GEPPU: An Eye-Tracking and Self-Paced Reading Benchmark Dataset for German Sentence Processing

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Introduction

- Benchmark data are an important tool for developing theories and evaluating model predictions.
- The majority of benchmark data in sentence processing are limited to naturalistic reading (e.g., [1, 2, 3]).
- But benchmarks based on controlled stimuli (e.g., [7, 17]) are also necessary for robust model evaluation.

The GEPPU data collection (in progress)

- We collect eye-tracking benchmark data for a battery of postulated effects in German (10 designs).
- In parallel, we have also collect self-paced reading (SPR) data on the same materials.
- So far, 195 out of target 312 in-lab participants have been tested with eye tracking. 1 was excluded due to low accuracy on comprehension questions.
- 1,100 Prolific participants have been tested with SPR. 76 were excluded due to low accuracy on comprehension questions.
- We show the results so far, compared to pre-registered qualitative and surprisal-based [4, 10, 15] predictions.

Pre-Registration Protocol (SPR)

osf.io/wpra9

Phenomena, Demographics, Predictions, and Estimates

Experimental Designs

GPSD (2×2): Garden Paths From Subject-vs.-Direct-Object Ambiguity
Ambiguous/Unambiguous × S–O/O–S — closely replicating [12]

GPSI (2×2): Garden Paths From Subject-vs.-Indirect-Object Ambiguity
Ambiguous/Unambiguous × Active/Passive — loosely replicating [13]

GPCA (2×2): Garden Paths From Coordination Ambiguity
NP-/VP-Coordination × AP-/PP-Modifier — closely replicating [9]

GPMI (2×2): Garden Paths From Modifier-vs.-Indirect-Object Ambiguity
Modifier/No-Modifier × Ambiguous/Unambiguous — closely replicating [8]

AGAT (2×2): Agreement Attraction in Grammatical Sentences
Singular-/Plural-Controller × Match/Mismatch — closely replicating [5]

LOCO (2×2): Local Coherence
Coherent/Incoherent × Intervener/No-Intervener — closely replicating [14]

SBIN (2×2): Similarity-Based Interference
Subject-Cue [Yes/No] × Animacy-Cue [Yes/No] — closely replicating [16]

RCSO (2×2): Subject vs. Object Relative Clauses
Subject/Object × Double-/Single-Embedding — German adaptation of [6]

