Stereotypes override grammar: Social knowledge in sentence comprehension

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Abstract

Many studies have provided evidence for the automaticity and immediacy with which stereotypical knowledge affects our behavior. However, less is known about how such social knowledge interacts with linguistic cues during comprehension. In this ERP sentence processing study we took advantage of the rich grammatical gender morphology of Spanish to estimate the processing of role nouns in which stereotype and grammatical cues are simultaneously manipulated in a factorial design. We show that stereotypical knowledge overrides syntactic cues, highlighting the immediacy with which stereotype knowledge is activated during language comprehension and supporting proposals claiming that social knowledge impacts on language processing differently from other forms of semantics.

Keywords: Event Related Potentials, N400, Gender agreement, Gender stereotypes, Sentence comprehension

Highlights

- Stereotypical and syntactic cues were manipulated in a factorial design
- ERPs time-locked to stereotype-biased words during sentence reading were recorded
- We observed strong predominance of stereotypes in guiding language processing

1. Introduction

Words are associated to gender-oriented stereotypes, i.e., beliefs concerning the gender properties of certain social groups (English: Banaji & Ardin, 1996; Kreiner et al., 2008; Spanish: Carreiras et al., 1996; German: Irmen & Roßberg, 2004). Stereotypical knowledge is automatically activated (and difficult to inhibit) for words referring to people (*nurse*, *doctor*; Oakhill et al., 2005), but also to object entities (*bikini*, *cigar*; Garnham et al., 2002) and adjectives (*aggressive*, *nurturing*; White et al., 2009). Many studies have shown that the activation of stereotypical knowledge is immediate and not based on conscious inferences (Carreiras et al., 1996; Garnham et al., 2002). Nonetheless, the influence that stereotypical cues exert on language processing is still a matter of debate. In fact, while a high number of studies have focused on the interaction between other sources of semantic knowledge and syntactic information during language processing (e.g., Osterhout & Nicol, 1999), it is unknown how simultaneous stereotypical and syntactic cues modulate language comprehension processes. Interestingly, the distinction between stereotypes and other types of semantic knowledge is mainly motivated by the fact that the brain processes information about categories of objects and living things (i.e., semantic knowledge) differently from information about categories of people (i.e., stereotypes; Contreras et al., 2012, and references therein). In the present study, we employed event-related potentials (ERPs) to evaluate the processing of stereotypes and morphosyntactic cues.

Previous studies on stereotype processing during sentence comprehension have focused on anaphoric constructions. Osterhout and colleagues (1997) reported qualitatively similar ERP effects for pronouns mismatching with either gender definition (*mother*, *father*) or the gender stereotype (*nurse*, *doctor*) of the previous antecedent. They reported increased positive amplitude shifts starting after 600 ms in the posterior scalp regions that they identified as P600s (similar results in Canal et al., 2015; Su et al., 2016). While some authors claimed that the P600 reflects syntactic processing (e.g., Kim & Osterhout, 2005), recent views suggest that it can reflect more general language integration (e.g., Brouwer et al., 2012), repair and reanalysis (e.g., Friederici, 2011) or more general conflict monitoring (e.g., van de Meerendonk et al., 2010; for a review Kuperberg, 2007). Independently of the functional interpretation of the P600 effect, the similar ERP correlate observed for stereotypical and definitional gender led Osterhout and colleagues (1997) to conclude that

stereotypical cues syntactically constrain pronoun resolution (see similar claims by Esaulova et al., 2014).

Osterhout et al.'s (1997) conclusions were mainly driven by the fact that no semantic-related ERP effect was observed for the stereotypical condition, in which world-knowledge inferences (known to elicit semantic ERP correlates such as the N400, Hagoort et al., 2004) could potentially drive pronoun resolution processes. A number of studies have indeed reported stereotype-related modulations of the N400 ERP component triggered by isolated role nouns in semantic priming paradigms (e.g., Siyanova-Chanturia et al., 2012). The N400 is a negative-amplitude deflection around 400 more evident in right posterior brain regions (Kutas & Hillyard, 1984). It is sensitive to a large number of lexical-semantic parameters and has also been associated to stereotype congruity. White and colleagues (2009), for example, reported a stereotype-related negativity and interpreted it is a N400 effect even though the distribution of the effect was evident across the whole scalp, including anterior electrodes.

