are not permanent and can be overwritten by acquiring other languages. As the speaker is exposed to multiple uses of differing grammatical gender, there will originate

inconsistencies that prevent the pre-existing ideas about gender stemming from grammatical gender from lasting. Bassetti (2011) hypothesizes that the effects of L1 gender assignment are reduced in bilinguals because they recognize gender assignments lack semantic meaning, or because they have thought patterns different to monolinguals arising from referring to the same objects with opposite genders across languages.

One primary source of incoherence across studies in language is differences in culture. Attributions for either gender such as the classification of stereotypical nouns, understanding of gender, and the use of gendered terms are a few examples regarding areas where culture can impact on perception of gender. Beller et al. (2015) attest to a significant impact of culture in Norwegian when attributing gender and stereotypes to words as findings showed incongruencies between participant answers and grammatical gender, and that it can even possibly "override the linguistic effect" (Beller et al., 2015, pg. 18).

Results concerning grammatical gender effects in bilinguals are dependent on many factors including age, time of exposure to languages, proficiency, languages included, and more. However, it is important to acknowledge the evidence proving that the impact of grammatical gender on cognition can fluctuate by learning other languages. Moving forward with discussions regarding the effect of grammatical gender on the perception of gender, the studies above reveal the influence language has on cognition and their interconnectedness.

**Grammatical Gender and Perception Of Gender**

Gygax et al. (2019) write that the way we perceive gender is dependent on how we communicate gender. Language acts as a building block for our opinions and beliefs, thus, an imbalance in our depictions of gender through language, specifically grammatical gender, will lead to biased perceptions. An example of such an imbalance in the expression of genders in language is how the masculine French word *couturier* translates to fashion designer but once it's transformed into the feminine form, *couturière*, it translates into seamstress (Savoldi et al., 2021). This concept can be explained as 'semantic derogation' where the connotation changes for women and men even if it's the same phrase.

Societal gender roles and language use can also mutually affect each other. Mullen (1990) observed that native English-speaking children tended to assign feminine grammatical gender to natural objects and masculine to artifacts. Similarly, Sera et al. (1994) concluded that Spanish speakers assigned femininity to natural objects more frequently than artifacts even when their grammatical gender was masculine. This is suggested to be rooted in the gender roles men and women assume in society, where women are perceived as the ones who "give life and nourish" and consequently, fruit, plants, and animals are associated with femininity (Haertlé, 2017, pg. 387). 2011 study by Kurinski and Sera with English-Spanish bilinguals and 2015 study by Kurinski et al. with Hungarian-Spanish bilinguals were also in accordance with the previous studies. Contrarily, a 2017 study by Haertlé with Polish and French found no significant evidence showing that femininity was assigned more frequently to natural objects than to artifacts. However, Haertlé notes that the nouns chosen had different grammatical genders across Polish and French which could have hindered the hypothesis. Correspondingly, Sera et al. (1994) observed that German speakers described "key" (masculine in German) with adjectives such as "hard, heavy, metallic or useful," while Spanish speakers described it (feminine in Spanish) as "golden, small, shiny or pretty."

Sato and Athanasopoulos (2018) conducted a two-part experiment, where they showed English monolinguals and French-English bilinguals objects highly associated with conceptual gender. After the object 'priming', participants were asked to make judgments about subsequent genderless facial images. The purpose of the first experiment was to link "conceptual gender association" of objects to human gender assignment and it "reliably predicted the native English speakers's categorical judgements" (Sato & Athanasopoulos, 2018, pg. 227). However, bilinguals were not motivated by conceptual genders but by grammatical gender, meaning grammatical gender "overrides conceptual gender information whilst implicitly attending to sex-related information" (Sato & Athanasopoulos, 2018, pg. 227).

The second experiment aimed to examine whether grammatical information is retrieved unconsciously and whether it "permeates to perceptual processes irrespective of the preceding object primes" in bilinguals (Sato & Athanasopoulos, 2018, pg. 222). This would inform the degree to which grammatical gender affects one's perceptual judgments as well as the influence it has compared to knowledge concerning conceptual gender. The second experiment asked the participants to assign traits to the genderless face, evaluating if it appears more feminine or masculine after being "exposed to object gender information" regarding preceding filler items (Sato & Athanasopoulos, 2018, pg. 222). The authors found that while English speakers made use of the conceptual gender of the preceding object, French-English bilinguals were still influenced by the grammatical gender of the objects, "which successively biased their judgments regarding sex-related information" (Sato & Athanasopoulos, 2018, pg. 221).