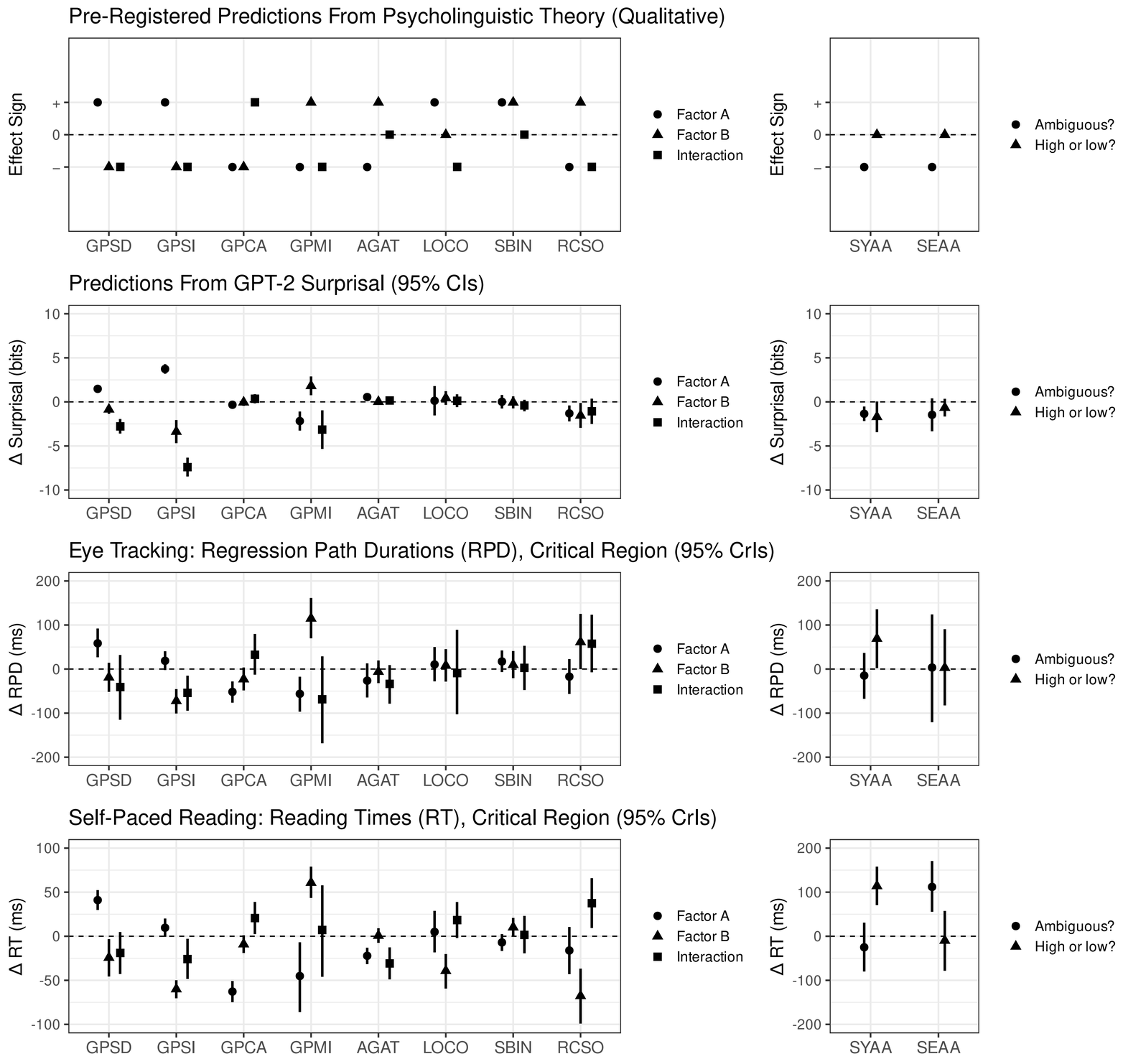
SYAA (3×1): Syntax-Based Attachment Ambiguity
High-/Low-/Ambiguous-Attachment — closely replicating [11]

SEAA (3×1): Semantics-Based Attachment Ambiguity
High-/Low-/Ambiguous-Attachment — German adaptation of [18]

Method	L1	N	Gender			Age (SD)	Comprehension Accuracy (%)	Trials per Participant
			Female	Male	Other			
Eye Tracking	German	195	147	46	2	23.3 (4.5)	82.6 %	114
SPR	German	1,100	456	643	1	30.9 (9.0)	76.1 %	114

Method	Level	Measure	Mean ± 95% CI
Eye Tracking	Word	Single Fixation[1]	238.1 ± 4.3
		First Fixation[1]	233.9 ± 3.8
		Gaze Duration[1]	306.0 ± 6.8
		Total Fixation[1]	558.6 ± 20.4
		Number of Fixations[2]	2.2 ± 0.1
		Skip Rate[3]	0.24 ± 0.01
		Regression Rate[3]	0.19 ± 0.01
SPR	Segment	Reading Time[1]	695.4 ± 12.9

[1]In milliseconds. [2]Average number of fixations per word. [3]Proportion of words.



Highlights

- **GEPPU** (**G**erman **E**valuation Benchmark for **P**sycholinguistics from **P**otsdam **U**niversity)
- A novel dataset with parallel eye-tracking and SPR data, based on controlled experimental designs
- Once published as a paper, the dataset will be made openly available!

References

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