Potential explanations for the lack of the N400 effect in Osterhout et al. (1997) rely on the fact that the authors did not estimate stereotype processing by focusing on the ERPs time-locked to the role noun (but to a distant pronoun). Given that previous behavioral studies have shown the immediacy with which stereotypical knowledge is activated upon reading a word (Carreiras et al., 1996; Garnham et al., 2002), it is relevant to evaluate the ERP correlates time-locked to a stereotypical target word. As an example, in an eye-tracking experiment, Kreiner and colleagues (2008) observed processing differences between definitional and stereotypical gender in cataphoric (but not in anaphoric) constructions in which pronouns preceded the stereotypical nouns where the experimental effects were measured.

In contrast to previous studies that separately compared stereotypical and definitional anaphoric mismatches, we here analyzed the ERP correlates triggered by the reading of stereotypically biased role nouns while manipulating the gender of the target word (identified by the noun ending) and the syntactic context preceding the target word (the gender marked determiner). We followed the rationale of ERP studies that evaluated the interaction between syntactic and semantic mismatches in a factorial design. The literature focusing on the interaction between syntax and semantics has observed dissociable ERP correlates for semantic and syntactic violations. The double mismatch condition has either confirmed the independence and

autonomy between semantic and syntactic processing showing additive effects (Gunter et al., 2000; Osterhout & Nicol, 1999) or has provided evidence for the vulnerability of the semantic processor to syntactic cues, but not the opposite (Hagoort, 2003). Martin-Loeches et al. (2006) proposed the relative prevalence of semantics over syntax in Spanish (i.e., the language investigated in the present experiment). However, they reported qualitative different effects for syntactic and semantic errors and an additive effect for the double anomaly when considering the pre-stimulus ERP baseline (as Osterhout & Nicol, 1999).

Brain sensitivity to the stereotypicality of the target word is studied in the present study by manipulating the role noun ending (congruent: *miner-os*, male miners; incongruent: *miner-as*, female miners). The syntactic context is manipulated by taking advantage of the gender markedness of the Spanish article, so that it could agree with a following role noun (…*los mineros*..., the$_{[+m]}$ male miners) or not (*…*las mineros*..., the$_{[+f]}$ male miners). The double anomaly condition (*…*los mineras*..., the$_{[+m]}$ female miners) will provide additional evidence on the interaction between stereotypical and syntactic cues during language comprehension (see Table 1).

-- please insert Table 1 around here --

We contrasted two possible outcomes for the present experiment. On the one hand, stereotypical knowledge could be processed in the same way as other sources of semantic knowledge, so that we should observe a relative independence between the ERP effects elicited by grammatical and stereotypical anomalies (Gunter et al., 2000; Martin-Loeches et al., 2006; Osterhout & Nicol, 1999; but also see Hagoort, 2003). We would expect different ERP correlates for the stereotypicality and the syntactic manipulations, i.e., an increased N400-like effect for stereotypes (White et al., 2009) and for grammatical anomalies a P600 that could be preceded by an Left Anterior scalp distributed Negativity (LAN) around 400 ms, an ERP correlate typically observed for morphosyntactic anomalies in morphology-rich languages (Barber & Carreiras, 2005; Molinaro et al., 2008; 2011a; 2011b; 2015). This last prediction is motivated by both previous studies who employed a similar linguistic construction (determiner-noun gender agreement error involving animate nouns, e.g., Sabouring & Stowe, 2008) and previous research con stereotypes involving gender agreement

mismatches (Canal et al., 2015; Osterhout et al., 1997; Su et al., 2016). Additive ERP effects could be observed in the double anomaly condition (Gunter et al., 2000; Martin-Loeches et al., 2006; Osterhout & Nicol, 1999).

On the other hand, if we take to the extreme the "immediacy hypothesis" discussed by some authors (Carreiras et al., 1996; Garnham et al., 2002), stereotypical knowledge (activated by the word stem *miner-*, male stereotyped) could possibly have more weight than other forms of linguistic cues. In this case, we would expect that any incongruence with the stereotypical gender of the role noun (i.e., either morphological, the noun ending *-as*, or syntactic, the previous gender marked determiner, *las*) would trigger a similar brain reaction. Plausibly, this effect would be the N400-like effect observed for isolated word stereotypical processing (White et al., 2009). Under this assumption, no syntactic ERP correlates should be observed (i.e., LAN and P600) even in sentences involving grammatical errors.

Twenty-four native Spanish speakers took part in the EEG session (half female). They attentively read sentences (Table 1) and answered comprehension questions after one third of the trials. We analyzed ERP responses in specific time windows of interest time-locked to target noun presentation. The statistics focused on the following factors for the four-way ANOVAs in each time interval: StereoCong (congruent vs. incongruent), GendAgree (agreement vs. disagreement), Hemisphere (three levels: left electrode group, medial group, right group) and Latitude (three levels: anterior electrode group, central group, posterior group). Post-hoc FDR corrected comparisons focused on the comparison between each anomalous condition and the control (see Table 1). For further details see the Materials and Methods section.

