Variation in reflexive processing across constructions and individuals

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While real-time linguistic dependency resolution is understood through a content-addressable cue-based retrieval process [1], variation in cue weighting across dependency types and individuals has only recently been explored [e.g.,2]. This study investigates how individual differences in *structural leniency*—leniency in using structural cues—affect English reflexive pronoun resolution. Prior work has identified a three-way gradient in preference for Nonlocal referents [3]: comparatives (1a) strongly prefer Nonlocal referents, coarguments (1b) strongly prefer Local referents [4-5], and PNP and PP constructions (1c-1d) show intermediate preferences [6-7]. Studies examining variation across structures have primarily relied on offline measures [3], while those using online measures have been limited to subsets of constructions [4-7]. This study uses online measures to compare structural variation and examines how individual differences influence sensitivity to structural cues.

Design & Procedure. A web-based visual world paradigm eyetracking experiment was conducted through PCIbex Farm [8] with native English speakers recruited via Prolific (subj n=100; item=32). Sentences contained a reflexive pronoun (*himself*/*herself*) and two noun phrases: one Local and one Nonlocal to the pronoun (1). Gender congruence between the reflexive pronoun and the Local referent was varied (Match vs. Mismatch), while the Nonlocal referent always matched the pronoun in gender, adapting the design from [7]. Four structures were tested: coargument, comparative, PNP, and PP. Each trial presented 4 images (2 referents and 2 distractors), and the target sentence was played auditorily, followed by a forced-choice antecedent selection task.

Results. Overall, we observed a three-way division in Nonlocal referent preference across structures in the offline data, replicating earlier findings [e.g.,3]. In comparatives, the Nonlocal referent was almost always preferred regardless of the condition (95%). In PNPs and PPs, the Nonlocal referent was predominantly chosen in the Mismatch condition (90%), while the Local referent was preferred in the Match condition (85%). The strongest preference for the Local referent was found in coarguments: 85% in the Match condition and 30% even in the Mismatch condition. To examine **individual differences in structural leniency**, we averaged Nonlocal-preference across constructions in offline judgments, excluding comparatives given the semantic implausibility of Local referents. The mean Nonlocal preference score categorized participants into *lenient* (n=44, score$\geq$top 30%), *strict* (n=39, score$\leq$bottom 30%), and *moderate* (n=17, middle 30%) groups (Fig. 1). In the **force-choice task**, group differences emerged in Local vs. Nonlocal preferences across four structures (Fig. 2). The strict group: comparative and coargument structures showed a strong locality constraint in opposite directions with minimal gender effect, while PNP and PP structures were intermediate. In the lenient group, comparatives consistently preferred the Nonlocal referent, and in the other three constructions, preference was modulated by gender match with Nonlocal referents preferred in the Mismatch condition. In the **eyegaze data** (Fig. 3), we analyzed looks to (non)local targets using cluster-based permutation analysis with the permutes package in R [9]. In the strict group, no significant clusters were found (ps>0.05). In the lenient group, significant clusters were found, i.e., more looks to the Nonlocal referent in the Mismatch than the Match condition, in coargument (5400–5700 ms), PNP (3400–3800, 5100–5500 ms), and PP (5800–6600 ms) (ps<0.05) but not in comparative (ps>0.05).

Discussion & Conclusion. We observed a ternary division in Nonlocal referent preference in average offline data, but this was only evident in the strict group. In contrast, the lenient group was influenced by both structural and nonstructural (gender) cues, with even Nonlocal gender-matching referent competing with a structurally Local referent. Eyetracking data supported this, showing that in the lenient group, the Nonlocal entity interfered after the pronoun onset, while the strict group mostly targeted the Local entity despite the gender-matching, Nonlocal competitor. These findings suggest that individual differences in structural leniency can guide parsing preferences. We conjec-

ture that the comparative weight difference between locality and gender cues would be higher in the strict group than the lenient group [e.g.,2], but quantitative modeling remains as future work.

(1) 32 items = 8 items * 4 constructions. NP1 = Nonlocal; NP2 = Local. Gender match between the Local NP and the reflexive pronouns was varied. Half *himself* & half *herself* as the pronoun.

a. Comparative. NP1 VERB that NP2 was ADJ-er than {him/her}self
[Match] *The queen* knew that **the princess** was lighter than **herself** by ten pounds.
[Mismatch] *The king* knew that **the princess** was lighter than **himself** by ten pounds.

b. Coargument. NP1 VERB that NP2 had VERB {him/her}self
[Match] *The king* knew that **the prince** had lost **himself** near the back of the store.
[Mismatch] *The queen* knew that **the prince** had lost **herself** near the back of the store.

