Illicit syntactic representations in garden-path reanalysis: More evidence from reflexives

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While garden-path misinterpretation has been used to suggest that garden-path reanalysis may not always be successful (Christianson et al., 2001), more recent work has proposed that the parser fully recovers a licit syntactic analysis and that misinterpretation instead results from fallible memory processes. Slattery et al. (2013) and Huang & Ferreira (2021) examined gender mismatch effects (GMMEs) on reflexives after NP/Z ambiguities, as in (1a,c), to probe the properties of the main clause subject after reanalysis, as reflexive bind to a c-commanding NP in their local domain and are relatively immune to grammatically inaccessible antecedents (Sturt, 2003). Both studies reported longer reading times (RTs) on reflexives in gender mismatch conditions, suggesting that the correct NP had been parsed as the main clause subject and structural reanalysis was fully successful in spite of lingering misinterpretations.

However, in addition to fallible memory for which analysis is ultimately adopted, cue-based retrieval models suggest that fallible memory processes may also be involved in the reanalysis process itself. In the NP/Z ambiguities like (1), the disambiguating verb cues the parser to retrieve an NP for its missing subject. If this retrieval process is structure-insensitive, as it is in other retrieval cases (Lewis & Vasishth, 2005), it could retrieve either the ambiguous NP or the subordinate clause subject NP as the missing main clause subject. To examine this possibility, we investigated an additional condition within Slatter et al.'s (2013) and Huang & Ferreira's (2021) design, where the reflexive's gender mismatched the ambiguous NP, but matched the subordinate subject NP, (1b). A full-recovery model predicts GMMEs in Garden-Path structures to match those in Controls; however, a cue-based memory retrieval model predicts that the presence of a matching but structurally irrelevant NP will mislead the parser to retrieve the wrong NP as its potential subject, leading to an illusion of recovery and a lessening of the GMME.

Method. 90 English speakers from Prolific participated in a word-by-word self-paced reading study consisting of 36 NP/Z garden-path sentences and 72 fillers. We manipulated the genders of NP1, the irrelevant subordinate subject (*Olivia*), and NP2, the temporarily ambiguous main clause subject (*actor*), to (mis)match with a reflexive (*himself*), half masculine/half feminine, in a 2 (Garden-path, Control) by 3 (Grammatical, Illusory, Ungrammatical) design, shown in (1) adding Illusory to the two conditions that replicate Slattery et al. (2013) and Huang & Ferreira (2021).

Results. Average RTs are shown in Figure 1. A linear mixed effect model on first spillover RTs (*into*), sum-coding Structure (Garden-path vs. Control) and agreement contracts: Grammaticality (Grammatical vs. Ungrammatical) and Agreement (Grammatical vs. Illusory), revealed significant effects of Grammaticality and an interaction of Structure:Agreement (see Table 1). Planned comparisons via *emmeans* revealed that both Ungrammatical (Est=-56.00, t=-3.755, p>.001) and Illusory (Est=-54.94, t=-4.234, p>.001) were slower than Grammatical in Control structures, while only Ungrammatical (Est=-49.19, t=-1.888, p=.003) was slower than Grammatical in Garden-paths. Illusory (Est=-20.33, t=-1.974, p=.125) no longer showed a significant difference from Grammatical in the Garden-path condition.

Discussion. While RTs on reflexives in control sentences consistently showed a gender mismatch effect regardless of NP1's gender, reflexives in garden-path sentences only showed a significant gender mismatch effect when both NP1 and NP2 were gender mismatched. The disruption was reduced when the gender of the irrelevant subject NP1 matched the reflexive but the main clause subject NP2 did not match the reflexive, suggesting an *illusion of full recovery*. That this illusion is limited to garden-path sentences argues against an account in which reflexives themselves suffered an illusion of grammaticality when retrieving their antecedents. Instead, we propose that all NPs, even those that are structurally inadmissible, are considered when the parser seeks an NP to analyze as its main clause subject. This suggests that the parser's use of noisy memory retrieval processes when under pressure to reparse structural ambiguities can sometimes cause it to stray from its grammatical bounds.

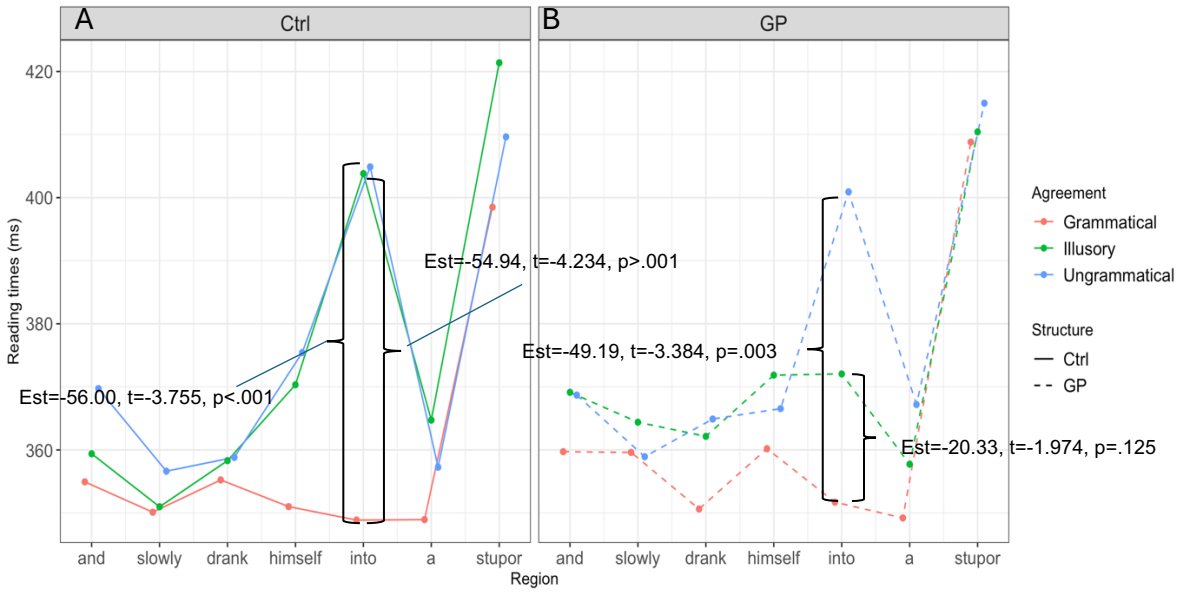
Example Stimuli. NP1 (*Olivia/Oscar*) and NP2 (*actor/actress*) are underlined, disambiguating verb italicized (*swore*), reflexive (*himself*) in bold.

(1) a. Grammatical	After Olivia visited(,) the actor who appeared unkempt and gloomy *swore* and slowly drank **himself** into a stupor.
b. Illusory	After Oscar visited(,) the actress who appeared unkempt and gloomy *swore* and slowly drank **himself** into a stupor.
c. Ungrammatical	After Olivia visited(,) the actress who appeared unkempt and gloomy *swore* and slowly drank **himself** into a stupor.

Table 1. Fixed effects for the first spillover region.

	Est.	Std.Err.	*t*	*p*
Structure	-10.965	6.701	-1.636	.104
Grammaticality	45.038	15.676	2.873	.005 **
Agreement	15.113	11.063	1.366	.175
Structure:Grammaticality	13.999	16.834	0.832	.406
Structure:Agreement	-41.606	18.765	-2.217	.028*

Figure 1. Average reading times for (A) Control and (B) Garden-path sentences. Planned comparisons are shown for each contrast.



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