Once Bitten, Twice Shy:

The Impact of Predictive Validity on Anticipatory Processing During Sentence Comprehension

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BACKGROUND

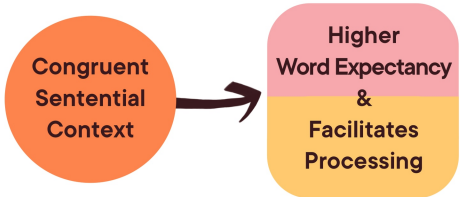
Readers can use contextual constraints to predict upcoming words.

Word Expectancy is the likelihood of a specific word being predicted based on the sentential context.

(e.g., also known as *cloze probability*; Taylor, 1953)

Prediction Validity refers to the overall likelihood of encountering a correct prediction in the experiment as a whole.

(e.g., Brothers et al., 2017)



(Brothers et al., 2015, 2017; Huettig, 2015)

AIM

Is the activation of lexical predictions *automatic* or *strategic*?

Strategic because generating specific predictions at the form level may require additional processing, which...

- may be metabolically costly
- and readers may suppress it when unfavorable.

(e.g., Cevoli et al., 2022; Heyman et al., 2015; Ito et al., 2016; Kuperberg & Jaeger, 2016)

Support from **Brothers et al. (2017)**'s findings.

Need for Clarification

Automatic because readers unconsciously activate associated concepts while processing a sentence, thus...

- with a constraining context, pre-activation occurs even at the phonological/orthographic level.

(e.g., Huettig, 2015; Nieuwland, 2019; Pickering & Gambi, 2018)

But other findings support the automatic-activation.

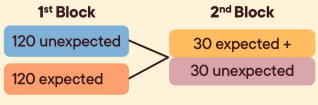
(e.g., DeLong et al., 2018)

METHOD AND RESULTS

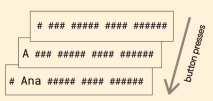
Word Expectancy and Prediction Validity effects.

96 participants (88 females)
M_{age}= 22.55, SD_{age}= 3.76

Participantes were randomly allocated to high or low validity conditions.



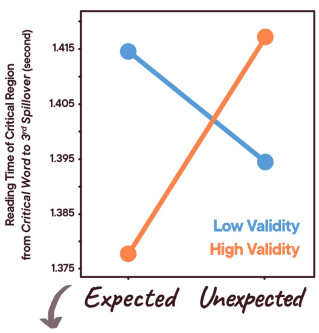
A **self-paced reading** task on Pavlovia was used.



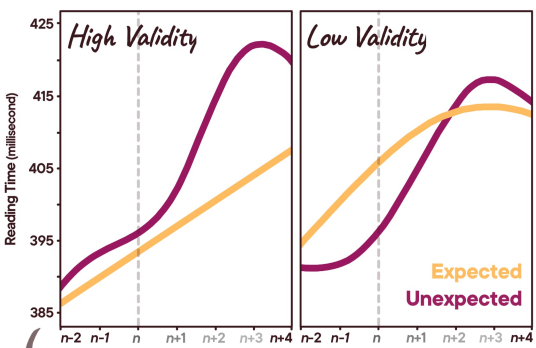
Only critical and spillover words from the 2nd Block were analyzed.

n 1 2 3

Expected: *Antes de cozinhar a Antónia vestia sempre um* **avental que foi bordado** *à mão.*
Unexpected: *Como ficou em segundo lugar também recebeu um* **avental que foi bordado** *à mão.*



Word Expectancy had a significant effect on reading time (b = 16ms, $t(3615) = 2.10$, p = .035), as **participants took longer to read regions with unexpected words** compared to those with expected words.



Since **the smooth terms were significant** (p <.001), we concluded that the effects of **Word Expectancy** (b = 8 ms, p <.001), **Prediction Validity** (b = 10 ms, p <.001), **and its interaction** (b = -12 ms, p <.001) **on reading time cannot be completely explained by a linear relationship.**

The **Reading Time** in the Critical Region **varied significanlty depending on the conditions of Word Expectancy and Prediction Validity.**

(1) Our findings suggest that Expected Words have an enhanced effect on reading speed, and
(2) Prediction Validity dynamically influences readers' antecipatory processing.
(3) But Validity and Expectancy alone may not fully explain these effects. Other factors may play a role!

Limitations: We did not consider other factors such as sentence complexity, word frequency, and reading proficiency.

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2023 APPE

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