Interference in planning: Accuracy and timing evidence from real-time possessive pronoun production

Eun-Kyoung Rosa Lee (University of Maryland), Sol Lago (Goethe University Frankfurt)

Production studies have shown that the selection of a pronoun's form can go wrong: Sometimes speakers produce faulty pronouns—in gender or number—due to interference from a previously uttered non-antecedent noun [1,2]. Such "attraction errors" demonstrate that memory of previously encountered constituents can interfere with pronoun selection. But can interference also arise due to constituents that are planned but not yet uttered? For example, in a sentence like "Susan chased <u>her</u> grandpa," English speakers need to select a possessive pronoun agreeing in gender with the possessor noun ("Susan") while ignoring the gender of the to-be-uttered possessee ("grandpa"). Failure to do so could result in pronouns with gender reversals, e.g., "<u>his</u> grandpa". Such errors occur in children and second language learners, but previous results are mixed in adult native speakers [3,4]. We demonstrate that interference from to-be-uttered constituents indeed affects native speakers if timing evidence—and deviations other than pronoun gender reversals—is taken into account.

Methods. We used a scene description paradigm (Figure 1): 110 English native speakers viewed 24 scenes depicting a transitive event with two labeled characters ("Susan", "Susan's grandpa"), followed by a to-be-completed preamble ("Susan chased…"). We manipulated whether the two characters (mis)matched in gender, and whether the preamble was active or passive (Table 1). If the gender of a to-be-uttered possessee noun interferes with pronoun selection, we expected more errors and/or delayed responses in mismatch vs. match conditions. Generalized linear mixed-effects models were used to analyze (i) the rate of non-target responses and (ii) the onset and duration of the possessive pronoun.

Results and discussion. Non-target responses were rare (10–13% across conditions) and only 3.4% of non-target responses related to the pronoun were gender reversals (Figure 2). The majority of pronoun-related non-target responses (72.4%) were switches from a pronoun to a definite determiner ("her grandpa" → "the grandpa"). Crucially, these substitutions occurred more frequently in mismatch than match active sentences (t = 3.21, p = .001). In correct responses, the duration of the pronoun was longer in mismatch than match conditions (t = 2.31, p = .02), but no effects were observed in pronoun onsets (t = 0.20, p = .85). Unexpectedly, non-canonical passive sentences elicited fewer—rather than more—non-target responses and earlier pronoun onsets (t = –8.21, p < .001). One possibility is that the longer passive preambles facilitated performance by allowing more time for response planning.

Consistent with previous work [3,4], our findings show that English native speakers rarely make pronoun gender reversals when the possessor and possessee noun differ in gender. Instead, speakers might deal with interference by replacing pronouns with definite determiners, which are unmarked for gender in English and thus do not require commitment to a gendered form. A second novel finding is that interference affects the timing of pronoun production. This effect might result in longer pronoun durations—rather than later onsets—if speakers do not delay uttering a pronoun but instead lengthen its articulation, a strategy feasible in English due to the shared phoneme in the two competing pronoun forms (his/her). Overall, our findings suggest that previously uttered and to-be-uttered constituents affect pronoun selection, suggesting an interaction between antecedent retrieval and constituent planning processes in production.

Table 1. Sample stimulus. The gender of the pronoun was counterbalanced across items.

Sentence type	Gender match	Preamble	Target response
Active	Match	Susan chased	"her grandma"
	Mismatch		"her grandpa"
Passive	Match	Susan was chased by	"her grandma"
	Mismatch		"her grandpa"

