# Non-referential Predicate Nominals and Agreement Attraction

## Evidence from EEG

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**Non-referential Predicate Nominals and Agreement Attraction: Evidence from EEG**

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Nominal discourse entities vary regarding how likely they are to act as antecedents to anaphoric expressions (Ariel, 1990, 1988; Gundel et al., 1993). Previous research has shown that grammatically unavailable nominal entities affect syntactic dependency computation, if the dependent entity matches them in terms of morphosyntactic or semantic features (e.g. number and gender) (Van Dyke, 2007; Lewis and Vasishth, 2005). This study tested whether noun phrases that are non-referential show the same kind of interference effects as referential NPs. We used a gender mismatch paradigm (Carreiras et al., 1996) as in (1) and looked at ERP effects on the pronoun (*she* in 1). The pronoun was either compatible with a referring, stereotypically or semantically gendered NP, as in (1a), where the noun *nurse* (stereotypically feminine) and the pronoun *she* match in gender. The referring NP is of a different (stereotypical) gender in the mismatch condition: *surgeon*, in (1b). These sentences are contrasted with similar sentences, with gender match, (1c), and mismatch, (1d), but where the NPs are predicative, i.e. non-referring.

Twenty-five self-reported native speakers of English took part in the experiment. The material consisted of 160 items as in (1), half of which had male proper names in subject position, *Henry* in (1), and half featured female proper names. All subject NPs were gender incongruent with the pronoun subjects in the coordinated clause (*she* in 1). The two ROIs were: a left anterior region (Fp1, F7, F3, FT7, FC3) and a posterior region (TP7, CP3, CPz, CP4, TP8, P7, P3, Pz, P4, P8, O1, Oz, O2). The P600 time window was set to 500-1000 ms post stimulus onset, and the LAN time window was set to 300-500 ms post stimulus onset (Gouvea et al., 2010; Delogu et al., 2019; Barkley et al., 2015).

Despite predicate NPs being non-referential, the results indicated significant effects of gender match on the EEG amplitudes. A predicate NP yielded no LAN effect, but a significant P600 effect against a baseline, referential NP condition (Fig. 1 and 2). This effect indicated that the pronoun was difficult to integrate, which was interpreted as the predicate NP being realised as a poor antecedent to the pronoun (e.g. Delogu et al., 2019). However, gender congruency between the predicate NP and the pronoun attenuated the P600 amplitude. Analyses of the ERPs on the predicate NP (*nurse*/*surgeon* in 1) identified no significant amplitude contrasts, suggesting that the attenuated P600 could not be explained by participants overriding the conventional gender of the proper name subjects (*Henry* in 1) (Fig. 3a). No difference between semantically and stereotypically gendered NPs was observed (Fig 3b). The results suggest that a predicate, non-referring NP is considered a potential antecedent to an anaphoric pronoun during the early stages of pronoun resolution. The results are discussed from the perspective of the relation between syntax and semantics in the building of discourse representations in sentence processing.

(1) Experimental conditions:

| | |
|---|---|
| a. Henry met *a nurse* at the hospital and *she* laughed a lot. | REF-MATCH |
| b. Henry met *a surgeon* at the hospital and *she* laughed a lot. | REF-MISMATCH |
| c. Henry was *a nurse* at the hospital and *she* laughed a lot. | PRED-MATCH |
| d. Henry was *a surgeon* at the hospital and *she* laughed a lot. | PRED-MISMATCH |

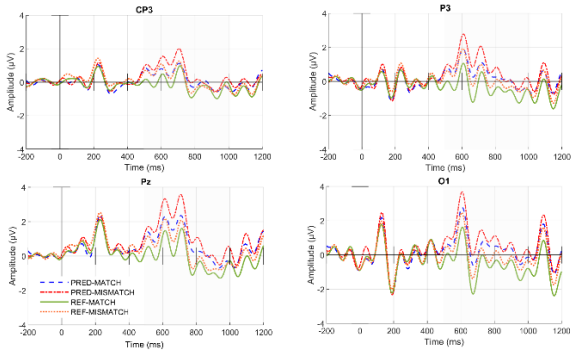



Figure 1: P600 after pronoun onset

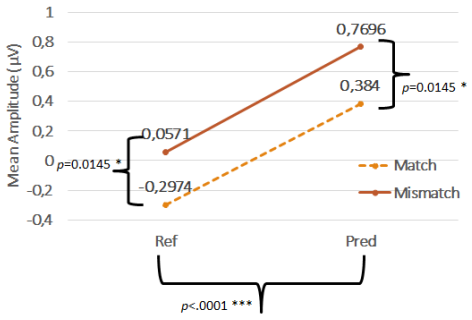
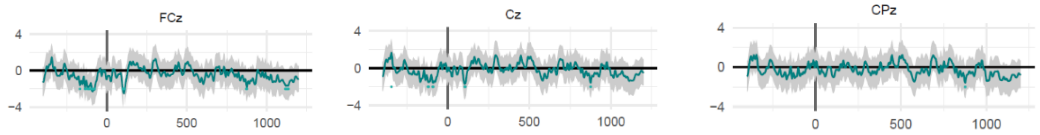
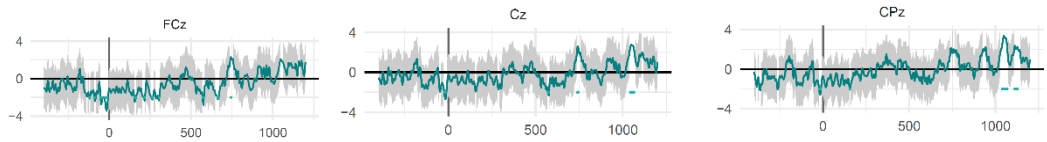



Figure 2: P600 mean amplitude contrast




(a) PRED-MATCH vs. PRED-MISMATCH




(b) Stereotypically vs. semantically gendered NPs

Figure 3: Amplitude contrasts after predicate NP onset

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