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Gender congruency effect across the animacy hierarchy and its neural correlates

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INDEX

ABSTRACT

The aim of this study was to examine the semantic load of grammatical gender and its relation with noun animacy, along with its neural correlates. In order to do this, a gender congruency effect was evaluated in a task in which participants were presented with pairs of primes-targets. A Spanish target pronoun (“esta” or “este”) was preceded by a gender congruent (*esta*$_F$ *mesa*$_F$) or incongruent noun (*este mesa*$_F$). Nouns belonged to one of the three different types of stimuli of the animacy hierarchy: animate nouns with biological gender (*actriz - actress*), animate nouns with grammatical gender (*jirafa - giraffe*), and inanimate nouns with grammatical gender (*puerta - door*). Participants were asked to determine the gender of the target personal pronoun (masculine/feminine). Results of the study revealed higher reaction times to target pronouns when preceded by gender incongruent than congruent primes. The effect was greater for nouns of biological gender in comparison to the other two categories. In addition, more positive wave lengths were observed in the incongruent primes in the occipito-parietal area. These results support the idea that the semantic load of gender is greater for nouns with biological gender than nouns with grammatical gender regardless of animacy.

INTRODUCTION

Gender can be defined as an arbitrary and abstract property of nouns present in languages on a lexical and syntactic level (Schriefers & Jescheniak, 1999). This property is the one that allows us to classify nouns according to a number of categories. These are reflected in agreement with other parts of the speech such as adjectives, determiners and other lexical categories. There is a dichotomy between gender characteristics: natural gender, which usually refers to biological sex, and grammatical gender, that refers to gender that is assigned arbitrarily and is common in inanimate objects (Kramer, 2014). There are differences in the classifications of gender among languages (Gygax,2019). Certain grammatical gender languages, such as Spanish and Italian, classify both personal pronouns and nouns according to their gender. Therefore, in Spanish and Italian, nouns contain both grammatical and natural gender. For example, regarding grammatical gender, in Spanish *la silla* (the chair) is classified as a feminine noun, and *el edificio* (the building) is a masculine noun. On the other hand, in Italian il *tavolo* (table) is masculine and *la stanza* (the room) is feminine. Secondly, *la maestra* (the teacher) and *el ingeniero* (the engineer) are feminine and masculine Spanish natural gender nouns, respectively. Other examples are, *la ragazza* (the girl) and *il prete* (the priest) in Italian. Nevertheless, in natural gender languages, such as English, nouns are not classified according to grammatical gender, however personal pronouns do differ in its male and female form (Gygax, 2019). For example, the noun *backpack* does not have gender, however *he* and *she* refer to the masculine and feminine pronouns.

Although natural gender is directly related to meaning, opinions differ on whether grammatical gender carries meaning (Konishi, 1993). Certainly, semantic processing may be affected by the lexical and grammatical properties of each language, and it is said that grammatical gender may be one of those properties having a role at the level of semantic encoding. Nonetheless this relationship is complex. Caramazza (1997) describes gender as merely a syntactic feature of language, as it is not deducible from the noun's meaning. On the other hand, Cubelli et al., (2011) mentions that grammatical gender has a semantic effect on the categorization of the noun. The idea of gender being an intrinsic lexical property and not only a syntactic feature is also supported by Paolieri et al. (2011).

Since grammatical and natural gender share the same values (feminine and masculine), the effects of this property on semantics may appear due to language-learning mechanisms based on similarity (Vigliocco et al., 2004). In this way, grammatical information may influence categorical judgments and even play a role on language processing by facilitating sex related information (Satos & Athanasopoulos, 2018). Indeed, research has found that there may be a relationship between the morphosyntactic feature of grammatical gender and the perceptions of the noun as masculine or feminine in different languages and how different languages assign different genders to the same noun; it was also reported that this occurs in languages of different families (Basetti & Nicoladis, 2016). For instance, a study on the French and Polish speaking population demonstrated that masculine and feminine characteristics are assigned to objects according to their grammatical gender (Haertlé, 2017). Similar results were supported by Samuel et al. (2019) review's that suggest that grammatical gender has an effect on conceptualization and that this is influenced by the task and its context. For example, tasks with a higher gender content have a relatively greater chance of being influenced by gender than those with low gender content. Analogously, processing animate targets rather than inanimate targets provides a facilitation effect on language.

