

ERPs and Artificial Mini-Grammars in Third Language Transfer/Learning

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Studies employing a violation paradigm with EEG recording have typically found that morphosyntactic gender and number agreement violations elicit P600 responses in native speakers (e.g., Osterhout & Mobley, 1995). In L2 learners, such violations have often been shown to elicit qualitatively similar effects albeit conditioned as a function of proficiency (e.g., Alemán-Bañón et al. 2013). Indeed, L1/L2 differences impact processing at low proficiency (e.g., Tokowicz & MacWhinney, 2005) as well as the rate of development to native-like processing (e.g., Alemán-Bañón et al., 2014), such that agreement violations of features present in the L1 elicit earlier (in proficiency) and more robust P600 responses than do those of novel features. However, research also shows that features not instantiated in the L1, such as grammatical gender in English-speaking learners of a Romance language, can eventually elicit P600 effects in higher proficiency (e.g., Alemán-Bañón et al., 2014; Foucart & Frenck-Mestre, 2012).

The above facts set the backdrop for applying the ERP method to studies examining transfer source selectivity in L3/ L_n acquisition. Multilingual settings contribute a window into the dynamics of previous language influence that L2 studies cannot possibly capture, since different previous languages can contribute divergent, even conflicting configurations for different grammatical properties, beyond their presence or absence in the grammar. To investigate these dynamic influences, we constructed two artificial languages (ALs) lexically based in English and Spanish, respectively, with no cognate words involved. Crucially, both languages display both number (present in both Spanish and English) and gender (unique to Spanish) agreement between determiners and nouns, and between nouns and adjectives. In both ALs, these are marked with phonotactically plausible novel morphology, distinct from English or Spanish morphemes. The ALs were composed by crossing 12 nouns and 12 adjectives, yielding 144 sentences presented in three different conditions: grammatical (baseline), number violations, and gender violations. Violations were always realized on the predicative adjective, in sentences like (1). 51 native speakers of Spanish, highly advanced in L2 English, participated in the experiment. After receiving implicit training in one of the ALs (Mini-Spanish, $N=26$; Mini-English, $N=25$), participants were tested behaviorally to a criterion of 80% accuracy in number and gender agreement. Once this threshold was reached, the critical sentences were presented in RSVP while participants' brain responses were recorded through EEG.

Results (Fig. 1) show no effects for either group in the N400 time window (200-500 ms post-onset of the critical adjective; all $p > .05$), but significant effects in the P600 time window (500-850 ms) for both types of violations, in both AL groups (all $p < .01$). These only show a trending interaction with caudality ($p = .052$), whereby higher amplitudes were elicited at posterior electrodes, in the Mini-English group. No further interactions were significant. These results could reflect Spanish transfer in both cases, consistent with default transfer from the L1 (Herms, 2010) and with proposals that any language can be used for transfer if it facilitates (Flynn et al., 2004), or they could reflect learning of the domain anew (but not from Spanish transfer) in the course of the experiment. These effects were not necessarily expected for the Mini-English group, given that transfer from the lexically more similar English would have been predicted, under proposals

prioritizing overall typological similarity, as the parsing cue for holistic transfer (Rothman, 2015). Ongoing work to tease out these possibilities, which will be completed before CUNY, involves two groups of monolingual English speakers, who have no recourse (from previous experience) to transfer knowledge of gender agreement, being trained in both ALs. If they perform like the two L3 groups, we will have evidence that the learning of gender was possible in the experiment itself. If not, results will support facilitative transfer effects in L3/*L_n* acquisition.

(1) Ze camion es *car-eju y ze reloj tambien.
 the-MASC-SG truck-MASC-SG is expensive-FEM-SG and the watch too.

Example (1) of a gender violation in Mini-Spanish.