2. Results

2.1. Comprehension questions: Participants responded accurately to the end-of-sentence questions with an average accuracy of 86% (range: 80-90%).

2.2. ERPs time-locked to role-nouns. No statistically reliable effects emerged from the ANOVA when considering the early time intervals (< 250 ms). In Figure 1 it is possible to appreciate the increased negative effect peaking around 400 ms for all the incongruent conditions compared to the correct control sentence.

2.2.1. The 300-600 ms interval. The interaction between StereoCong and GendAgree was statistically significant [$F(1,23) = 8.01$, $p < 0.01$, $\eta^2 = 0.01$]. Post-hoc comparisons (considering *all* electrodes) showed that the stereotypically incongruent [mean difference (m.d.): −0.77 μV; $t(23) = 3.15$, $p_{FDR} < 0.01$], the syntactic violation [m.d.: −0.75 μV; $t(23) = 3.45$, $p_{FDR} < 0.01$] and the double anomaly [m.d.: −0.83 μV; $t(23) = 2.79$, $p_{FDR} < 0.05$] all differed from the control condition. In addition, a triple interaction between StereoCong, GendAgree and Hemisphere emerged [$F(2,46) = 3.27$, $p < 0.05$, $\eta^2 = 0.01$]. Independent (three-way) ANOVAs excluding the Hemisphere factor for the left, medial and right electrode groups revealed that the interaction between StereoCong and GendAgree was stronger in the right hemisphere [right: $F(1,23) = 11.22$, $p < 0.01$, $\eta^2 = 0.03$; left: $F(1,23) = 3.23$, $p < 0.1$, $\eta^2 < 0.01$; medial: $F(1,23) = 5.67$, $p < 0.05$, $\eta^2 < 0.01$]. In the right electrodes a significant difference emerged between the stereotypically incongruent and the control condition [m.d.: −0.82 μV; $t(23) = 2.98$, $p_{FDR} < 0.01$; m.d. for syntactic violation: −0.46 μV, *not significant* (*n.s.*); m.d. for double anomaly: −0.55 μV, *n.s.*].

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2.2.1. The 600-850 ms interval. The significant interaction between StereoCong and GendAgree [$F(1,23) = 4.94$, $p < 0.05$, $\eta^2 = 0.01$] was driven by the sustained negative effect carrying on from the earlier time window [m.d.: −0.71 μV] between the stereotypically incongruent condition and the control condition [$t(23) = 2.58$, $p_{FDR} < 0.05$; m.d. for syntactic violation: −0.15 μV, *n.s.*; m.d. for double anomaly: −0.25 μV, *n.s.*]. The triple interaction including Hemisphere emerged also in this time interval [$F(2,46) = 9.21$, $p < 0.05$, $\eta^2 = 0.01$]. Separate ANOVAs in the three levels of the factor Hemisphere showed that the interaction between StereoCong and GendAgree was significant in the right electrodes only [right: $F(1,23) = 11.99$, $p < 0.01$, $\eta^2 = 0.03$; left: $F(1,23) = 0.59$, *n.s.*; medial: $F(1,23) = 2.24$, *n.s.*]. The right electrodes interaction was driven by the stereotypicality contrast [m.d.: −0.96; μV; $t(23) = 3.68$, $p_{FDR} < 0.01$; ; m.d. for syntactic violation: −0.23 μV, *n.s.*; m.d. for double anomaly: −0.08 μV, *n.s.*].

3. Discussion

Two main findings emerge from the present study: first, the stereotypicality contrast elicited a long lasting negativity starting in the N400 time interval and extending to right *anterior* scalp regions; second, we did not observe ERP correlates of syntactic processing for the comparisons involving gender agreement manipulations, but increased negative effects in posterior scalp electrodes, resembling a classic N400.

The scalp distribution of the stereotypicality effect (but also its long-lasting duration) involving additional right frontal regions is different from typical N400 lexical effects that are observed only in the posterior scalp regions. This suggests that stereotypical knowledge is represented differently from other forms of semantic knowledge. Stereotypes refer to knowledge about social groups, which seems to be emotionally more relevant to us compared to knowledge about non-social entities (Norris et al., 2004). Contreras and colleagues (2012) reported increased activation for brain regions involved in social cognition for social stereotypes, while knowledge about non-social entities activated regions associated with general semantic knowledge. More specifically, they propose that social stereotype processing depends on our ability to represent the mental state of the members of a group. Interestingly, this ability involves anterior frontal brain regions whose activity at the scalp level emerges as an increased negativity in the right lateralized electrodes (Sabbagh et al., 2004). This right anterior effect could overlap with the more posterior effect, more recognizable as a typical N400 effect, and give rise to the widespread and long-lasting effect observed for the stereotype contrast (Figure 1).