Indeed, grammatical gender, although abstract, seems to have an effect on semantic categorization. However, other studies found grammatical gender effects on general language-learning mechanisms based on similarity to be limited to a semantic field, (i.e., animals), which are either nouns with a grammatical gender or nouns whose gender value depends on the referent, but this effect does not appear on nouns that have no distinctions in grammatical gender and are not animals, such as tools (Vigliocco et al., 2004). Also mentioned in Samuel et al. (2019), the cognitive processing of animate nouns is more likely to be influenced by grammatical gender than that of inanimate nouns. This is not surprising, previously stated by Dahl (2000) nouns that are higher in the animacy hierarchy (where humans are on the higher end, objects on the lower end and animals somewhere in the middle of it) are more prone to have a greater semantic load.

A study by Paolieri et al. (2020) evaluated the advantage in processing congruent vs. incongruent nouns in grammatical gender through a bare noun translation recognition task while evaluating electroencephalographical data in Spanish - Catalan bilinguals. Gender congruent pairs (*estiu/verano* –summer, which in both languages is masculine) responses were faster and more accurate than those that were gender incongruent (*tardor/otoño* - autumn, which is feminine in Catalan and masculine in Spanish). This result supports the hypothesis that grammatical gender is connected with semantic information by showing a faster lexical access when gender congruency is present. This occurs because grammatical gender serves as an inherent property of nouns during lexical access, as proposed by Cubelli et al. (2005). These results were matched with the ERP data that showed that the N400 component, that normally emerges at the appearance of semantically incongruent stimuli (Kutas & Hillyard, 1980), was larger in the incongruent pairs, supporting the previously stated hypothesis that gender carries semantic information and that gender congruent noun are easily integrated during processing.

In addition, a study by Siyanova-Chanturia et al. (2012) evaluated the semantic load of grammatical gender by classifying pronouns as femenine or masculine when primed by definitional or stereotypical antecedents. This study observed a P300 effect. The P300 effect has been associated with stimulus categorization and evaluation (Kutas & Hillyard, 1980).

In our case, to study how related semantics and gender are in representational and processing terms, we selected stimuli across the animacy hierarchy, making three different groups: nouns with biological gender (*actriz$_F$ - actress, marinero$_M$ - marine*), and nouns with grammatical gender that could be either animals (*tortuga$_F$ - turtle, cocodrilo$_M$ - crocodrile)* or inanimate objects *(escuela$_F$ - school, monumento$_M$ - monument)*. Animals are considered epicenes, which are nouns that have the same referent for feminine and masculine. The congruency effect was studied in a task based on a previous study by Pesciarelli et al. (2019) where the gender congruency effect is studied through the agreement between a target pronoun and a noun previously presented as prime. In that task, similarly to Paolieri et al.

(2020) study a larger N400 was found associated with the gender incongruent condition. A P300 effect was also observed associated with the incongruency conditions.

We hypothesize the prime-target gender incongruent pairs (*granja*$_F$ *este*$_M$ *- farm*) to have slower reaction times and N400 and P300 of greater amplitude with respect to the gender congruent (*granja*$_F$ *esta*$_F$ *- farm*) condition, with greater effects for biological gender stimuli with respect to animate nouns and inanimate nouns with grammatical gender. Also, animate nouns should show greater effects than inanimate nouns following what stated on the animay hierarchy.

