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., in the given illustration, *teeth* is more likely to be predicted than *eggs*; 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., the validity would be higher if the participant had read a considerable number of congruent sentences; Brothers et al., 2017)

Congruent Sentential Context → Higher Word Expectancy & Facilitates Processing

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

BUT!

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., in a low validity environment; Cevoli et al., 2022; Heyman et al., 2015; Ito et al., 2016; Kuperberg & Jaeger, 2016)

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)

Support from **Brothers et al. (2017)**'s findings. — **Need for Replication** — But other findings support the automatic-activation. (e.g., DeLong et al., 2018)

REPLICATION OF BROTHERS ET AL. (2017)

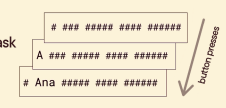
Replication of Word Expectancy and Prediction Validity effects.

99 participants (90 females)
M_{age} = 22.64, SD_{age} = 3.72

Participantes were randomly allocated to **high** or **low** validity conditions.

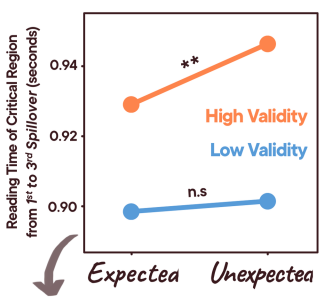
1st Block	2nd Block
120 expected	30 expected +
120 unexpected	30 unexpected

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



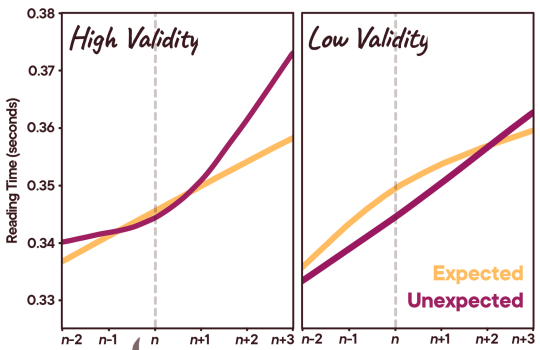
Only critical and spillover words from the 2nd Block were analyzed.

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.*			



Interaction Effect was replicated, b = 0.02, $t(5802)$ = 2.06, p = .039.

Unexpected Words led to significantly longer reading times than **Expected Words**, b = -0.02, p < .001, with a stronger effect in the **High Validity** condition (but validity alone did not have a significant effect).



The Non-Linear Predictive Relationship of Reading Time throughout the Critical and Spillover Words was significant for all terms (p <.001).

(1) Readers reduce their anticipatory processing in low validity environments,
(2) anticipatory processing can become costly in high validity environments, and
(3) predictive validity alone may not fully explain these effects. Other factors may play a role!

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

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