It could be argued, however, that this effect does not necessarily reflect stereotype processing but lexical frequencies of the targets. The stereotypically incongruent items that are less frequent compared to the congruent ones could have triggered the N400 effect. To test this claim, we separately considered masculine and feminine stereotypes. There is a general tendency to refer to role nouns in their masculine version and this interacts with stereotypicality. Indeed, masculine congruent stereotypes were much more frequent than the incongruent counterparts (congruent: logFreq: 1.01; incongruent: logFreq: 0.45; $t(39) = 4.10$, $p < 0.01$), and masculine incongruent ones were numerically, but not statistically, more frequent than feminine congruent ones (congruent: logFreq: 0.52; incongruent: logFreq: 0.62; $t(39) = -0.81$, *n.s.*). Even so, the magnitude of the negative stereotypicality effect across all electrodes was similar in the two cases (−0.68 μV for the first and −0.86 μV

for the second contrast). This shows that the amplitude of the negative stereotypicality effect was not sensitive to lexical frequency parameters. This difference is also informative of the relative asymmetry in the male-biased rates: female role nouns were less stereotypically female-bias compared to the male-biased role-nouns who showed more extreme values (Appendix A). Despite this asymmetry the stereotypicality effect was numerically larger for female role nouns.

Interestingly, these data also suggest that stereotypical knowledge strongly influences language processing functions. In fact, the similar posterior N400 effect across the three conditions emphasizes the pivotal role played by the stereotypes in interpreting the incongruences. In the three experimental contrasts, stereotypical knowledge of the role noun is activated independently of any morphological cue. If any such cue (either the previous determiner or the noun suffix or both) contrasts with the gender stereotype, the neurocognitive system reacts to the anomaly by anchoring on the stereotype. While this negative ERP effect was expected for the stereotypical contrast (White et al., 2009; even if not often reported for sentence processing), it was unexpected for the anomalies involving morphosyntactic manipulations (associated to LAN-P600; Molinaro et al., 2011a; Martin-Loeches et al., 2006; see Barber et al., 2004, for agreement involving biological gender). Thus, the strong attracting force of the role noun's gender stereotype overshadows the typical ERP correlates for morphosyntactic violations such as gender agreement in Spanish (LAN-P600 biphasic response) and thus explains their absence in the present experiment.

A possible factor that could have triggered the N400 also for syntactic errors (differently from previous studies) is the presence of a large number of role nouns in whole experimental set of stimuli. It is not easy to disentangle if the N400 for syntactic errors is inherent to the processing of each target role noun or it is due to the context of the experiment with a large number of role nouns. Future research should address this issue. However, it is worth mentioning that previous studies on gender stereotypes (in which role nouns abounded) consistently reported P600 effects (Canal et al., 2015; Osterhout et al., 1997; Su et al., 2016) and no N400s. The present study differs from previous research by focusing on a full factorial design, on a different syntactic construction and on a morphology-rich language like Spanish.

In sum, the present findings differ from previous studies that have investigated sensitivity to semantic and syntactic cues during morphosyntactic processing. These studies (Gunter et al., 2000; Hagoort, 2003; Martin-Loeches et al., 2006; Osterhout & Nicol, 1999) reported reliable sensitivity to the structural language cues independently of the interaction with different forms of semantic knowledge. In a similar vein, Van Berkum et al. (2008) reported similar N400 effects for semantic anomalies and speaker inconsistencies (stereotypically male utterances produced by a female speaker, see also Lattner & Friederici, 2003, for similar evidence involving P600). Despite the different experimental paradigm compared to the one used in the present study, the comparison between the two studies highlights the strong stereotypical force triggered by role nouns during reading.

In contrast, in the present study, stereotypical knowledge reduced the influence of syntactic cues (grammatical gender) on language comprehension processing. This unexpected result supports proposals indicating that social stereotypes should not be considered a typical form of semantic knowledge (Contreras et al., 2012). Future research could possibly examine possible modulating factors of the present stereotype effect such as previous discourse context (Nieuwland & Van Berkum, 2006) or subjective variables such as empathy (Van den Brink et al., 2012) or social class (Varnun et al., 2012).

4. Materials and Methods

4.1. Participants: Twenty-four native Spanish speakers (12 males, mean age: 23.21, range 18-30) took part in the ERP study and were paid for their participation. They were healthy, right-handed, with normal or corrected-to-normal vision. None of them reported prior history of neurological disorder.

