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Title: Gender-agreement errors on adjectives and determiners elicit different ERP patterns in French

Introduction: In French, feminine gender on variable adjectives is irregularly marked with a word-final consonant (e.g., *vert/e* [vɛʁ]/[vɛʁt], 'green.M/F'). In contrast, singular definite determiners carry a predictable transparent vowel (e.g., *le/la*, 'the.M/F'). In event-related brain potential (ERP) studies, morphosyntactic violations typically elicit a left anterior negativity (LAN) followed by a posterior positivity (P600) [1]. The biphasic LAN/P600 represent two phases of morphosyntactic processing, the first automatic error recognition, and the second integration and repair. While most ERP experiments use written sentence presentations [1], ours uses a bimodal visual-auditory paradigm, taking advantage of the linguistic properties of French.

Methods: Twenty-nine neurotypical French-speaking monolinguals took part in the experiment. Similar to a previous paradigm [2], participants saw an image of the scene described by the sentence, then heard a correct or ungrammatical spoken sentence, and completed a judgment task. Three sentence conditions were created, all of which contained a complex noun phrase with gender marking (determiner + noun + post-nominal color adjective) and a prepositional phrase: 1. correct, 2. adjective agreement error (e.g., *Je vois le soulier *verte sur la table*, 'I see the.M *green.F shoe.M on the table') and 3. a gender mismatch between the determiner and both the image-object and auditory-noun (e.g., *Je vois *la soulier vert …*, 'I see *the.F green.M shoe.M …'). Global ANOVAs examined the ERPs time windows for each condition: (1) time-locked to the adjective onset and (2) at the determiner vowel change.

Results: Reported effects were all significant. Adjective agreement errors elicited a broad negativity (BN) from 300–500 ms, maximal in left and medial scalp areas, and a large P600 (650–1050 ms). Determiner mismatches elicited an anterior negativity (AN) from 400–500 ms, followed by a small P600 from 750–1050 ms. Both P600s were followed by late frontal negativities.

Discussion: The BN elicited by adjective agreement errors differs from the AN elicited by determiner agreement errors and from the LAN found in reading studies [1]. Its broad distribution, left lateralization, and latency suggest a frontal left-lateralized negativity superimposed by a centro-parietal N400, the latter reflecting lexical-semantic integration and lexical-phonological mismatches [3]. As our adjectives were irregular, this distribution is probably linked to lexical access. The AN for determiner agreement errors is compatible with transparent morphological cue processing. The P600s that follow both negativities likely reflect participants' categorization of sentences as ungrammatical and attempts to reanalyze them [4]. These data suggest that different neurocognitive mechanisms can underlie the processing of two linguistically similar anomalies (here: gender dis-agreement) within the same language.

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