

Effects of linguistic context and reader literacy on processing of unknown words

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Encountering unknown words disrupts reading and requires readers to rely on contextual information to infer meaning. The present study investigates how discourse context and individual differences in literacy modulate processing of unfamiliar words during natural reading, using eye-tracking. Prior research has shown that readers can use context to support meaning reconstruction, but it remains unclear how broader discourse expectations shape this process [1,2]. We test the hypothesis that different types of discourse context guide readers' expectations about encountering unfamiliar words, thereby influencing processing strategies. Specifically, we contrast *science-themed* narratives, which evoke specialized settings and may lead readers to expect technical or unfamiliar vocabulary, with *daily-life* narratives, which describe familiar situations and are less likely to trigger such expectations (see Table 1). Importantly, both contexts are matched in structure and narrative style, allowing us to isolate expectation-driven differences rather than general text difficulty. To examine meaning reconstruction in a controlled manner, we embedded pseudowords as proxies for unknown words within short texts, paired with matched real-word controls. Each pseudoword was followed by a semantically associated word in the subsequent sentence, enabling us to assess how readers use semantic cues. 96 native German speakers read these texts while their eye movements were recorded. Literacy was assessed via an Author Recognition Test and a vocabulary size test, as a composite score. Eye-tracking analyses focused on the target (critical) and associated word regions, using measures such as first-pass reading time, total reading time, and regressions. Consistent with prior work, pseudowords elicited longer reading times and more regressions than real words, reflecting increased processing difficulty [1,3]. Crucially, literacy modulated sensitivity to discourse context. High-literacy readers showed longer first-pass reading times in science-themed contexts compared to daily-life contexts at the target word, suggesting strategic adaptation to contextual expectations (Figure 1). At the associated word, high-literacy readers exhibited increased total reading times specifically following pseudowords in science-themed contexts, indicating allocation of attention to informative regions that support meaning reconstruction (Figure 2). In contrast, low-literacy readers showed little modulation by context, suggesting reduced sensitivity to discourse-level expectations. These findings demonstrate that literacy supports strategic, context-sensitive processing of unfamiliar words during reading. Ongoing work extends these analyses to scanpath patterns to better characterize how readers dynamically integrate contextual information across the entire text.

References

- [1] Lowell, R., & Morris, R. K. (2017). Impact of contextual constraint on vocabulary acquisition in reading. *Journal of Cognitive Psychology*, 29(5), 551–569.
- [2] Wochna, K. L., & Juhasz, B. J. (2013). Context length and reading novel words: An eye-movement investigation. *British Journal of Psychology*, 104(3), 347–363.
- [3] Just, M. A., & Carpenter, P. A. (1980). A theory of reading: From eye fixations to comprehension. *Psychological review*, 87(4), 329.

Figures and Tables

Table 1: Example item translated to English with critical and post-critical sentence in German with English translation. Target word and associate are in bold.

	Daily-life context	Science-themed context
Pre-critical context	Little Adam sat on the floor of his nursery and was eagerly building a house out of Lego bricks. When he wanted to insert a small brick, it slipped from his fingers and disappeared into the Lego house. Adam began to cry, whereupon his older brother Max, who was playing in the next room rushed over.	In the emergency room of a hospital there was bustling activity. Doctors and nurses hurried from one patient room to another. Around midnight a patient was brought in who seemed to be suffering from severe pain. Dr. Belau took over the operation as chief surgeon.
Critical sentence	Er liess sich sofort eine Finntatte / eine Pinzette reichen, nachdem er das Problem erkannt hatte. (<i>He immediately had a pair of prodents / tweezers handed to him after recognizing the problem.</i>)	
Associate	Die Arbeit erforderte die Präzision eines Experten. (<i>The work required the precision of an expert.</i>)	
Post-critical context	Adam looked over his brother's shoulder while he searched for the brick. Finally, he held the tiny building block in his hand and gave it to Adam, who beamed at his older brother. Shortly after, the house was finally finished. Now Adam had to build a car for the Lego figure.	The operation was successful, and the patient could be discharged again after a short time. Dr. Belau worked until five o'clock in the morning before he collapsed into bed, exhausted. He knew that he had to prepare for the next day of work, because the well-being of the patients was his top priority.

Figure 1: Target word region. Predicted first-pass reading time (FPRT) as a function of literacy and context. Shaded areas indicate 95% confidence intervals.

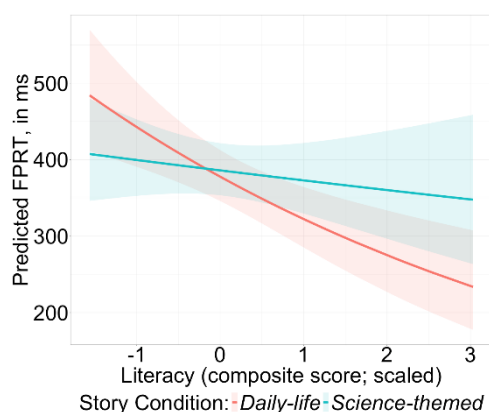


Figure 2: Associate region. Predicted total reading time (TRT) as a function of literacy, word, and story context. Shaded areas indicate 95% confidence intervals.

