

Reading longer does not help: Reaction times predict general comprehension but not garden-path recovery

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Background: The process of reanalysing garden-path sentences (GPs) is time-consuming, and its outcome is often imperfect, frequently resulting in disrupted representations [1,2]. Interestingly, neither the amount of slowdown nor the amount of re-reading seems to influence the success of reanalysis in any way [3,4]. However, previous studies only probed comprehension with a question focusing on the inhibition of initial misanalysis of the ambiguous region (cf. example 1), while the relationship between reaction times (RTs) and response accuracy (RA) could be related to other analysis steps. If this is the case, the effects could be found if other sentence regions are probed.

Methods: We used 48 Czech GPs with four yes/no comprehension questions targeting distinct regions in a self-paced reading paradigm (N=384). We tested whether response accuracy (RA) is predicted by RTs in disambiguating, spillover, or wrap-up regions. Additionally, we examined mean per-word RTs for pre-disambiguation regions (unrelated to reanalysis), post-disambiguation regions, and whole sentence to assess whether time dedicated specifically to reanalysis affects RA. Logistic mixed-effects models were used for analysis.

Results & Discussion: All model predictions are shown in Fig. 1. We found that longer RTs improved RA for most questions regardless of ambiguity presence, with two exceptions: a) the question targeting the correct interpretation of the disambiguating region, which showed ceiling effects, and b) the question targeting the correct interpretation of the ambiguous region, where longer RTs increased RA only in the non-GP condition. Crucially, identical patterns held for all RT measures, including pre-/post-disambiguation and global means. This suggests that: **a)** slower reading likely reflects deeper processing, helping readers avoid general comprehension errors related to memory decay or interference (errors shared by GP and non-GP conditions [2]); **b)** recovering the correct interpretation of GP sentences is largely time independent (no effects of RTs on RA regarding the correct interpretation of ambiguous region in GP), **c)** the ultimate comprehension success is not straightforwardly affected by time spent specifically on reanalysis (no difference between reanalysis-related and -unrelated regions). Instead, readers often seem to maintain either the initial correct analysis or the misanalysis regardless of how much time they spend rereading the sentence. This is consistent with the ideas of the good-enough approach [1,2] or confirmatory re-reading [3,4].

References

- [1] Christianson, K., Hollingworth, A., Halliwell, J. F., & Ferreira, F. (2001). Thematic roles assigned along the garden path linger. *Cognitive Psychology*, 42 (4), 368–407. <https://doi.org/10.1006/cogp.2001.0752> [2] Ceháková, M., & Chromý, J. (2023). Garden-path sentences and the diversity of their (mis)representations. *Plos one*, 18 (7), e0288817. <https://doi.org/10.1371/journal.pone.0288817> [3] Paape, D., & Vasisht, S. (2022b). Is reanalysis selective when regressions are consciously controlled? *Glossa Psycholinguistics*, 1 (1). <https://doi.org/10.5070/G601139> [4] Christianson, K., Dempsey, J., Tsiola, A., Deshaies, S.-E. M., & Kim, N. (2024). Retracing the garden-path: Nonselective rereading and no reanalysis. *Journal of Memory and Language*, 137, 104515. <https://doi.org/10.1016/j.jml.2024.104515>

Model example of a GP sentence and related questions (we use an English sentence for the sake of brevity):

While the thief hid the jewels sparkled brightly.

Misanalysis of the ambiguous region (AmbMis): *Did the thief hide the jewels?*

Correct analysis of the ambiguous region (AmbCor): *Did the thief hide himself?*

Misanalysis of the disambiguating region (DisMis): *Did the thief sparkle brightly?*

Correct analysis of the disambiguating region (DisCor): *Did the jewels sparkle brightly?*

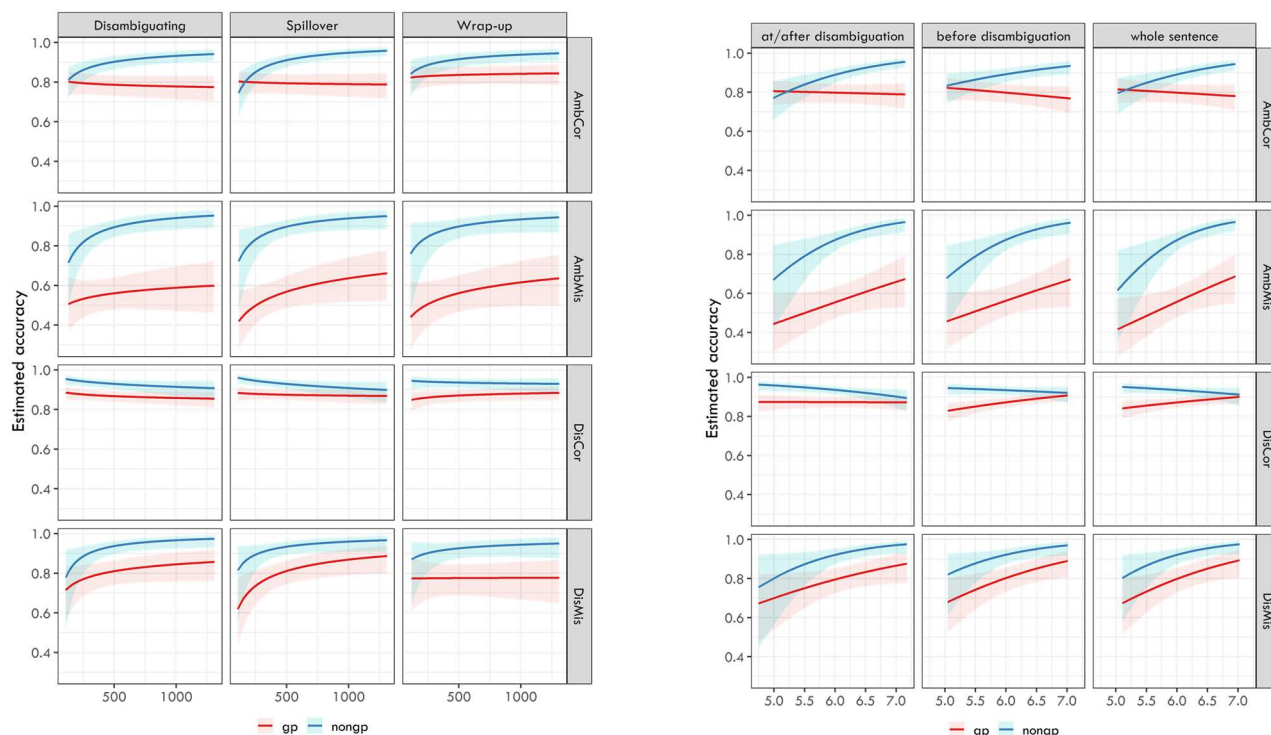


Fig. 1: Model predictions for the individual combinations of RTs on the specific sentence regions and the four comprehension questions.