

Does Emotion Matter Less in Dense Conceptual Networks?

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Background: While concrete concepts are anchored in the sensory and motor representations of their referents, meanings of abstract words cannot be anchored this way—their sensory or motor correlates, if any, are unlikely to represent their core meanings. It has been proposed that abstract words are partly anchored in affective processing and representation [1, 3]: less concrete words are rated higher on emotional valence (further discussed in [2]). We derive additional empirical predictions from this representative substitution approach. One assumption is that the representation of all concepts relies in part on relations to other concepts, and that these are especially important for abstract concepts. The second assumption is that abstract concepts rely more on anchoring to affective processes, partly replacing sensory and motor anchoring of concrete ones. Consequently, the role of affective anchoring for abstract words should be smaller in people with denser conceptual networks, which leave less space for affective anchoring. Conversely, the smaller conceptual networks of children or people with limited vocabulary should be associated with stronger affective anchoring in abstract words.

Method: We tested this prediction by collecting emotional valence ratings for 2700 Czech words (approximately 1600 nouns, 800 adjectives and 300 verbs) while also presenting a 25-item multiple-choice vocabulary task and scoring success rate. The list was divided into 17 smaller lists with overlap for calibration. In an online jsPsych survey, participants ($N = 536$, $M_{age} = 22.9$, $SD_{age} = 4.8$) were asked to rate each word on a 7-point (-3 to +3) scale as eliciting negative, neutral or positive emotions. The accompanying vocabulary task showed good internal consistency in previous unpublished studies (Cronbach's alpha > 0.85).

Results: The results were analyzed using cumulative link mixed models (R package `ordinal`), with rating polarity, vocabulary scores, and word frequency and concreteness (sourced from the Cze-Lex database of psycholinguistic word properties, in preparation) as fixed predictors (including all possible interactions between concreteness, frequency and vocabulary), and random intercepts for word and participant. In a noun-only subset of the original list, the analysis revealed a robust main effect of concreteness ($z = -5.79$, $p < 0.001$), confirming that abstract words tend to have stronger affective anchoring. In addition, there was a significant interaction of concreteness and vocabulary ($z = 2.01$, $p = 0.045$), see Table 1. While the distribution of valence ratings was similar for highly concrete words across people with high and low vocabulary scores, people with high vocabulary scores appear to be less affected by the main effect of concreteness (Figure 1).

Discussion: The results indicate that word concreteness effects on affective anchoring are generally stronger for people with limited vocabularies, presumably in relation to their sparser conceptual networks. This may have implications for communicating abstract meanings to different types of audiences.

References

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- [2] Allan Paivio. Dual coding theory, word abstractness, and emotion: A critical review of Kousta et al. (2011). *Journal of Experimental Psychology: General*, 142(1):282–287, 2013.
- [3] Bo Yao, Anne Keitel, Gillian Bruce, Graham G. Scott, Patrick J. O'Donnell, and Sara C. Sereno. Differential emotional processing in concrete and abstract words. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 44(7):1064–1074, 2018.

Figures and Tables

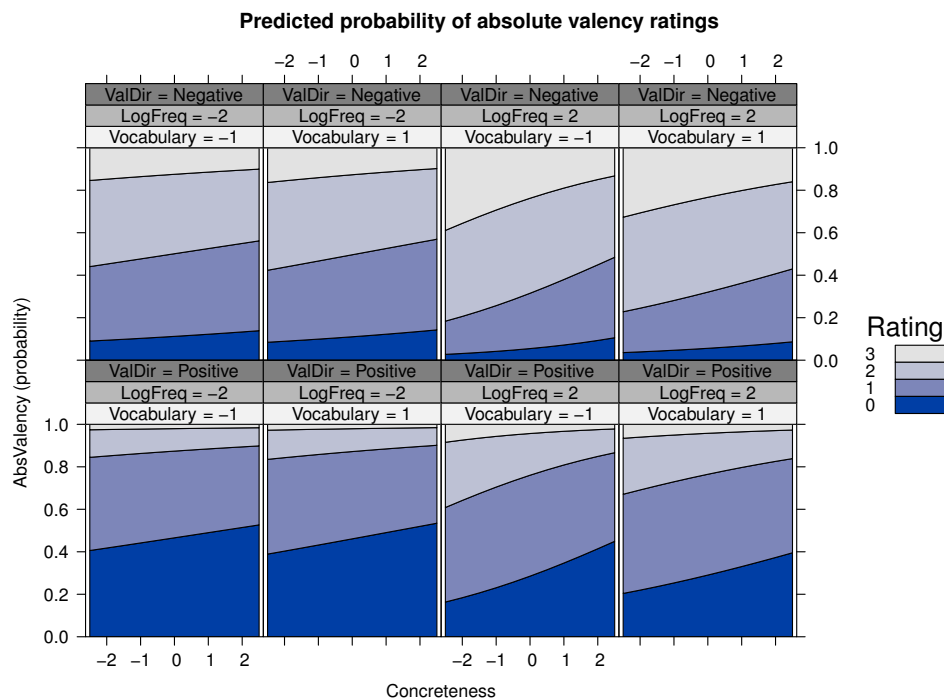


Figure 1: The predicted relations between the measured vocabulary score, the frequency and concreteness of a word, and the absolute value of its emotional rating. Of primary interest are the predicted proportions captured in the lighter bands, which correspond to probabilities of obtaining ratings closer to the endpoints of the scale.

Predictor	Odds Ratio	z-score	p
Frequency	1.21	5.77	<0.001
Concreteness	0.84	-5.79	<0.001
Concreteness × Vocabulary	1.02	2.01	0.045

Table 1: Descriptive statistics for the significant effects of word frequency, concreteness and the participant's vocabulary size on the absolute values of valence scores. The effects of vocabulary itself or of the various interactions with frequency were not statistically significant.