While investigating the correlation between grammatical gender in German and Greek and cognition, Pavlidou and Alvanoudi (2019) concluded that the relationship between grammatical gender and assigned gender was "strongest for humans, less strong for animals and even less for inanimate objects" (Pavlidou & Alvanoudi, 2019, pg. 324) Such was supported by Bassetti (2013) when it was revealed that gender assignment was more "semantically motivated" for "personified entities" and animals whereas for artifacts, it was mostly arbitrary (Bassetti, 2013, pg. 16). This suggests grammatical gender is more effective on thought patterns when humans and humanized objects are concerned, implying possible biases when it comes to the real-world impacts of regular use of grammatical gender. As an example, Mecit et al. (2021) observed that when marked with feminine grammatical gender in French and Spanish, participants found COVID-19 to be less dangerous. A more psychological hypothesis is that similarly to how pronoun-drop languages are "less individualistic" than those not, native speakers of grammatical gender languages may become aware of their own gender identity earlier than those who are not (Flaherty, 2001).

**Linguistic Injustice in Artificial Intelligence**

Artificial Intelligence (AI) is the main topic of interest of the 21st century, exhibiting a fast-paced constant advancement. However, since AI imitates linguistic patterns displayed by people, it is highly under the influence of our use of language. While it learns to communicate, it also acquires the stereotypical and biased fragments of our speech. Çalışkan et al. (2017) explain that AI is at risk of obtaining the "historic cultural associations" attached to language (Çalışkan et al., 2017, pg. 185). The issue becomes more troubling when considering the amount of agency given to AI in modern society, such as screening resumes and recruitment, and brings questions of biased consequences. Xiaomeng et al. (2022) give the example of Amazon whose AI hiring system was noticed to be prejudiced against female applicants,

especially in technological positions. It is suspected that this is because the majority of the pre-recorded data of hired software developers were of males.

Another example of an imbalanced portrayal of gender in language leading to algorithmic injustice was Google Translate (Çalışkan et al., 2017). Up until recently, Google Translate was observed to exhibit stereotypical language. For example, the phrase "O bir doktor," ("S/he is a doctor") in Turkish, a gender-neutral language that does not have gendered pronouns, was translated to English as "He is a doctor"; however, "O bir hemşire," ("S/he is a nurse") was translated as "She is a nurse" (Çalışkan et al., 2017). Wellner (2020) writes that the English phrase "I am a teacher," is still translated to only cater to the masculine form of "I" (אֲנִי) and not provide an alternative incorporating the feminine "I" ( אָנֹכִי) even though a vast majority of the teachers in Israel are female. Google Translate started displaying both the feminine and masculine versions when translating from a gender-neutral language in 2018 but loopholes continue to exist, demonstrating biased uses of language (Castaneda, 2022). Wellner also explains that the algorithm for the messaging platform WhatsApp can sometimes autocorrect messages from the feminine form to the masculine form, assuming the latter to be the default.

At the height of AI, the way humans make use of language is critical in order to not open up to algorithmic bias due to linguistic injustice that might stem from grammatical gender. Considering that AI is increasingly being given more responsibility in societal matters, it should be our duty to be more conscious about using language systems fairly for all genders so that gender inequality doesn't become a growing issue supported by digital intelligence systems. Thus, it is vital that we consider the large-scale impacts of our language use, especially in such an influential and interconnected decade.

**Conclusion**

Linguistic relativity and grammatical gender are topics concerning linguists for many years now, and more recently people have begun to focus on how these two matters might merge to create an impact on our perception of gender. In fact, there is myriad research done that provides evidence in favor of the supposition that grammatical gender does have an effect on the perception of gender. Thus, it can be concluded that linguistic relativity is correct to a degree such that linguistic concepts can have influences on cognition and perception. While it is dependent on other factors such as culture (Beller et al., 2015), the active influence of grammatical gender on the perception of gender is widely supported by various studies to suggest that it can lead to real-life consequences (Yorkston & Mello, 2005).

When altering cognition and perception, grammatical gender languages can reinforce stereotypes and biases (Sera et al., 1994) (Haertlé, 2017), hinder gender equality (Prewitt-Freilino et al., 2011), and affect judgments made about worldly occurrences and even sense of self (Flaherty, 2001). Grammatical gender internalization can be powerful enough that it can override conceptual gender information at times, displaying its significant role in cognition (Sato & Athanasopoulos, 2018). Grammatical gender not only greatly affects humans but also Artificial Intelligence through machine language learning that imitates human speech (Çalışkan et al., 2017) (Xiaomeng et al., 2022) (Wellner, 2020). Therefore, it is even more crucial to observe and possibly alter our speech patterns to fashion a more equitable use of language so that there are no risks of algorithmic bias that expand the real-life injustices created by grammatical gender. The effects of grammatical gender are observed to change in a multitude of ways when combined

with another language, bringing questions about whether multilingualism is the 'solution' to diminish the impact of language on our biased perceptions and beliefs on gender, if there is one at all (Bassetti & Nicoladis, 2015).

Language is seen to perpetuate cultural gender norms and expectations, making it harder to challenge deeply ingrained gender roles when they are so routinely established in the domain of language we use daily. Recognizing and studying the implications of grammatical gender and its impact on the perception of gender is essential in promoting more equitable societies through the promotion of more balanced uses of language that do not have any prejudiced implications or connotations, discussing possible solutions to diminish biases that stem from grammatical gender use, and understanding the cognitive, sociological, and psychological effects of grammatical gender.

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