METHOD:

PARTICIPANTS:

Thirty students at the University Granada (25 women; 5 men; age range: 18–28 yrs, M = 20.56 yrs ± 2.5) participated in the experiment for either course credit or monetary reward. All participants were native Spanish-language monolingual speakers. Participants did not present any history of neurological or mental disorders. Also, they had normal or corrected to normal vision. Participants signed an informed consent form and a Spanish translation from the Language Experience and Proficiency Questionnaire (LEAP-Q) by Marian et al (2007). This questionnaire was used in order to get to know the participant's linguistic background. For the behavioral analysis the thirty participants were considered, however for the electrophysiological analysis only 14 were taken into account due to time limitations. The results of this study are only considerate preliminary. The present study was approved by the Ethic Research Commission of the University of Granada No. 2702/CEIH/2022. This research is part of the project "The impact of grammatical gender on processing: a psycholinguistic and social prospective" (PI Daniela Paolieri).

MATERIALS:

We selected 180 Spanish nouns as primes (for the complete list of stimuli, see the Appendix). We divided them into three groups of 60, each with 30 feminine and 30 masculine nouns: inanimate nouns (e.g., *granja*$_F$*- farm, museo*$_M$*-museum),* animate nouns (e.g., *hormiga*$_F$*- ant, búho*$_M$*-owl*), and natural gender nouns (e.g., *prima*$_F$*- cousin, médico*$_M$*-doctor*). The three types of stimuli (biological gender male or female; animate nouns male or female; inanimate nouns male or female) were also balanced for frequency and length by using the database EsPal (calculated through T tests, p > .1; Duchon et al., 2013). See Table 1 for the analyzed variables.

Primes were followed by a masculine or feminine third-person singular pronoun (*este*$_M$*, he; esta*$_F$*, she*). Four counterbalanced blocks were created so all the primes could appear in the task under both pronouns, the congruent (*museo*$_M$ – *este*$_M$; *tortuga*$_F$-*esta*$_F$) and incongruent (*museo*$_M$-*esta*$_F$; *tortuga*$_F$-*este*$_M$) condition depending on their gender category. Six lists were created so the order of the blocks containing the primes could be counterbalanced across participants. Besides, list order was counterbalanced across participants. Each participant completed 720 trials. Before the experimental session, participants participated in a training session with 20 prime-target pairs that contained different stimuli than the one in the experimental session. In the training session half of the stimuli presented were gender congruent and half were gender incongruent.

Table 1
Mean values of analyzed variables and standard deviations

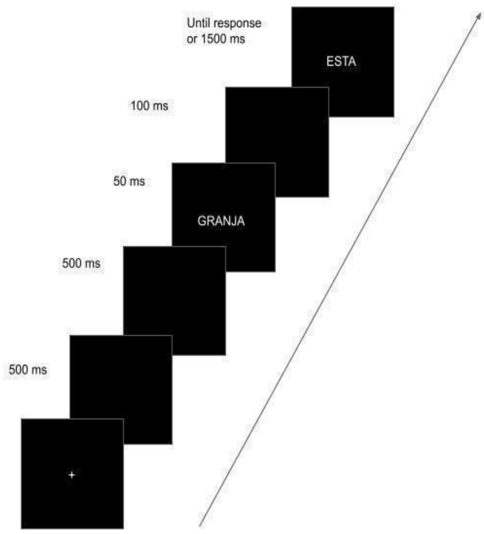
Variable	Grammatical Gender Inanimate	Grammatical Gender Animate	Biological Gender
Freq log (SPA)	2.66 (0.66)	1.90 (0.55)	2.44 (0.87)
Length (SPA)	7.03 (1.58)	6.96 (1.81)	7.53 (1.81)

DESIGN AND PROCEDURE

The procedure and design of this study was based on the one of Pesciarelli et al. (2019). Before starting the experimental session, participants answered two questionnaires. The first one, a screening questionnaire, was meant to evaluate if participants had any previous medical condition that could influence the electrophysiological outcome of the study. The second questionnaire was the previously mentioned LEAP-Q by Marian et al (2007), a language questionnaire whose purpose was to detect participants with a B2 level in other languages with gender in order to exclude them out of this study.

