Recent studies have shown variability in the processing of pronominal reference within both ambiguous contexts (1a/b) and in contexts of ‘referential failure’ in which there is no gender-matching antecedent within the sentence (2a/b) (Osterhout and Moleby, 1995; Nieuwland and Van Berkum, 2006; Van Berkum and Nieuwland, 2008; Nieuwland, 2014).

These contexts have been shown to give rise to a sustained, frontal negative shift (Nref) or a P600 (or both ERP components) depending on both the accompanying behavioral task and individual differences in working memory (e.g. Nieuwland, 2014). In both contexts, high working memory has been associated with Nref, a component that indexes the inability to assign a unique referent, as opposed to P600 (Nieuwland and Van Berkum, 2006; Nieuwland, 2014). For ‘referential failure,’ it has been proposed that the presence of an explicit acceptability judgment task may give rise to P600s, suggesting attempts at co-reference despite the mismatch in gender (Nieuwland, 2014).

We further examine both referential ambiguity and referential failure using an end of sentence recall task, and including a wider range of cognitive measures, to better understand the factors that impact the resolution of pronominal dependencies.

### 2. EXPERIMENT 1 RESULTS: REFERENTIAL AMBIGUITY

**All Participants (n=33)**

- No significant difference emerged between the two referent (ambiguous) and one referent conditions in the all participants analysis.
- Analyses comparing low and high working memory participants (e.g. Nieuwland and Van Berkum, 2006) did not reveal distinct ERP patterns.
- However, distinct patterns emerged when participants were divided based on whether or not they showed a positivity in the posterior region (500-1400ms) (see Nieuwland and Van Berkum, 2008).

**Group 1**: Nref (n=15)

- Topographic Plots (500-1400ms)
  - No Referent: One Referent
  - Two Referent: One Referent

**Group 2**: Broad Positivity (n=18)

- Topographic Plots (500-1400ms)
  - No Referent: One Referent
  - Two Referent: One Referent

**End of sentence recall task: 83.8-100% (Mean 94.3, SD 5.3)**

**ERP Results**

- 2x2 Repeated Measures ANOVA with Referent (one/two, one/none) and Anteriority (anterior, posterior) as within-participants factors

**Experiment 1: Ambiguity (500-1400ms)**

- All Participants: No significant effects
- Group 1 (n=15): Sustained negativity consistent with Nref
- Group 2 (n=18): Broad positivity

**Experiment 2: Referential Failure**

- Significant positivity restricted to posterior region for all participants. Marginal interaction with Group.
- Significant anterior negativity for Group 1 (not statistically robust)

**Individual Differences**

- Significant negative correlation between performance on counting span task and effect size in the anterior region (500-1400ms) for Group 1 (n=15).
- Significant positive correlation between performance on counting/reading span tasks and effect size in the posterior region (500-900ms) for all participants.