c. Picture NP (PNP). NP1 VERB that NP2 VERB a {picture/portrait...} of {him/her}self
[Match] *The princess* knew that **the queen** left a portrait of **herself** by the table …
[Mismatch] *The prince* knew that **the queen** left a portrait of **himself** by the table …

d. Prepositional Phrase (PP). NP1 VERB that NP2 had VERB NP PP {him/her}self
[Match] *The prince* remembered that **the king** had rolled the carpet around **himself** …
[Mismatch] *The princess* remembered that **the king** had rolled the carpet around **herself** …

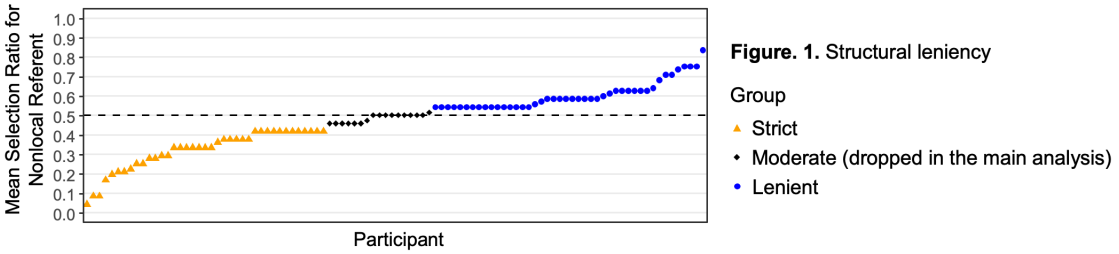

Figure. 1. Structural leniency

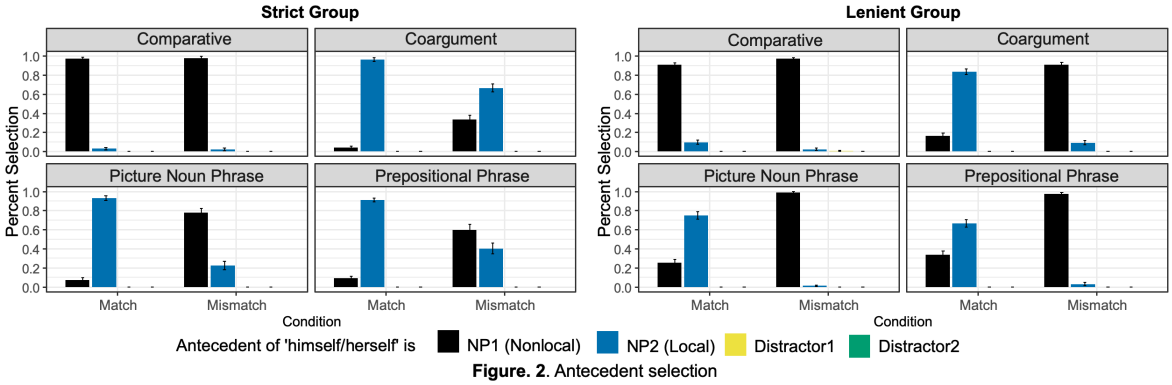

Figure. 2. Antecedent selection

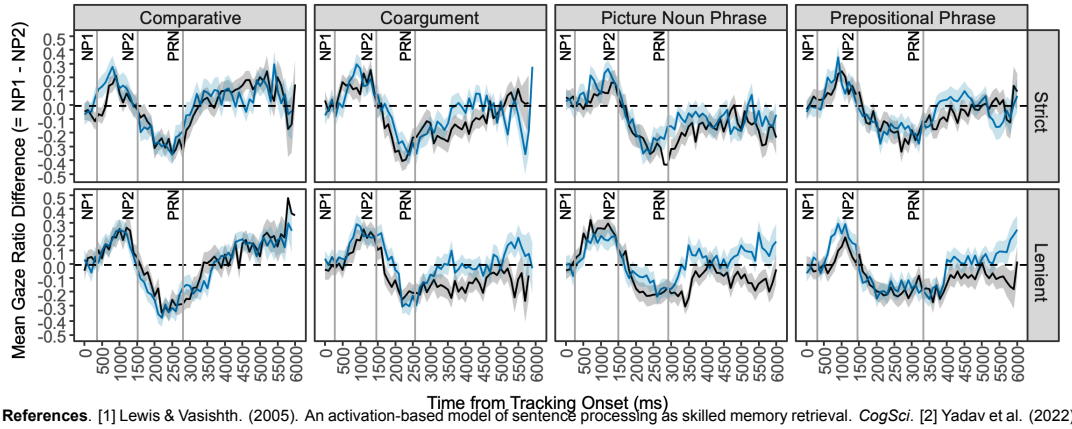

Figure. 3
Eye-gaze difference.
NP1 = Nonlocal.
NP2 = Local.
PRN = Pronoun.

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