Participants took part in the experimental session in a sound-attenuated room. All stimuli were presented in the center of a monitor that was positioned at eye level in front of the participant. Stimuli were displayed in white uppercase letters using a Courier font and size 13 against a black background. E-Prime 2.0 software (Psychology Software Tools, Pittsburgh, PA) was used for stimulus presentation and behavioral response collection. Trials started with a fixation cross (+) that was followed by a black screen that lasted 1000 ms. After that a prime word (GRANJA) that lasted 50 ms appeared, it was then preceded by a black screen that lasted 100 ms. Later, it was followed by the target pronoun (ESTE$_M$ or ESTA$_F$) that appeared and remained for a maximum of 1500 ms or until response was made. Participants were asked to decide if the pronoun was masculine or feminine by pressing M key for masculine and F key for feminine. See Figure 1 for depiction of task procedure. Participants were asked to answer the task as quickly and accurately as possible.

Figure 1
Depiction of task procedure



EEG RECORDING AND ANALYSIS

EEG was amplified and recorded with the program Curry CX from 64 active electrodes placed on the scalp. Besides, four electrodes were placed around the eyes for eye-movement monitoring (one below, one over and one at the side of the right eye and one at the side of the left eye) and two electrodes were placed over the left and right mastoids. The impedances of the electrodes were maintained at <10 kΩ during recording. The EEG signal was amplified with a sampling rate of 512 Hz. EEG signals were re-referenced to the average of the signal. After a band-pass filter (0.01–80 Hz band pass), 1400- msec epochs containing the ERP elicited by the target pronoun were extracted, starting with 200 ms prior to the onset of the pronoun. ICA was used to correct data with excessive blinks. Artefacts were eliminated using ADJUST. Out of the 14 analyzed participants[1], none was eliminated for the analysis. The lost data due to artefacts was equal to 2,8% on average. A 200 ms pre-stimulus baseline was used in all analyses. The following components were identified for target onset at frontal (F3, Fz, F4), central (C3, Cz, C4), parietal (P3, Pz, P4) and parieto-occipital (PO5 , POz, PO6) scalp sites: N400 from 200 to 400 ms after target onset; P300 from 300 to 500 ms after target onset. For each ERP component amplitude was measured as mean activity.

[1] We analysed only 14 out of the 30 participants due to time restriction reasons.

STATISTICAL ANALYSIS

For the behavioral analysis the mean response times (RTs) of correct responses per condition were submitted to analyses of variance (ANOVAs) of repeated measures with Gender Congruency (Congruent; Incongruent), and Gender Category (BG - Biological Gender, GGA- Animate Nouns, GGI - Inanimate Nouns) as within-subject factors.

For the electrophysiological analysis, ERP effects were time-locked to the onset of the target. ANOVAs were performed on mean ERP amplitudes with Gender Congruency (Congruent; Incongruent), Gender Category (BG, GGA, GGI) and Region of Interest (frontal, central, parietal and parieto-occipital) as within- factors. Statistical analyses were carried out in the *200-400 ms and 300-500 ms* time windows, to check for the P300 and N400 components, respectively, as Pesciarelli et al. (2019) did.

RESULTS

BEHAVIORAL RESULTS

The ANOVA conducted on the RT data showed a Gender Congruency effect, $F(1, 29) = 60.9$, $p < .0001$, $\eta p\ 2 = .68$. The Gender Congruency effect showed faster RTs for pronouns preceded by congruent (545 ms) than incongruent primes (574 ms). On the other hand, Gender Category did not show a significant effect, $F(2, 58) = .43$, $p = .65$, $\eta p\ 2 = .015$. Importantly, the Gender Category x Gender Congruency interaction was significant, $F(2, 58) = 5.09$, $p < .011$, $\eta p\ 2 = .14$. Therefore, ANOVAs were made for each of the Gender Categories considering the factor Gender Congruency and obtaining the following data: BG, $F(1, 29) = 52$, $p < .001$, $\eta p\ 2 = .64$, GGA, $F(1, 29) = 35$, $p < .001$, $\eta p\ 2 = .54$ and GGI, $F(1, 29) = 41$, $p < .001$, $\eta p\ 2 = .58$. See Table 2 for descriptive statistics.