4.2. Materials: The stereotypical role nouns used in this study were selected from a questionnaire containing 328 Spanish role nouns. We used plural nouns to avoid potential differences in the number of letters between feminine and masculine stimuli.

Sixty-four native Spanish speakers (32 males, aged from 18 to 38, mean age: 21.83) were paid for rating this questionnaire. Participants were instructed to judge on an 11-point Likert scale (from 0% to 100% with 10% intervals) the percentage of males/females composing a category based on their immediate intuition. The 40 most

male-biased, and the 40 most female-biased role nouns were selected as target words (Appendix A: 1-40 were male-based and 41-80 female-biased).

The eighty noun phrases (determiner + role noun) were inserted in 80 non-constraining sentences. We manipulated in a factorial design the Stereotype Congruity of each role noun (StereoCong: congruent vs. incongruent) and the Gender Agreement of noun phrase (GendAgree: agreement vs. disagreement). Across items, sentences' structures were similar (Table 1) and the target role nouns were located from the third to the fourteenth sentence position but never in the sentence final position.

Stimuli were balanced across participants employing four lists with equal number (40) of trials in each condition, so that each participant did not see the same item in different conditions. Additional filler sentences were employed to balance the number of correct/incorrect sentences, for a total of 334 sentences per list.

4.3. Procedure: Individual words were presented in white letters on a dark grey background. After a 500 ms centered fixation point followed by a 200 ms blank screen, each word was presented for 300 ms and 200 ms blank followed. The inter-sentence time interval varied from 1700 ms to 3000 ms.

During the experiment, participants sat in a sound-attenuated cabin and were instructed to read each sentence silently and carefully. Their task was to answer yes/no comprehension questions by button pressing. Comprehension questions were introduced after 30% of the sentences. Questions referred to the content of each sentence and never to the gender related information of our interests. Twelve practice trials preceded the beginning of the experiment.

4.4. Data recording and analysis: EEG data were recorded by the BrainAmp system. The 27 active electrodes were positioned on a cap according to the 10-20 system and the impedance was kept below 5Ω for all electrodes. The sampling rate (A/D) was 1000 Hz. The on-line reference electrode was the left mastoid (M1). Signals were amplified with a bandpass of 0.01-250 Hz. HEOGs were placed at the outer canthi of the eyes and VEOGs were placed above and below the left eye.

Brain Vision Analyzer was used to perform off-line signal processing analyses. EEG data were off-line re-referenced to the average activity of M1-M2. Signal was bandpass filtered between 0.3 and 30 Hz. Epochs of interest lasted from

−250 ms before the onset of the target words to 1000 ms post-stimulus onset (−250 to 0 ms baseline corrected). Artifact activity was excluded based on visual inspection of each trial. As a result, 10% of the trials were removed (no different amount of rejection among experimental conditions).

Statistical analyses (R software) focused on the mean voltage at each electrode within time intervals of interest. We focused on the time intervals corresponding to the N400/LAN (300−600 ms) and the P600 (600−850 ms). Further analyses were however carried on the time intervals corresponding to early visual components (C1: 0–80 ms; N1: 80–150 ms; P2: 150–250 ms) to evaluate the presence of possible perceptual effects.

Repeated measures-ANOVA was performed considering the two experimental factors (StereoCong and GendAgree) and two topographical factors: Hemisphere (three levels: left, medial, right) and Latitude (three levels: anterior, central, posterior). This pattern considered nine groups of three electrodes (see groups in the upper panel of Figure 1). We will report in the Results section significant (Greehouse-Geisser corrected) effects involving the experimental conditions. Possible interactions between the two experimental factors will be resolved comparing the different anomalous conditions to the control condition (FDR corrected pairwise *t*-tests).

