

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Conceptualization in Language and Its Relation to Perception

Permalink

<https://escholarship.org/uc/item/5dz1901s>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 30(30)

ISSN

1069-7977

Authors

Clausner, Timothy C.

Kellman, Philip J.

Palmer, Evan M.

Publication Date

2008

Peer reviewed

Conceptualization in Language and Its Relation to Perception

Timothy C. Clausner (tclausner@casl.umd.edu)

University of Maryland Center for Advanced Study of Language
College Park, MD 20742 USA

Philip J. Kellman (kellman@cognet.ucla.edu)

Department of Psychology, University of California Los Angeles
Los Angeles, CA 90095 USA

Evan M. Palmer (evan.palmer@wichita.edu)

Department of Psychology, Wichita State University
Wichita, KA 67260 USA

Keywords: language, perception, conceptualization, semantics, information visualization, human-computer interaction.

Abstract

People typically use language expecting the result to be meaningful comprehension. People also expect their perceptions of the world to make sense. For example, the word “up” expresses useful meaning about spatial relations, just as perceiving distance to an object enables useful spatial reasoning. Links between language and perception have been studied in cognitive development (Gelman, Croft, Fu, Clausner & Gottfried, 1998). We studied the relation of language and perception in the context of adult visual search by representing spatial altitude as icons of varying size and contrast (Palmer, Clausner & Kellman 2008, Figure 1).

Language can express magnitude in terms of vertical space: Metaphors in cognitive semantic theory are largely treated as relations between knowledge domains. The metaphor MORE IS UP is a correspondence between vertical space and magnitude. The strength of a metaphor’s semantic relation varies positively with the number of distinct conceptualizations expressible in language (Clausner & Croft 1997), or expressible as visual forms (Clausner 2002). A wide range of basic sensory experiences (e.g., spatial distance, heat, brightness) can be understood in terms of a magnitude scale (Clausner & Croft 1999).

We studied whether magnitude of spatial altitude can be expressed as perceptual cues of size and contrast. Relative to no-cue (reading numerical altitude) the perceptual cues improved search accuracy (Figure 1) and reduced search time. Conceptualizing graphical symbols that are larger or darker as meaning *more* altitude may have helped our participants apprehend the altitude information present in written form. We will discuss explanations of these results by considering whether performance improved because perceptual cues are aligned with conceptual metaphors or if some perceptual encodings are more natural than others.

We will also discuss the relative contributions of depth processing and metaphoric correspondence, and report latest results derived from cues consistent or inconsistent with imagined vantage points. Each conceptualization was

primed by instructing participants as they bodily looked head up or head down at a 3D perspective model.

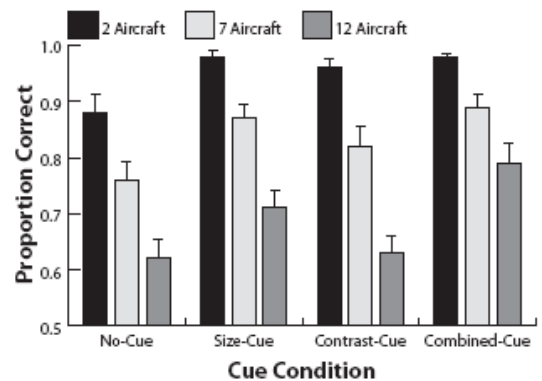


Figure 1: Perceptual cues improved visual search for two potential collisions among 2, 7 or 12 aircraft icons.

References

- Clausner, T.C. (2002). How conceptual metaphors are productive of spatial-graphical expressions. *Proceedings of the 24th Annual Conference of the Cognitive Science Society*. (pp. 208-213). Mahwah, NJ: Lawrence Erlbaum Associates.
- Clausner, T.C. & Croft, W. (1999). Domains and Image Schemas. *Cognitive Linguistics*, 10, 1-31, New York: Mouton de Gruyter.
- Clausner, T.C. & Croft, W. (1997). Productivity and Schematicity in Metaphors. *Cognitive Science*, 21, 247-282. Greenwich, CT: Ablex.
- Gelman, S., Croft, W., Fu, P.F. Clausner, T.C. & Gottfried, G. (1998). Why is a pomegranate an ‘apple’? The role of shape, taxonomic relatedness, and prior lexical knowledge in children’s overextensions of ‘apple’ and ‘dog’. *Journal of Child Language*, 25, 267-291.
- Palmer, E.M., Clausner, T.C. & Kellman, P.J. (2008). Enhancing Air Traffic Control Displays via Perceptual Cues. *ACM: Transactions on Applied Perception* 5, 1-22. New York, NY: ACM Press.