Table 2
Descriptive Statistics

Gender_congruency	Gender_category	Mean	SD	N
Congruent	BG	542	67.197	30
	GGA	547	75.090	30
	GGI	546	69.392	30
Incongruent	BG	579	69.224	30
	GGA	572	64.878	30
	GGI	571	65.668	30

Note. Effect sizes: BG = 37, GGA = 25, GGI = 25. As it can be seen, GGA and GGI have the same effect size, this is in line with the interaction found between gender congruency and gender category, showing that the differences between conditions of congruency in BG are greater than these for GGA and GGI.

ERP RESULTS

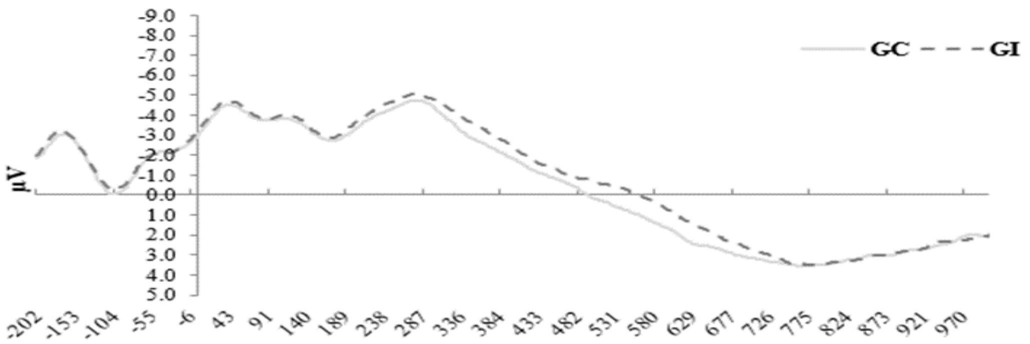
During the 200-400 ms time window, when looking for the presence of a P300 component, the ANOVA showed a significant main effect of ROI, F (3, 39) = 7.809, p < .0001, $\eta p\ 2$ = .37. Results also show a significant interaction between Gender Congruency x ROI, F(3,39)=6.38, p = .001, ηp 2 = .329. Post hocs results revealed significant difference in the congruency effect in the parieto-occipital area, with wavelengths with a greater positive amplitude for incongruent primes.

Regarding the 300-500 ms time window, when looking for the presence of a N400 component, no effects were found. These results can be a consequence of the lack of statistical power, due to the fact that only 14 participants were analyzed for EEG data. See Figure 2 for averaged ERP waveforms on the different regions of interest.

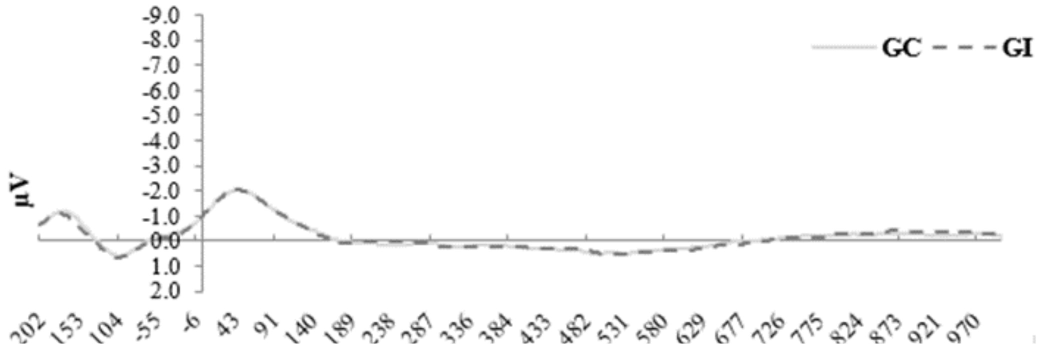
Figure 2

Averaged ERP waveforms elicited as function of prime-target congruency (congruent vs incongruent) in each region of interest

