Memory retrieval selectively targets different discourse units

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Appositive relative clauses (ARCs) are distinct from restrictive relative clauses (RRCs) in their discourse status [1]. ARCs are often considered as side-comments and separate discourse units from the main clause. Earlier studies showed that ARCs cause less processing burden compared to RRCs, raising the possibility that linguistic units with different discourse status are maintained separately in working memory (WM) [2-3]. To further investigate how the WM is sensitive to distinct discourse status, we examine whether memory retrieval can selectively target specific discourse units, circumventing similarity-based interference between different discourse units.

Design: Following [4], we use the well-established number agreement attraction effect to examine the retrieval process in ARCs, having RRCs as a control comparison. Three self-paced-reading experiments were conducted in English on native English speakers, all with a 2x2x2 design: grammaticality (grammatical vs. ungrammatical), distractor noun (singular. vs. plural), and clause type (ARC vs. RRC) (1). The attraction effect was hypothesized to manifest an interaction of grammaticality and distractor, with faster RTs in the critical region with the ungrammatical plural distractor condition compared to the ungrammatical singular distractor condition [e.g., 5]. In Experiment 1, the retrieval target NP that controls the agreement was in the main clause and the distractor NP was in the ARC. This mapping was reversed in Experiment 2: the retrieval target NP in the ARC and the distractor NP in the main clause. In Experiment 3, the basic design was identical to Experiment 2, but the distractor NP (*musicians*) was placed in an object position.

Prediction: For RRCs, we expect to replicate the standard agreement attraction effect in all three experiments. For ARCs, if memory retrieval accurately targets ARC and main clause based on their discourse status, there should be no attraction effect across all three experiments since the retrieval target NP and the distractor NP were located in distinct discourse status.

Results: In **Experiment 1** (subj n=120; item n=48), there was a 2-way interaction of distractor and grammaticality at the spillover region (b=0.018, SE=0.006, t=2.024) with RRCs, replicating previous work on the attraction effect [6]. However, no such interaction was found with ARCs (b=0.003, SE=0.006, t=0.534) (Figure 1). Possibly due to insufficient power, we did not find a 3-way grammaticality x distractor x clause type interaction (b=0.004, SE=0.004, t=-1.035). In **Experiment 2** (subj n=96; item n=48), we found the attraction effect at the spillover region, irrespective of clause type (b=0.014, SE=0.005, t=2.981) (Figure 2). In **Experiment 3** (subj n=96; item n=48), we also found the attraction effect regardless of clause type at the spillover region (b=0.018, SE=0.004, t=2.639) (Figure 3).

Discussion and conclusion: We found *directionality of interference* with ARCs, where the distractor NP in the main clause could intrude on the agreement process within the ARC, but not vice versa. Such directionality is not predicted if WM strictly targets only linguistic content within the same discourse unit. Instead, we suggest that the memory retrieval mechanism can incrementally track the availability and accessibility to *Discourse Questions* (DQs). Following the proposal that discourse is represented as an incremental construction of discourse units [7-9] and that each discourse unit raises a new DQ [9], we assume that ARCs open a new DQ, separate from the main DQ, while in the meantime the main DQ is still accessible. The agreement process within the ARC therefore still has access to the main content (Experiments 2-3). However, once the ARC is closed off, the DQ based on the ARC becomes no longer available/active [8-9], and consequently the information within the ARC can no longer intrude on the agreement process in the main clause (Experiment 1). For RRCs, the RRC content is part of the main DQ, and therefore it is always accessible for memory retrieval. In short**, the scope of memory retrieval is sensitive to DQs**, targeting only information relevant to the DQs that are active at the retrieval site.

(1) **Examples.** Critical regions bold-faced. Retrieval-target nouns italicized. Distractor nouns underlined. The '/' sign marks self-paced-reading regions. The '*' indicates ungrammaticality.

a. Experiment 1 (RRC material adapted from [6])
   The *waitress*(,) / who / sat / near / the girl(s)(,) / {**was**/***were**} / **surprisingly** / unhappy…
b. Experiment 2 (RRC material adapted from [5])
   The / musician(s)(,) / who / the / *reviewer* / {**praises**/***praise**} / **so** / highly(,) / will …
c. Experiment 3
   Alicia / met / the / musician(s)(,) / who / the / *reviewer* / {**praises**/***praise**} / **so** / highly…

