Title. Who gets to start the race? Distinguished referents in pronominal ambiguity resolution

Background. Global ambiguity resolution is sometimes costly [1-4] but it can also exhibit an advantage [5-6] depending on the experimental context [4, 7-8]. [6] showed that pronominal resolution can exhibit an 'ambiguity advantage' such that having multiple matching antecedents speeds up the processing of pronouns. They argue that, like structural attachment, referential dependency resolution can engage in an unrestricted race [9]. Unambiguous pronouns receive penalties due to the reanalysis of erroneously coindexing to non-matching candidates.

Current Study. An unexplored question is what governs when there is such an unrestricted race. A surprising observation from [6] is that subjects and objects are equally preferred in comprehension when ambiguous and there was no difference in reading times when either was unambiguously the referent. Nonetheless, previous studies have shown that subjecthood boosts referent salience [10-12]. In this study, we question whether salient subjecthood affects the condition of the race. We employ three syntactically possible referents in our stimuli, but our syntactic structure makes the matrix subject prominent. If the race for pronominal ambiguity is unstructured, we expect an ambiguity advantage regardless of the availability of the subject. Alternatively, in a more structured process, we expect an advantage for distinguished referents when available. Our results support a structured model in which a distinguished prominent referent, like the subject, can reside in a special cognitive state [14, cf. 13].

Methods. Itemsets were constructed following the template in (1) in a 2x2x2 design that manipulated the gender match of the pronoun with highly gender-typical names [15] occurring at each of three positions; the [Mismatch, Mismatch, Mismatch] condition was dropped to make all sentences natural in isolation. Self-paced reading data from 49 English speakers were collected (age 17-30, mean 21) in person. After each trial, participants answered a wh-question of the embedded object with four choices – three antecedents and a null answer in random order – that revealed how the pronoun was interpreted. Participants read 54 target items and 54 fillers. Pronoun gender and name-to-position assignment were counterbalanced across itemsets.

Results. **Comprehension**. Participants largely only answered the comprehension questions with gender-matching antecedents (Table 1). When it matched the pronoun's gender, the subject was preferred in comprehension question answers. **Reading time (RT)**. We found an ambiguity advantage contingent upon whether the pronoun was co-indexed with the subject as indicated by the comprehension answer. When it was, RT at the pronoun did not show an ambiguity advantage, i.e., the number of other matches was irrelevant. When the pronoun was <u>not</u> co-indexed with the subject, an ambiguity advantage was found at the pronoun: faster RTs to multiple matches grouped by the availability of the subject (Figure 1), $\beta = _{.95}(-53.2, -2.6)$, p=0.03. Moreover, RTs at the pronoun negatively correlated with the antecedent choice percentage. RTs were shortest whenever the subject was chosen in line with previous findings in [16] (Figure 2).

Discussion. We found that pronominal ambiguity resolution is structured by the availability of subjects. When participants interpret the pronoun as referring to the subject, the pronoun is read the fastest, and an ambiguity advantage effect only arises when the pronoun is <u>not</u> linked to the subject. One way to explain these results is to assume that a distinguished referent, usually the subject in our stimuli, exists in a privileged cognitive stage (cf. [13-14]) that diminishes the ambiguity effects. Coindexation with the distinguished referent is always attempted initially, as indicated in Figure 3. If this fails, an unrestricted race commences with other feature-matching antecedents which gives rise to an ambiguity advantage.

(1) Sample item trial

… When {Michael, Lisa} arrived, {William, Crystal} mentioned to {Gregory, Amy} that the government would hire him/her in two weeks.

… Who would be hired by the government in two weeks?