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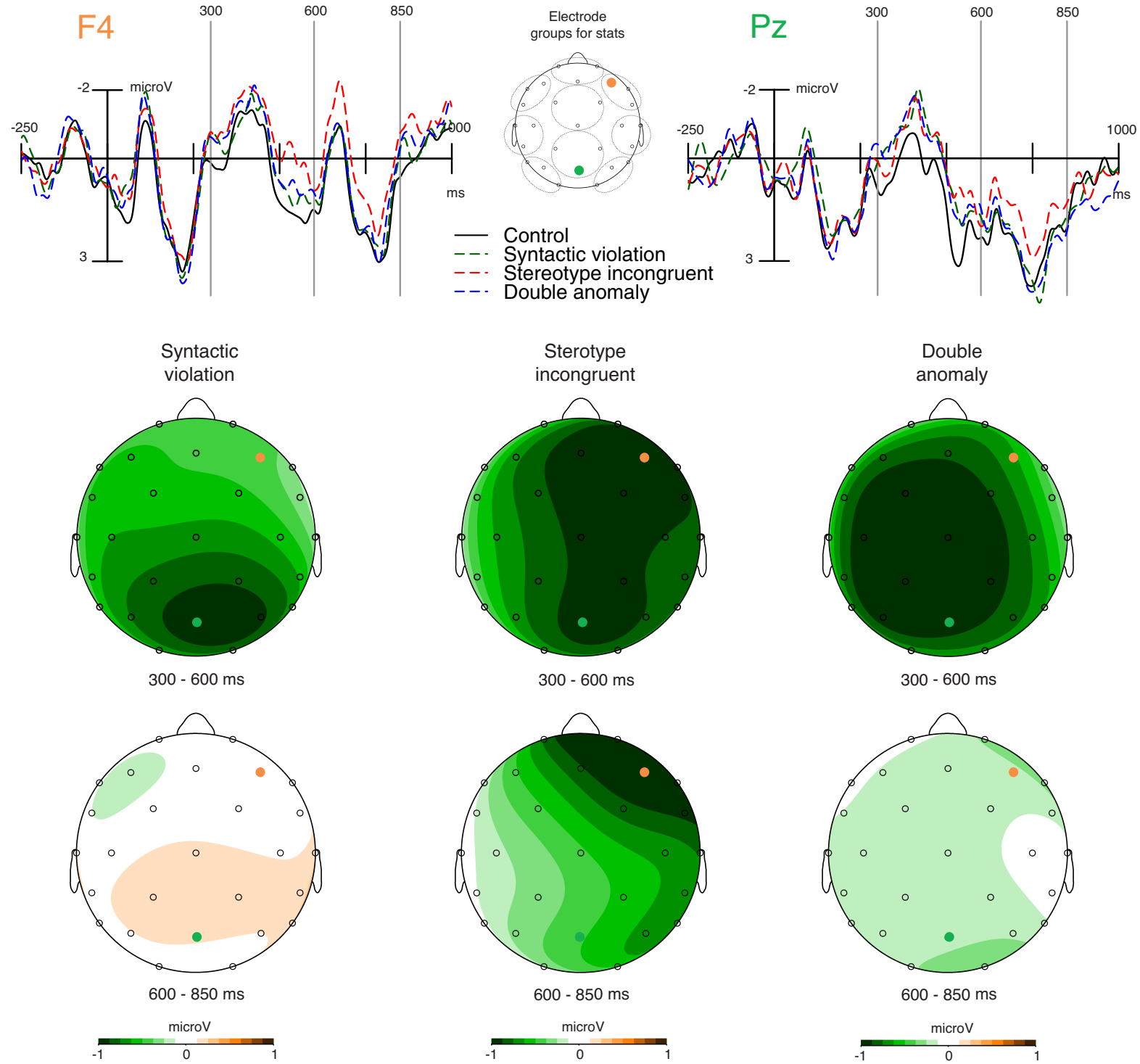
Table 1: Example of the experimental sentences. The target stereotypical role noun is underlined in bold.

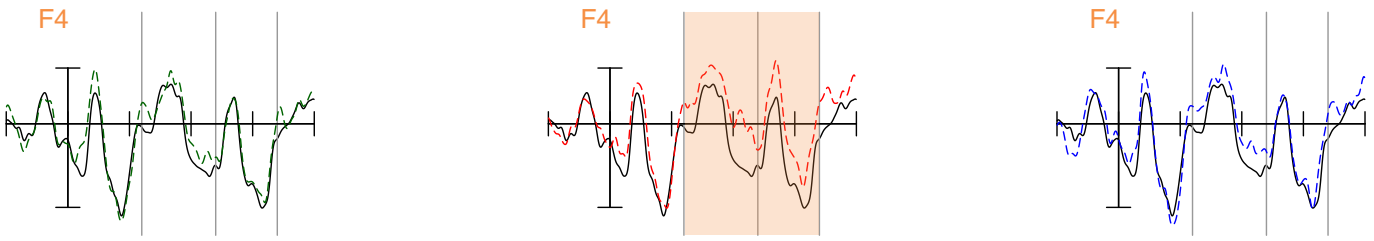
Condition	**Example Sentences**
Control *(stereotypically congruent/syntactic agreement)*	Ayer, **los <u>mineros</u>** fueron a una cena para celebrar el fin de la asamblea. *Yesterday,* the$_{[+M]}$ *(male)* miners *went to a dinner for the celebration of the end of an assembly.*
Stereotypically incongruent *(and syntactic agreement)*	Ayer, **las <u>mineras</u>** fueron a una cena para celebrar el fin de la asamblea. *Yesterday,* the$_{[+F]}$ *(female)* miners *went…*
Syntactic violation *(and stereotypically congruent)*	*Ayer, **las <u>mineros</u>** fueron a una cena para celebrar el fin de la asamblea. **Yesterday*, the$_{[+F]}$ *(male)* miners *went…*
Double anomaly *(stereotypically incongruent/ syntactic violation)*	* Ayer, **los <u>mineras</u>** fueron a una cena para celebrar el fin de la asamblea. **Yesterday,* the$_{[+M]}$ *(female)* miners *went…*

