Reanalysis in Hebrew object-subject local ambiguities: Effects of verb type and prior reading times

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Background. Sentences with object-subject local ambiguity in English, such as (i), were found to show slowdown the main verb *fell,* argued to reflect reanalysis (e.g., [1-2]). In contrast, in Hebrew, slowdown was observed mostly at the sentence end, rather than on the verb [8]. Previous research also showed that longer RTs on the disambiguation region predict successful reanalysis in such sentences [8].

(**i**) When the woman drew a cute boy *fell* from the high chair.

Interestingly, the Hebrew experiment showing sentence-final effects included unaccusative main verbs (e.g. *fell*). These verbs map their subject internally. In contrast, the subject of unergative verbs is mapped externally [3-5]. In Hebrew, verb-subject order is allowed more freely with unaccusative than unergative verbs, though both are allowed when a phrase is preposed to the sentence-initial position [6]. Thus, in Hebrew, upon the arrival of the main verb in (**i**), it is possible to anticipate a post-verbal noun, e.g. '*another toddler*' as in (**ii**), that will serve as subject for this verb.

(**ii**) When the woman drew a cute boy fell/jumped from the chair another toddler.

The current experiment tests whether unaccusative and unergative main verbs in Hebrew object-subject ambiguities give rise to different parsing decisions. If a post-verbal subject is more readily available in real time processing for unaccusative compared to unergative verbs (because it is not conditioned on a specific syntactic environment), then participants will be more likely to anticipate a post-verbal noun phrase when the main verb is unaccusative than when it is unergative, and will not perform reanalysis at the verb. To probe attachment preferences we used a speeded forced choice completion task [7]. In addition, the sentence preamble was read via self-paced reading. This enabled us to correlate reading times of the preamble with whether reanalysis was performed or not.

Methods. In 20 sets, we manipulated ambiguity and main verb type (unaccusative vs. unergative) (see Table 1). For each preamble, two completion options were presented: (a) an NP, which would be the preferred completion if no reanalysis was performed on the verb, and a post-verbal subject was anticipated; (b) an adverbial PP, which would be the natural completion if reanalysis was performed. For RTs, we carried out separate analyses for the main verb and its two spill-over regions. The analyses included completion choice in addition to ambiguity and verb type.

Results (N=80). For unambiguous sentences, completion accuracy was high. More NP-completions were chosen in the ambiguous than in the unambiguous conditions, and there was no difference between the two verb types. For RTs, all regions showed a main effect of ambiguity, with longer RTs in ambiguous sentences. In the first spillover region we found an interaction between ambiguity and verb type, with larger difference between ambiguous and unambiguous sentences in unergatives than unacusatives. In ambiguous sentences, completion choices showed an effect, with longer RTs for PP-choices (reflecting reanalysis) compared to NP-choices. Completion choice did not interact with verb type.

Discussion. The lack of a difference between verb types in completion choices shows that participants were garden pathed at the main verb, both with unaccusative and unergative verbs, i.e., the parser did not anticipate a subject after unaccusatives in more cases than after unergatives. The relation between critical RTs and completion choices provides evidence that longer reading times are indeed indicative of reanalysis performance. The greater processing difficulty in unergatives compared with unaccusatives in the first spill-over (in both PP and NP completions) can be due to thematic differences leading to differences in argument mapping between the verb types.

Table 1: Example set

Ambiguous:

kše-ha-iša ciyra yeled xamud ve-šovav   nafal / kafac me-ha-bama ha-gvoha

'When the woman drew a cute and playful boy fell / jumped from the high stage'

Completion options: **NP** [*paot axer*]   / **PP** [*la-miflas še-mitaxat*].

another toddler /   *to the level below*

(no reanalysis   /   (reanalysis)

Unambiguous:

kše-ha-iša yac'a yeled xamud ve-šovav   nafal / kafac me-ha-bama ha-gvoha

'When the woman came out a cute and playful boy fell / jumped from the high stage'

Completion options: **NP**-[*paot axer*]   / **PP**-[*la-miflas še-mitaxat*].

another toddler /   *to the level below*

(incorrect)   /   (correct)

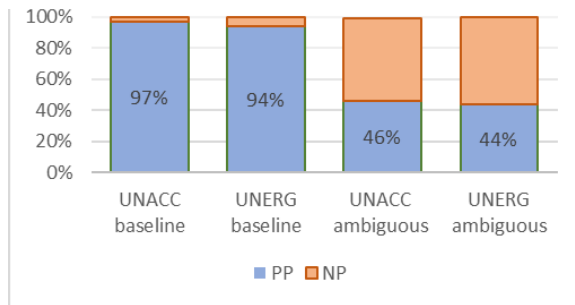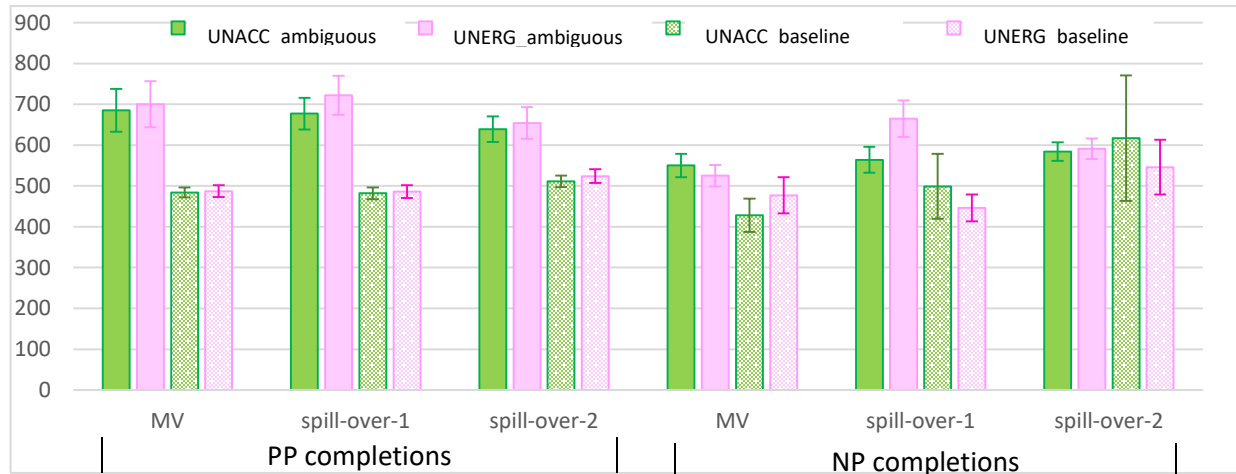Figure 1. Rate of PP and NP completions by condition

Figure 2. Critical region RT means (ms) by the choice of completion. Error bars represent +/-SE

References [1] Qian, Garnsey, & Christianson (2017). A comparison of online and offline measures of good-enough processing in garden-path sentences. *LCN*. [2] Sturt, Pickering, & Crocker (1999). Structural Change and Reanalysis Difficulty in Language Comprehension. *JML* [3] Burzio (1986). *Italian Syntax*. [4] Levin & Rappaport-Hovav (1995). *Unaccusativity*. [5] Reinhart (2000). The theta system. *OTS working papers in linguistics*. [6] Shlonsky & Doron (1992). Verb second in Hebrew. *Proceedings of the Conference on Formal Linguistics*. [7] Sikos, Duffield, & Kim. (2016). Grammatical predictions reveal influences of semantic attraction in online sentence comprehension. *LCN*. [8] Karsenti, & Meltzer-Asscher(**2022**). Prediction of successful reanalysis based on eye-blink rate and reading times in sentences with local ambiguity. *Language and Cognition*