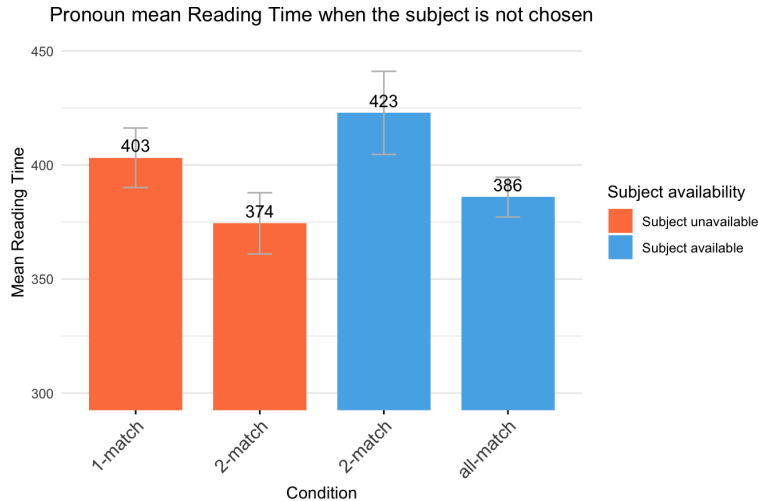a. {Michael, Lisa}   b. {William, Crystal}   c. {Gregory, Amy}   d. I'm not sure

Figure 1: Pronoun RT contingent to subject availability
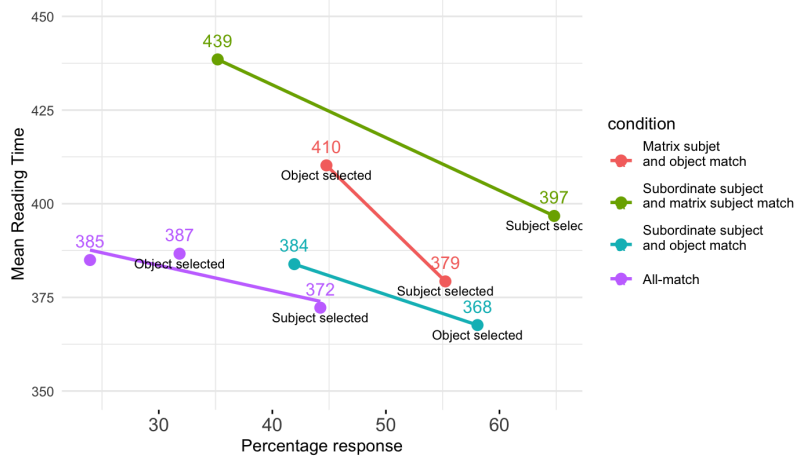

Figure 2: Pronoun RT in relation to percentages of response

References. [1] Stewart et al. (2007) QJEP. [2] Badecker & Straub (2002) Journal of Experimental Psychology. [3] Logačev & Vasishth (2015) Cognitive Science. [4] Swets et al. (2008) Memory and Cognition. [5] Traxler et al. (1998) JML. [6] Grant et al. (2020) Glossa. [7] Garnham et al. (1992) Language and Cognitive Processes. [8] Rigalleau et al. (2004) QJEP. [9] van Gompel et al. (2000) Cambridge. [10] Kaiser (2011) Language and Cognitive Processes. [11] Arnold (1999) University of Pennsylvania. [12] Cowles (2003) UCSD. [13] Foraker & McElree (2007) JML. [14] Gundel (1999) Language. [15] CDPH (2024) [16] Kush et al. (2019) Journal of Experimental Psychology.
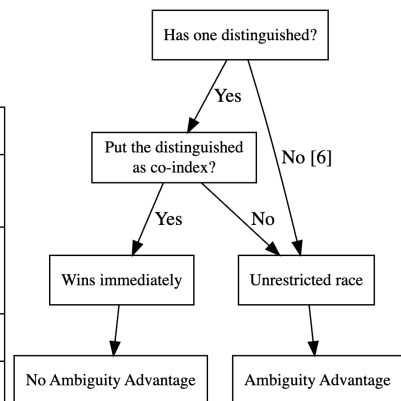
Table 1 Comprehension percentage per condition

Response %	Subject Matches Pron.				Subject Mismatches Pron.		
X = Referent **matches** pronoun's gender **Y** = Referent **mismatches** pronoun's gender	All Match	Two Match		Single Match	Two Match	Single Match	
	XXX	XXY	YXX	YXY	XYX	XYY	YYX
Sub. subject (Name 1)	**21**	**29**	2	4	**26.5**	2.4	**82.7**
Subject (Name 2)	**39**	**56**	**49**	**86**	10.2	5.4	8.8
Object (Name 3)	**24**	3	**38**	4	**49.7**	**86.7**	3.1
I'm not sure	16	12	11	5	13.6	5.4	5.4

Figure 3: Race flowchart