

Conventional But Not Dead: The Role of Metaphorically-based Connections in the On-line Processing of Prepositional Meaning

Michele I. Feist and Brooke O. Breaux

Prepositions are highly polysemous, naming both spatial (e.g., apples *in* bowls) and metaphorical (e.g., Jim's *in* pain) relationships. According to Conceptual Metaphor Theory, these meanings are organized within people's mental lexicons via metaphorically-based connections, with nonphysical meanings conceptualized in terms of physical ones (Lakoff & Johnson 1980). If conceptualization influences on-line processing, metaphorical meanings of prepositions should be processed in terms of spatial meanings, but not vice-versa (e.g., Boroditsky, 2000). To test the psychological reality of these connections, we designed two semantic priming experiments with participants assessing whether phrases and images were natural/expected or unnatural/unexpected.

In Experiment 1, stimulus pairs were created with spatial stimuli (photographic images depicting one object in relation to another) presented before metaphorical stimuli (attested phrases consisting of a preposition followed by an abstract noun). We varied metaphorical relatedness, with pairs based on either the same or different prepositions, and response type, with both prime and target natural/expected (matched) or prime unnatural/unexpected and target natural/expected (mismatched). While response type was the dominant predictor of response speed for *on* phrases—with matched pair phrases being responded to faster than mismatched pair phrases, $F(1, 16) = 11.46, p = .004$ (Figure 1), for *in* phrases this effect was modulated by relatedness—as demonstrated by an interaction of the two factors, $F(1, 16) = 7.19, p = .016$ (Figure 2), suggesting that metaphorical relatedness influences the processing of *in* but not *on* phrases.

In Experiment 2, we asked whether processing metaphorical *on* and *in* phrases would influence processing of spatial images. For each stimulus pair, we presented an *on* or *in* phrase before either a related (*on* or *in*) image or an unrelated image. We found that responses to both *on* and *in* images were faster than responses to unrelated images, $F(1, 18) = 9.11, p = .007$ and $F(1, 16) = 18.93, p < .001$, respectively. To test whether these results were due to a difference between related and unrelated pairs and not simply a difference in processing between image types, we presented the images outside of the priming context. Only responses to *in* images were faster than responses to unrelated images, $F(1, 17) = 6.50, p = .021$, suggesting that metaphorical phrases may prime *on* but not *in* images.

These findings support the claim that even conventionalized metaphorically-based connections can be accessed during on-line processing; however, these connections may differ across prepositions. Previous work has noted that *in* occurs in more contexts, and participates more freely in novel combinations, than does *on* (Breaux & Feist, 2010; Navarro, 1998). We suggest that the strength and direction of the on-line connections may be related to the ability of prepositions to combine to form novel uses (Breaux & Feist, 2010). A strong connection from spatial to abstract meaning and ease of creating novel combinations may indicate that a metaphor is “live”, while a strong connection from abstract to spatial meaning and more restricted ease of combination may be hallmarks of a metaphor that is no longer productive.

References

- Boroditsky, L. (2000). Metaphoric structuring: Understanding time through spatial metaphors. *Cognition*, 75(1), 1-28.
- Breaux, B. O., & Feist, M. I. (2010). Extending beyond space. In S. Ohlsson & R. Catrambone (Eds.), *Proceedings of the 32nd Annual Conference of the Cognitive Science Society*, pp. 1601-1606.
- Lakoff, G. & Johnson, M. (1980). *Metaphors we live by*. Chicago: The University of Chicago Press.
- Navarro i Ferrando, I. (1998). A Cognitive Semantics analysis of the Lexical Units AT, ON and IN, in English. (Doctoral dissertation, University Jaume I, 1998). Retrieved from http://www.tesisexarxa.net/TESIS_UJI/AVAILABLE/TDX-0804103-133233//navarro.pdf

Figures

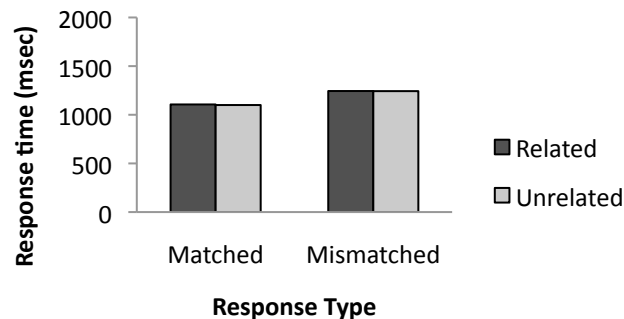


Figure 1. Effect of response type (matched, mismatched) for *on* phrases; no interaction of response type with relatedness.

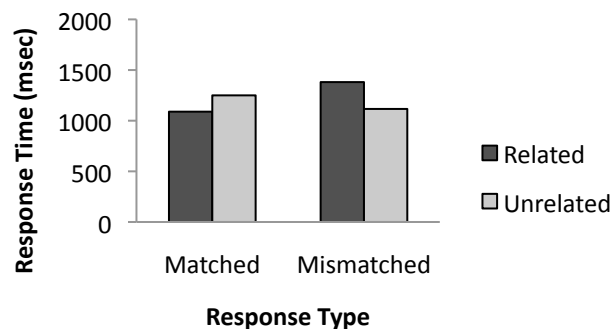


Figure 2. Interaction of response type (matched, mismatched) with relatedness for *in* phrases.