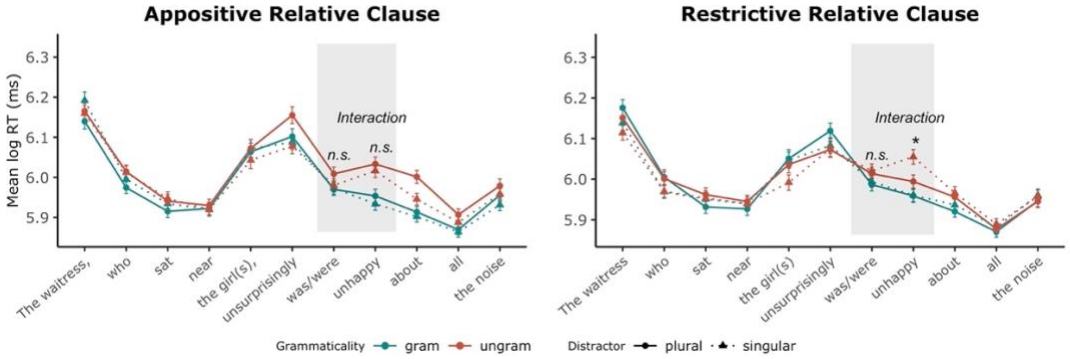

Figure 1. Experiment 1 Mean log reading times. Critical regions in grey box.

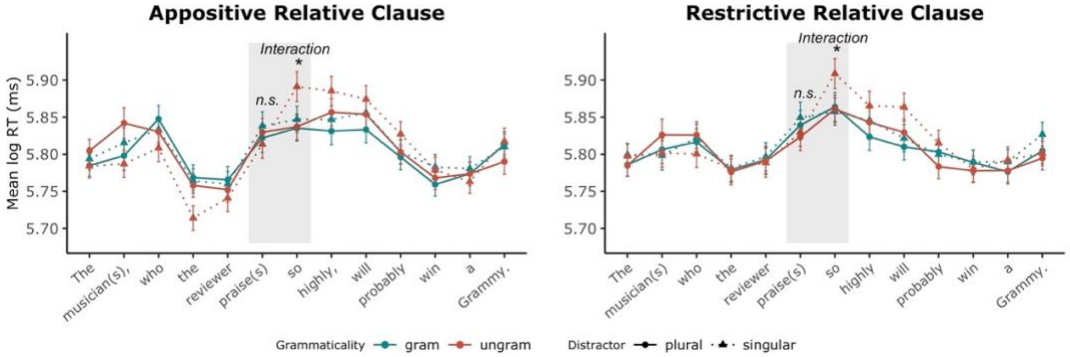

Figure 2. Experiment 2 Mean log reading times. Critical regions in grey box.

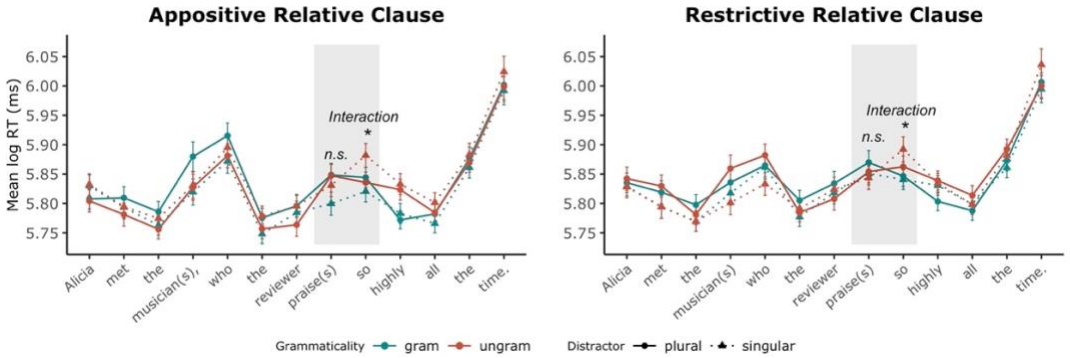

Figure 3. Experiment 3 Mean log reading times. Critical regions in grey box.

References. [1] Koev, T. 2013. Rutgers Univ. Doctoral dissertation. [2] Dillon et al. 2014. *Lang. Cog. Neuroscience*. [3] Dillon et al. 2017. *JML*. [4] McInnerney & Atkinson. 2020. *CUNY* talk. [5] Wagers et al. 2009. *JML*. [6] Parker & An. 2018. *Fpsyg*. [7] Asher & Lascarides. 2003. *Logics of Conversation.* [8] Grosz & Sidner. 1986. *Comp Ling.* [9] Jaskinskaja, K. 2016. Not at issue anymore. *ms.* U of Cologne.