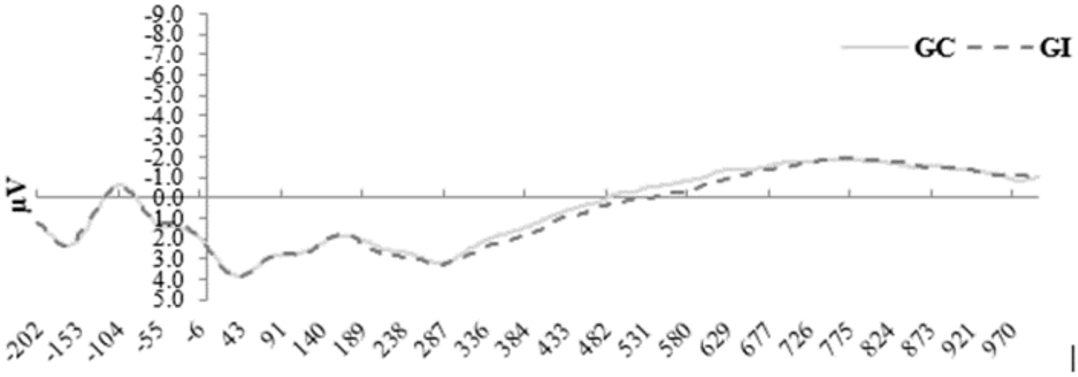
GC - GI Frontal



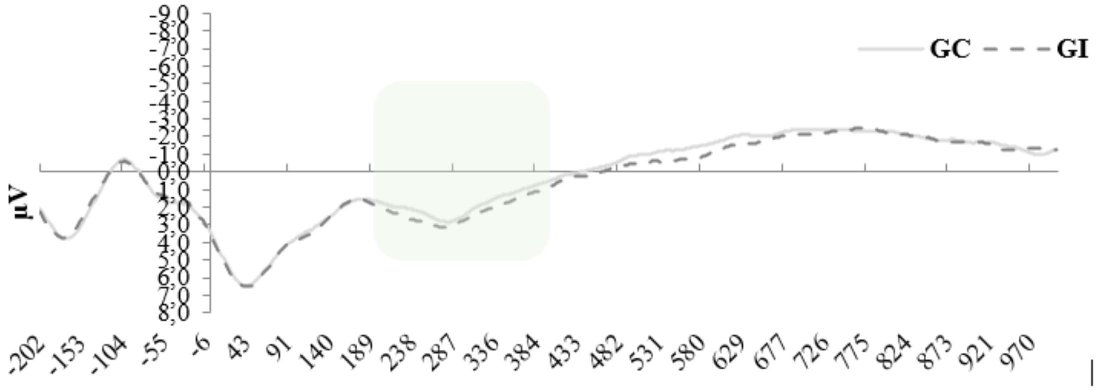
GC - GI Central



GC - GI Parietal



GC - GI Parieto-occipital



DISCUSSION

The aim of this study was to analyze the semantic load of grammatical gender involving the different categories of the animacy hierarchy and its neural correlates. The study of grammatical gender processing has been going through a complex debate as opinions differ on whether gender is somehow linked to semantics. As animacy has been shown an important variable to take into account when exploring the effects of gender, and the type of gender (biological [directly associated with semantic information] vs. grammatical [apparently not associated with semantic information]) depends on the Animacy Hierarchy, we decided to study the possible relationship between both factors. To do so, participants were required to classify as masculine or feminine a personal pronoun that preceded a word prime that was either congruent or incongruent with the pronoun gender. The stimuli selected as the material for the task belonged to three different categories of the animacy hierarchy: biological gender (i.e., the peak of animate nouns), animate nouns, and inanimate nouns. While the task was being done, electroencephalographical data was being recorded. We expected participants to answer with lower reaction times for congruent primes than for incongruent primes. In addition, we expected a greater effect of congruency for biological gender nouns compared to nouns with grammatical gender, but also of animate nouns with grammatical gender compared to inanimate nouns due to the greater semantic load of gender in these cases. On the electroencephalographical data, we expected to find N400 and P300 of greater amplitude for incongruent prime pairs than congruent pairs as the greater the semantic load of gender, the more the information to encode. We anticipated an N400 to appear due to its relation with the appearance of incongruent stimuli. Similarly, larger positive waves were expected regarding the P300 component because of its relation with categorization and decision making (Kutas & Hillyard, 1980). These components should also reflect the differential effects described for reaction times.