Figure captions

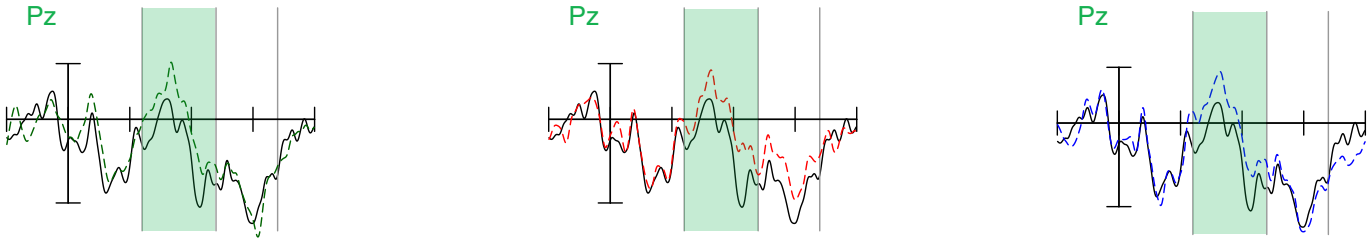
Figure 1: ERPs time-locked to the presentation of the target stereotypical noun. In the upper panel the four conditions are plotted in the same graph for two relevant electrodes. In the intermediate panels the topographical scalp distributions of each anomalous condition compared to the control in the 300−600 and 600−850 ms ms time intervals are plotted. In the lower panel we highlight the relevant effects of interest.



Long-lasting right-lateralized negativity for Stereotype incongruent



Common posterior N400 effect



Appendix A

Male-biased rating scores for the 80 Spanish role nouns employed in the present experiment. The first forty role nouns are the most male-biased ones and the last forty the most female-biased ones. Log frequency is extracted by the EsPal database (http://www.bcbl.eu/databases/espal/).

