The processing of polar quantifiers, and numerosity perception

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Deschamps, Isabelle, Agmon Galit, Loewenstein Yonatan, and Grodzinsky Yosef. 2015.

Abstract:

We investigated the course of language processing in the context of a verification task that required numerical estimation and comparison. Participants listened to sentences with complex quantifiers that contrasted in Polarity, a logical property (e.g., more-than-half, less-than-half), and then performed speeded verification on visual scenarios that displayed a proportion between 2 discrete quantities. We varied systematically not only the sentences, but also the visual materials, in order to study their effect on the verification process. Next, we used the same visual scenarios with analogous non-verbal probes that featured arithmetical inequality symbols (<, >). This manipulation enabled us to measure not only Polarity effects, but also, to compare the effect of different probe types (linguistic, non-linguistic) on processing.

Like many previous studies, our results demonstrate that perceptual difficulty affects error rate and reaction time in keeping with Weber’s Law. Interestingly, these performance parameters are also affected by the Polarity of the quantifiers used, despite the fact that sentences had the exact same meaning, sentence structure, number of words, syllables, and temporal structure. Moreover, an analogous contrast between the non-linguistic probes (<, >) had no effect on performance. Finally, we observed no interaction between performance parameters governed by Weber’s Law and those affected by Polarity. We consider 4 possible accounts of the results (syntactic, semantic, pragmatic, frequency-based), and discuss their relative merit.

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