Figure 1. Example stimulus in the mismatch condition. Each trial began with an image with labeled characters, followed by a preamble in RSVP. Response deadline: two seconds.
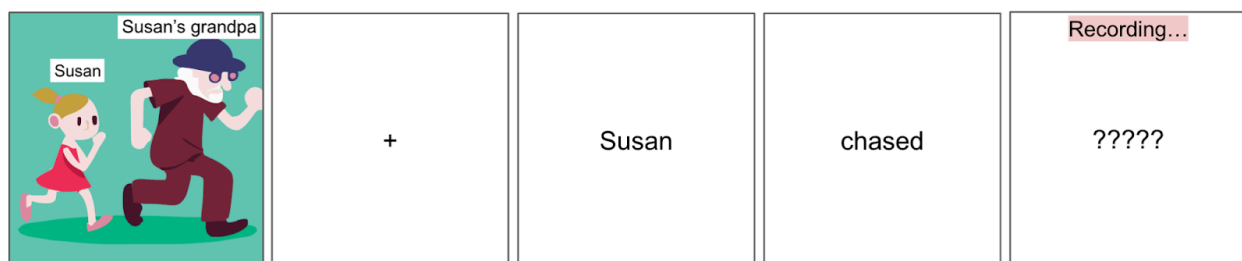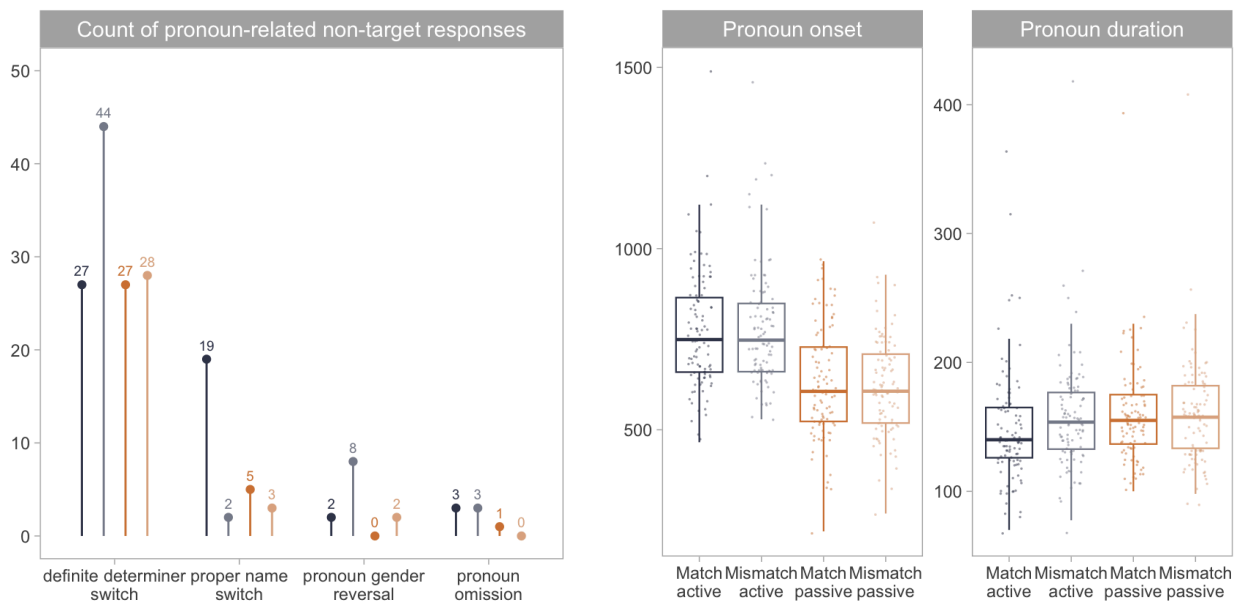

Figure 2. Pronoun-related non-target response counts (left) and pronoun onset and duration (right). Sample non-target utterances for the target response "her grandpa": *determiner switch*: "<u>the</u> grandpa"; *proper name switch*: "<u>Susan's</u> grandpa"; *pronoun gender reversal*: "<u>his</u> grandpa"; *pronoun omission*: "grandpa". Latencies shown in milliseconds (each dot shows a participant).

References [1] Bock, Nicol, & Cutting (1999) *JML* [2] Kandel & Phillips (2022) *JML* [3] Pozzan & Antón-Méndez (2017) *Appl. Psycholinguist.* [4] Slevc, Wardlow Lane, & Ferreira (2007) *MITWPL*