

Of a cute urglon and a nasty pebi: systematic form-meaning mappings in context

Giovanni Cassani¹, Kazimierz Garstecki², Ngoc-Anh Tran³

¹ Tilburg University, Netherlands

² Tilburg School of Humanities and Digital Sciences, Tilburg University, Netherlands

³ Department of Methodology and Statistics, Tilburg University, Netherlands

Studies on form-meaning mappings have highlighted many systematic relations between the surface form of words and what they mean [1–4]. Recent studies also showed that prime-target similarity and semantic neighbourhood density influence lexical decision latencies for pseudowords [5, 6], blurring the boundary between words and pseudowords. From a learning perspective, this blurred boundary makes sense: every word one knows was a pseudoword during development, and many words are pseudowords to many speakers, who might have to quickly shape a semantic representation for them. Our work examined the interplay between semantic connotations conveyed by the word form [7] and by the sentence context in which the word first appears [8, 9]. We focused on valence, i.e., how positive or negative a stimulus is [10].

We conducted a behavioural experiment where each trial consisted of a free association (FA) task and a self-paced reading (SPR) task: for half the participants, each trial started with the FA task; for the other half, each trial started with the SPR. This procedure yields associations for isolated items as well as for items which had been experienced in a sentence, allowing us to see how context affects the perceived valence of an item. We manipulated the valence of the target item, as gauged from ratings for words [11] and pseudowords [12], and the valence of the sentence in which they appeared [*match* (e.g., both positive) or *mismatch* (e.g., one positive and 13 positive items in both categories, determined from ratings when available and from definitions when not). 20 words were high prevalence, 20 were low prevalence (known to less than 10% of the participants in 960 participants completed 20 trials each, to collect 10 responses per item-sentence combination, with each item embedded into 12 sentences. We measured the valence of the free associates (retrieved from [11, 13]) produced for isolated and contextualised items, as well as the Reading Times (RTs) at the target and post-target word, expecting that a valence mismatch would slow down reading. High prevalence words function as a control set: if the expected slowdown does not happen there, the whole procedure would be called into question. We analysed data using GAMMs, controlling for trial, item length, surprisal (estimated from LLaMa2 and marginalized following [14] to mitigate tokenizer-specific effects), and plausibility ratings for pseudowords. We included random intercepts for item, sentence template, and participant.

When the FA task preceded the SPR task, the associates' valence patterned as expected: positively rated pseudowords in [12] elicited significantly more positive associates than neutral and negative pseudowords. When the FA task followed the SPR task, item polarity was the most important predictor for high prevalence words (again, as expected), while the polarity of the sentence dominated the picture for low prevalence words and pseudowords. However, for pseudowords, item polarity still had a significant effect (Figure 1). Concretely, a positive pseudoword read in a negative sentence elicited significantly more positive associates than a negative pseudoword in a negative sentence. For RTs, the expected slowdown brought by a valence mismatch was only observed for high prevalence words (Figure 2): this confirms that the design was sensitive enough to detect the mismatch but it also confirms that such a mismatch did not affect the reading of pseudowords. Pseudowords were read more slowly overall, but it did not matter whether their perceived polarity matched or mismatched with the polarity of the sentence template.

Our results show that the form of a novel word still influences the associations it triggers even once the word has been experienced in a sentence context, confirming a certain strength for systematic form-meaning associations [1] even though the sentence context affected such associations more strongly [8, 9, 15]. However, while reading, the valence triggered by the word form did not significantly affect

reading, suggesting that during online comprehension, participants were unaffected by form-meaning correspondences for pseudowords.

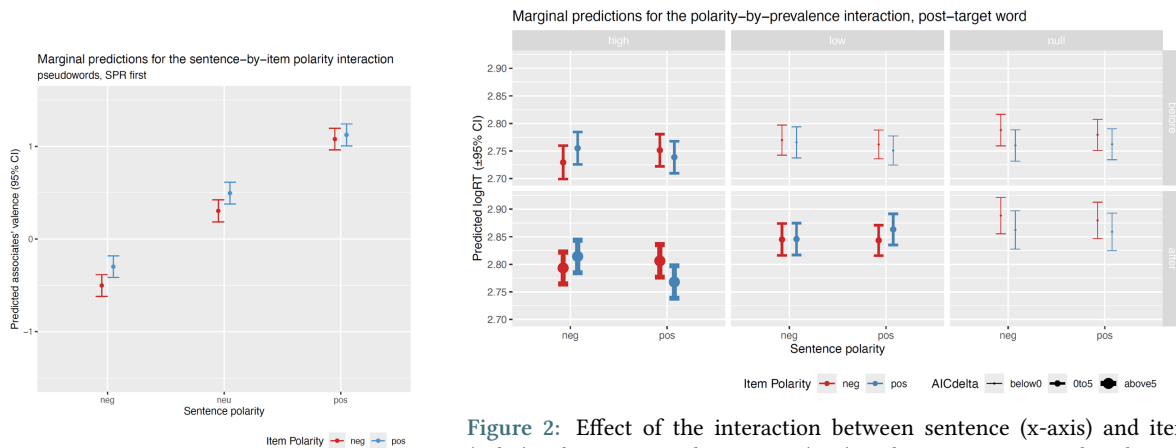


Figure 1: Effect of sentence (x axis) and pseudoword (color) polarity on the valence of associates when the FA task followed the SPR task. We show here results for positive (blue) and negative (red) pseudowords only.

Figure 2: Effect of the interaction between sentence (x-axis) and item (color) polarity on Reading Times (RTs) at the post-target word in the SPR task. Thicker lines indicate data subsets where the target interaction improved model fit (measured using AIC) over a model including the linear combination of the two predictors. Column facets indicate prevalence (high, low, null –for pseudowords). Row facets indicate experimental conditions: before (top) indicates FA before SPR; after (bottom) indicates FA after SPR.

We provide three example sentences, with **positive (1)**, **neutral (2)**, and **negative (3)** valence:

- (1) The actors danced happily around the magical [TARGET] radiating a soft glow.
- (2) The inspector reviewed a basic [TARGET] before leaving on holiday.
- (3) Taylor froze in fear when she noticed the alarming [TARGET] looming from the ceiling.

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