

Psycholinguistics in Iceland – Parsing and Prediction

June 19-20

Veröld, University of Iceland

Reykjavik, Iceland

This conference is partly funded by the Icelandic Research Fund (RANNÍS project Brain and Language) and the Institute of Linguistics of the University of Iceland. We would also like to thank the Vigdís Finnbogadóttir Institute of Foreign Languages for the use of their beautiful facilities and logistical support.

Lexical predictability effects on gender and number agreement encoding reveal their differences

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During sentence comprehension we make predictions not only about upcoming words but also about their morphophonology based on both semantic and grammatical knowledge (Freunenberger & Roehm, 2016). Morphophonological forms of upcoming words are determined by person, number or gender features, and these features are suggested to be processed differently (i.e. Greenberg, 1963; Carminati, 2005). The nature of agreement processes has been widely investigated in the fields of linguistics and psycholinguistics but little is known about whether they are affected differently by lexicosemantic predictability. The present study provides a first exploration of that. Specifically, whether and to what extent verb-cloze probability interacts with object-clitic gender and number agreement, and if so, what the timing of these processes is.

ERPs of 64 Spanish native speakers were recorded during a RSVP reading for comprehension task with 120 sentences where (a) lexical predictability (semantically high- vs. low-cloze predictable verbs) and (b) grammaticality (grammatical vs. ungrammatical object-clitic morphemes) were manipulated; e.g., *El conductor frenó muy bruscamente el tren para intentar pararlo/*pararla/*pararlos* vs. *aparcarlo/*aparcarla/*aparcarlos en el andén*, “The driver stopped very abruptly the train_{SG-MASC} to try to stop it_{CL-SG-MASC/*FEM} vs. park it_{CL-SG-MASC/*FEM/*them_{CL-PL-MASC}} at the platform”). Feature type (gender vs. number) was manipulated between-groups (N=32 each).

We hypothesized that if semantic (= predictability) and morphophonological information is first used in an independent way, additive effects of grammaticality and predictability should be expected at early stages of processing (300-500 ms, LAN/N400) and an interaction at later ones (500-800 ms, P600). However, if both sources of information are considered

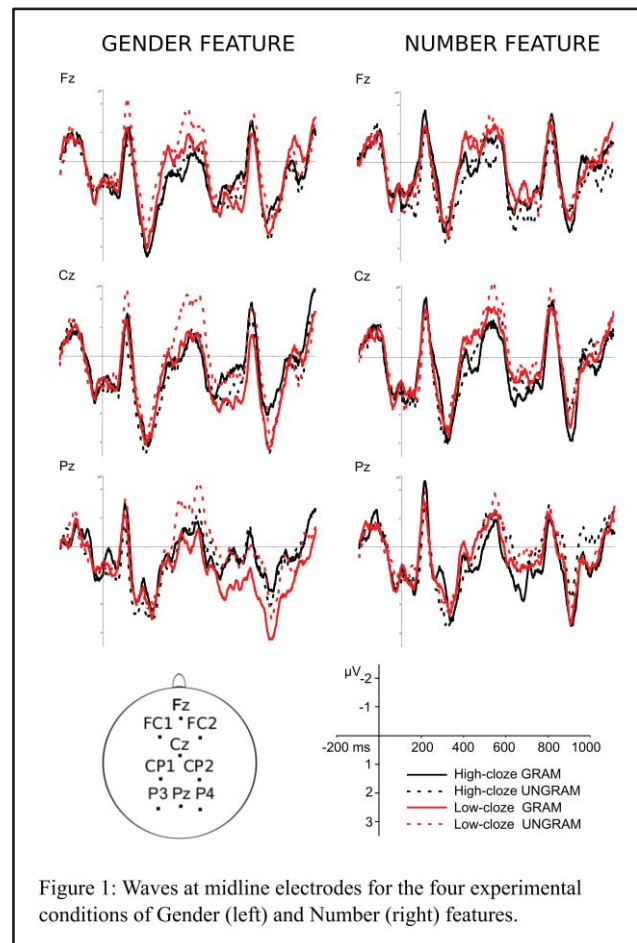


Figure 1: Waves at midline electrodes for the four experimental conditions of Gender (left) and Number (right) features.

simultaneously, interaction effects should show at both early and late stages. Importantly, if gender and number features are processed differently, divergent patterns of grammaticality effects and/or interactions with lexicosemantic predictability should be expected.

Results between 300 and 500 ms (N400) showed a main effect of grammaticality (larger negativity for ungrammatical than grammatical sentences), left-lateralized for gender and right-lateralized for number agreement. A main effect of lexicosemantic predictability (larger negativity for low-cloze than high-cloze verbs) was found over lateral regions, and over mid-central and mid-parietal regions. Interestingly, a Grammaticality by Prediction by Feature by Region interaction showed that the grammaticality by predictability interaction was only significant for gender features over mid-central and mid-parietal regions, with grammaticality effects only with low-cloze verbs and predictability effects only in ungrammatical sentences (see Figs. 1 and 2). Between 500 and 800 ms, there was a main effect of grammaticality (larger positivity for ungrammatical than grammatical sentences) only for the gender feature in the right hemisphere (Grammaticality by Feature by Hemisphere interaction: $p=.053$). Neither the predictability effect nor any other interaction was significant.

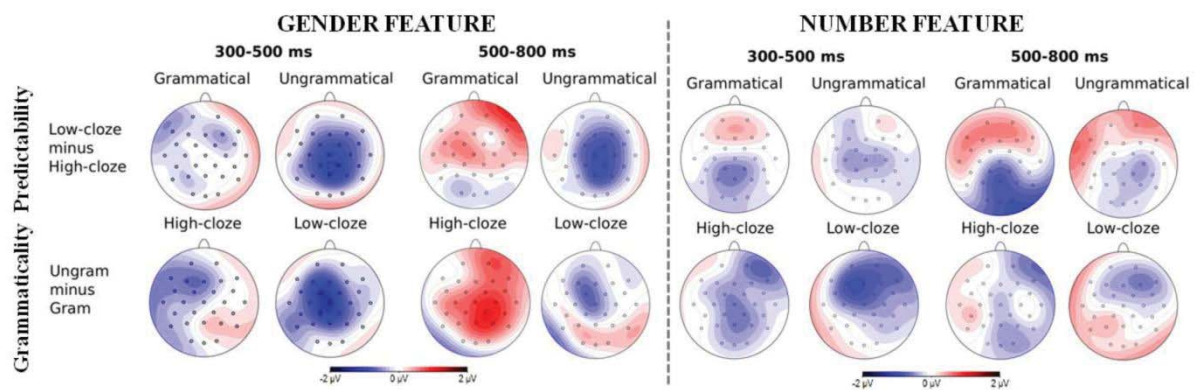


Figure 2: Topographic amplitude differences for Predictability effects in grammatical and ungrammatical agreement conditions (top) and Grammaticality effects with high-cloze and low-cloze verbs (bottom) for Gender (left) and Number (right) features.

Taken together, our results indicate that lexical prediction affects gender and number agreement computation differently, exerting its effects only on gender agreement and at early processing stages. All in all, our results suggest that similar processing resources are used for lexicosemantic prediction/integration and lexically-based grammatical gender agreement, while different syntactically-based processing resources are used for number agreement.