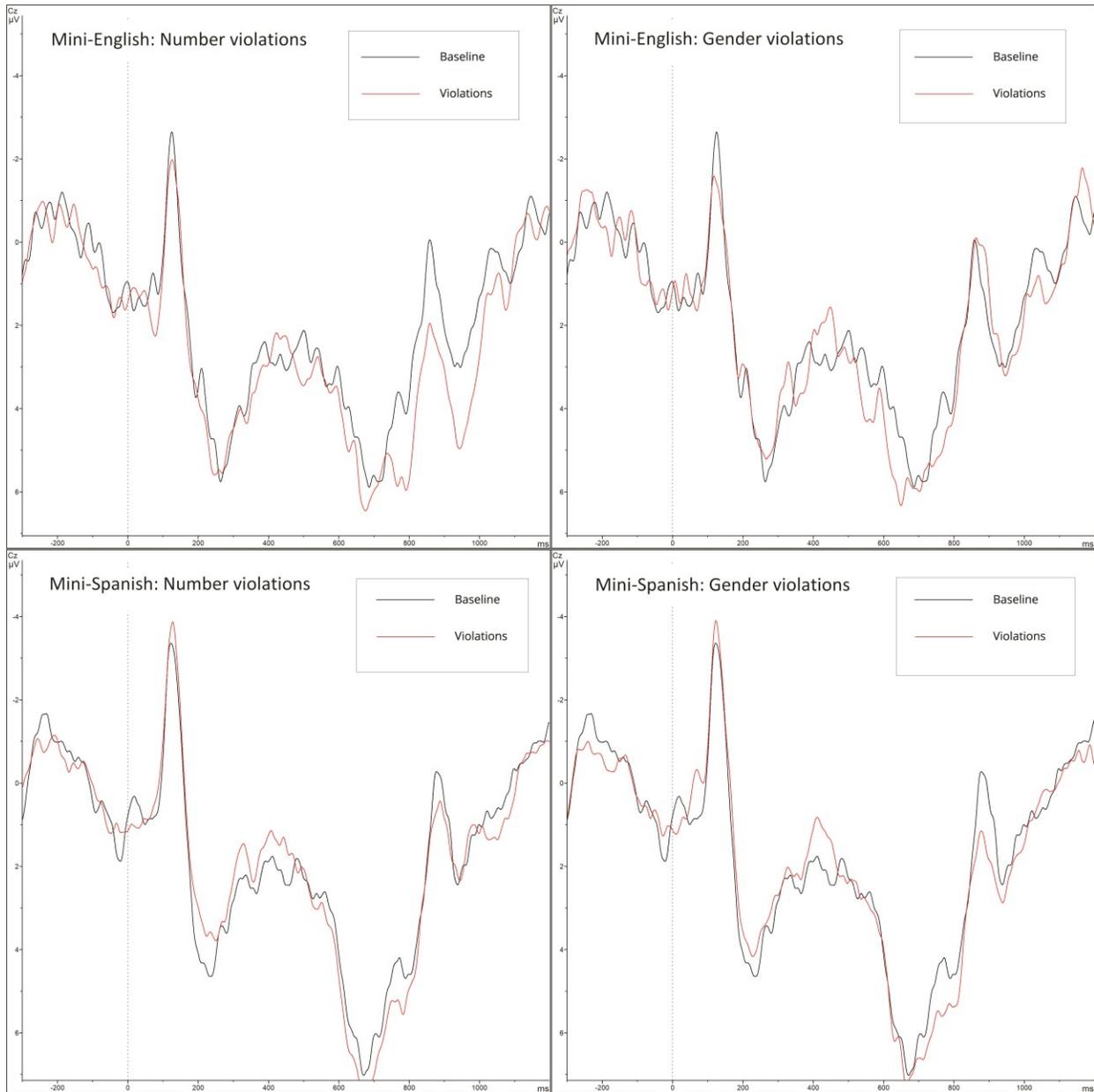


Figure 1. ERP responses at electrode Cz for number and gender violations in Mini-English (upper row) and Mini-Spanish (bottom row).