The behavioral analysis that explored the congruency effect revealed higher reaction times when the pronouns preceded a gender incongruent prime as expected in our hypotheses. This result is in line with the results presented in Pesciarelli et al. (2019) where it was reported that grammatical and stereotypical information influenced the processing of information leading to slower reaction times in gender incongruent trials. Results also match with those of Paolieri et al. (2020) who found a gender congruency effect.

Nevertheless, regarding the animacy variable, the results we obtained in the study differ from those reported on Vigliocco (2004), where gender congruency effects were found when primes on the task belonged to the semantic field of animals but not of tools (inanimates). This did not happen in our study, as animate nouns did not provide a significant gender congruency effect when compared to inanimate nouns. Both showed the effect with no differences between them (effect size of 25 ms in both cases). However, the congruency effect was greater for biological gender nouns in comparison to the other two types of gender. This supports our hypothesis. Yet, animate primes did not show greater effects than inanimate primes. Hence biological gender has a semantic charge that directly reflects on the experimental effects obtained when processing agreement, but animates do not if they simply have grammatical gender. In conclusion, we did not find differences in the reaction times due to animacy but due to the opposition between biological and grammatical gender.

Concerning the ERP findings, unlike Paolieri et al. (2020) the N400 component did not appear during the processing of gender incongruent stimuli in our study, this was probably due to low statistical power as not enough participants were analyzed to have significant results. Nevertheless, an effect in the occipito-parietal area was observed in the 200 to 400 ms window, where wavelengths of bigger positive amplitude were present for incongruent prime-target pairs. Similar to Siyanova-Chanturia et al. (2012) we can attribute these results to the decision-making process that participants need to go through while answering the task, with the processing requirements being greater for the incongruent condition.

To conclude, the present study provides evidence on the processing of grammatical gender depending on animacy. We did not find differences between the processing of gender for animate and inanimate nouns with grammatical gender, but both differed from nouns with biological gender. Differences are more related to the opposition biological/grammatical gender rather than to animacy. Up to our knowledge, this study is the first one that investigates the role of animacy in the processing of grammatical gender congruency by using both a behavioral task and EEG recording in Spanish. Results of the behavioral task and the ERPs showed an effect of grammatical gender in lexical access.

For further knowledge, the replication of this study is important, especially in order to corroborate the results on electroencephalographic data as we were limited by the amount of participants analyzed.

ACKNOWLEDGMENTS

Special thanks to Francesca Peciarelli for letting us use the materials of her experiment in order to keep the conditions as similar as possible.