Sequence No.	Spanish role noun	English translation	Male-biased rating score	Standard Error	LogFreq masculine	LogFreq feminine
s01	violadores	male rapists	92.540	1.738	0.278757	0.009767
s02	mineros	male miners	91.429	1.058	0.833114	0.882056
s03	obreros	male labors	88.438	1.412	1.353053	1.071650
s04	marineros	male sailors	87.031	1.254	0.835182	0.463968
s05	camioneros	male road builders	86.875	1.065	0.449174	0.026016
s06	fontaneros	male plumbers	85.469	1.407	0.207053	0.005608
s07	bomberos	male fire fighters	85.000	1.179	0.388434	0.001823
s08	cazadores	male hunters	84.375	1.334	1.052196	0.513838
s09	carpinteros	male carpenters	82.656	1.359	0.721492	0.029985
s10	asesinos	male murderers	80.318	1.600	1.303094	0.757227
s11	carceleros	male jailers	79.524	1.899	0.458602	0.037815
s12	luchadores	male fighters	79.219	1.814	0.931027	0.249577
s13	basureros	male garbage collectors	77.656	1.913	0.255102	0.000431
s14	presidentes	male presidents	77.656	1.707	2.960595	2.007741
s15	gobernadores	male governors	76.719	1.682	1.859681	0.419597
s16	conquistadores	male conquerors	75.873	2.485	0.943901	0.142983
s17	magos	male magicians	73.125	1.650	1.069851	0.288306
s18	mayordomos	male butlers	72.540	2.771	0.850380	0.035221
s19	ladrones	male thieves	72.344	1.764	1.187986	0.255885
s20	prisioneros	male prisoners	72.344	1.602	1.170999	0.491670
s21	vagabundos	male vagabonds	72.222	1.559	0.589055	0.118981
s22	banqueros	male bankers	70.794	1.815	0.809918	0.020667
s23	carniceros	male butchers	70.781	1.758	0.556613	0.044235
s24	granjeros	male farmers	70.625	1.835	0.449174	0.045507
s25	presos	male prisoners	70.318	1.767	1.195427	1.488705
s26	entrenadores	male coaches	70.156	2.011	1.669703	0.184581
s27	alcohólicos	male alcoholics	70.000	1.494	0.454657	0.524933
s28	zapateros	male shoemakers	69.844	2.210	1.649781	0.061720
s29	payasos	male clowns	69.844	1.551	0.682552	0.020667
s30	cirujanos	male surgeons	69.531	1.613	0.852169	0.066589
s31	sospechosos	male suspects	69.365	1.905	0.966580	0.557395
s32	jefes	male chiefs	69.063	1.570	2.169034	0.653149
s33	tatuadores	male tattoo artists	68.750	1.803	0.006999	0.006999
s34	inventores	male inventors	68.750	1.803	0.921496	0.085538
s35	ministros	male ministers	68.281	1.568	2.383978	1.383855
s36	millonarios	male millionaires	68.281	1.936	0.718804	0.349215
s37	políticos	male politicians	68.125	1.371	2.326735	2.752374
s38	exploradores	male explorers	68.095	1.808	0.878337	0.120053
s39	diputados	male representatives	67.656	1.692	1.750337	1.002679
s40	neurocirujanos	male neurosurgeons	67.656	1.663	0.089001	0.006999
s41	autores	male authors	51.875	1.315	2.112403	1.074036
s42	posaderos	male innkeepers	49.677	2.672	0.387857	0.337697
s43	joyeros	male jewelers	48.906	2.006	0.315072	0.006999
s44	muchachos	young boys	47.937	1.065	1.447014	1.359945
s45	acupuntores	male acupuncturists	47.813	2.414	0.008385	0.000327
s46	niños	male kids	47.778	1.023	2.004625	1.591124
s47	caseros	male homemade products makers	47.419	2.444	0.660919	0.577638
s48	veterinarios	male veterinarians	47.031	1.632	0.574267	0.619920
s49	niñitos	male grandchildren	46.984	1.688	0.126428	0.239126
s50	vecinos	male neighbors	45.968	1.407	1.521806	1.256515
s51	humanitarios	male humanitarians	45.625	1.589	0.858274	1.265642
s52	camareros	male waiters	45.469	1.558	0.722295	0.525354

s53	vendedores	male vendors	45.313	2.004	0.982735	0.387279
s54	biólogos	male biologists	45.000	1.606	0.519421	0.121122
s55	famosos	male celebrities	44.844	1.510	1.702011	1.488339
s56	ginecólogos	male gynecologist	44.375	2.596	0.229251	0.044235
s57	compradores	male customers	42.188	1.816	0.826853	0.172420
s58	pasteleros	male bakers	40.161	2.089	0.160883	0.107016
s59	farmacéuticos	male pharmacists	39.524	2.164	0.696681	0.741650
s60	profesores	male professors	38.125	1.650	1.906708	1.047162
s61	mecanógrafos	male typists	37.343	2.162	0.028666	0.044235
s62	psicopedagogos	male educational psychologists	36.250	2.107	0.011144	0.000297
s63	bibliotecarios	male librarians	33.125	1.709	0.509494	0.181805
s64	coreógrafos	male choreographers	32.656	1.970	0.470703	0.212277
s65	cosmetólogos	male cosmeticians	32.064	2.764	0.001409	0.001409
s66	modistos	male tailors	31.406	2.052	0.100347	0.324531
s67	adivinos	male fortune tellers	30.469	1.921	0.471657	0.886293
s68	cajeros	male cashiers	29.375	2.281	0.362889	0.177138
s69	bailarines	male dancers	26.250	1.703	0.693263	0.831661
s70	peluqueros	male hairdressers	24.531	1.589	0.299778	0.123252
s71	tejedores	male weavers	23.438	1.578	0.422273	0.094711
s72	cuidadores	male caretakers	22.188	1.659	0.638801	0.116830
s73	azafatos	male flight attendants	21.875	1.589	0.002813	0.314388
s74	enfermeros	male nurses	21.094	1.357	0.370772	0.811010
s75	secretarios	male secretaries	21.094	1.741	2.057915	1.267170
s76	animadores	male cheerleaders	20.938	2.013	0.578384	0.275028
s77	maquilladores	male make-up artists	20.469	1.908	0.024685	0.029985
s78	limpiadores	male cleaners	18.594	1.424	0.092436	0.077349
s79	prostitutos	male prostitutes	16.094	1.329	0.045507	0.654088
s80	niñeros	male baby sitters	15.938	1.489	0.019319	0.456141