APPENDIX

Biological Gender Nouns		Animate Nouns		Inanimate Nouns	
Femenine	**Masculine**	**Femenine**	**Masculine**	**Femenine**	**Masculine**
ACTRIZ *actress*	PRESO prisoner	LLAMA *lama*	CANGURO *kangaroo*	GRANJA *farm*	MERCADO *market*
FOTÓGRAFA *photographer*	TORERO bullfighter	JIRAFA *giraffe*	DINGO *dingo*	PORTERÍA *goal*	TEJADO *roof*
NIÑA *girl*	INQUILINO tenant	CABRA *goat*	DINOSAURIO *dinosaur*	BARANDILLA *railing*	MUSEO *museum*
LADRONA *thief*	MARINERO marine	CEBRA *zebra*	LORO *parrot*	*I*GLESIA *church*	LABERINTO *labrynth*
ENFERMERA *nurse*	CARTERO postman	MOFETA *skunk*	PELÍCANO *pelican*	BODEGA *cellar*	ESTADIO *stadium*
ARQUITECTA *architect*	CARNICERO butcher	BALLENA *whale*	BÚHO *owl*	PISCINA *pool*	PASILLO *hallway*
MINISTRA *minister*	GUERRERO warrior	PANTERA *panter*	SAPO *toad*	ESCALERA *stairs*	PUERTO *port*
JEFA *boss*	MÉDICO doctor	GACELA *gazelle*	CUERVO *raven*	PUERTA *door*	CASTILLO *castle*
VECINA *neighbor*	ASESINO murderer	NUTRIA *otter*	PULPO *octopus*	VENTANA *window*	LABORATORIO *laboratory*
BRUJA *witch*	CHICO boy	HIENA *hyena*	CANGREJO *crab*	CABAÑA *cabin*	CEMENTERIO *cemetery*
ALCALDESA *mayoress*	ABOGADO lawyer	MARMOTA *groundhog*	COCODRILO *crocodile*	MURALLA *wall*	MOLINO *windmill*
PRESIDENTA *president*	ABUELO grandparent	TORTUGA *turtle*	PINGUINO *pinguin*	CAPILLA *chapel*	MONUMENTO *monument*
DUQUESA *duchess*	MODELO model	IGUANA *iguana*	BAUBINO *baboon*	FORTALEZA *fortress*	EDIFICIO *building*
ALUMNA *student*	EMPRESARIO businessman	PALOMA *dove*	GRILLO *cricket*	ALCOBA *bedroom*	TEMPLO *temple*
DECANA *doyenne*	PADRINO godfather	HORMIGA *ant*	ESCARABAJO *beetle*	ESCUELA *school*	PISO *floor*
ALDEANA *villager*	FUNCIONARIO official	MARIQUITA *ladybug*	JERBO *gerbil*	BIBLIOTECA *library*	SÓTANO *basement*
CIUDADANA *citizen*	BIÓLOGO biologist	CIGUEÑA *stork*	GUEPARDO *cheetah*	LIBRERÍA *bookshop*	ÀTICO *penthouse*

CAJERA *cashier*	ASTRÓNOMO astronomer	ALPACA *alpaca*	MIRLO *blackbird*	PLAZA *square*	TEATRO *theatre*
INGENIERA *engineer*	PSICÓLOGO psychologist	CACATÚA *cockatoo*	MURCIELAGO *bat*	EMBAJADA *embassy*	PALACIO *palace*
PRIMA *cousin*	FILÓSOFO philosopher	CAPIBARA *capybara*	ARMADILLO *armadillo*	GALERÍA *gallery*	ZOOLÓGICO *zoo*
LECHERA *milkmaid*	ARQUEÓLOGO archeologist	COMADREJA *weasel*	CIERVO *deer*	BASÍLICA *basilica*	INSTITUTO *institute*
PELUQUERA *hairdresser*	ESPOSO husband	LAMPREA *lamprey*	LEOPARDO *leopard*	BARRACA *barrack*	CAPITOLIO *capitol*
PANADERA *baker*	HERMANO brother	LANGOSTA *lobster*	ORNITORRINCO *platypus*	PRESA *dam*	HÓRREO *granary*
COCINERA *cook*	PODÓLOGO podologist	LIBÉLULA *firefly*	HIPOPÓTAMO *hippopotamus*	CHOZA *hut*	COLISEO *coliseum*
PESCADERA *fishwife*	HIJO son	MARIPOSA *butterfly*	CAIMÁN *alligator*	ÀGORA *agora*	FARO *lighthouse*
VETERINARIA *vet*	FILÓLOGO philologist	PIRAÑA *piranha*	CHIMPÁNCE *chimpanzee*	FUENTE *fountain*	MINISTERIO *ministry*
LIBRERA *banker*	PROFESOR professor	SALAMANDRA *salamander*	CAMALEÓN *chameleon*	PÍRAMIDE *pyramid*	TÚNEL *tunel*
DERMATÓLOGA *dermatologist*	PINTOR painter	HURRACA *magpie*	EMÚ *emu*	CÀRCEL *jail*	PUENTE *bridge*
BANQUERA *banker*	ASESOR adviser	LIEBRE *hare*	ESCORPIÓN *scorpion*	TERRAZA *terrace*	BALCÓN *balcony*
EMPERATRIZ *empress*	PRÍNCIPE prince	PÉRDIZ *partridge*	MAPACHE *raccoon*	DESPENSA *pantry*	INMUEBLE *property*

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