

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Insight Problem Solving as Goal-Derived, Ad-Hoc Categorization

Permalink

<https://escholarship.org/uc/item/4wf6v7tw>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 26(26)

ISSN

1069-7977

Authors

Chrysikou, Evangelia G.
Weisberg, Robert W.

Publication Date

2004

Peer reviewed

Insight Problem Solving as Goal-Derived, Ad-Hoc Categorization

Evangelia G. Chrysikou (lila@temple.edu)

Robert W. Weisberg (weisberg@temple.edu)

Department of Psychology, Temple University
1701 N. 13th St., Weiss Hall 6th Floor, Philadelphia, PA 19122-6085 USA

Problem Solving and Categorization

Research on categorization suggests that, when facing a goal, people construct *goal-derived categories* through *conceptual combination*. These categories may be either well-established or ad hoc, constructed “on-the-spot” from elements from well-established or taxonomic categories. Under pressure or uncertainty people tend to employ taxonomic categories, that reflect world models (i.e., *primary categorizations*) and are denoted by lexemes (e.g., *cups*), as opposed to goal-derived categories, that are unstable, dependent on context, and are denoted by phrases (e.g., *things to pack when going on vacation*; Barsalou, 1983, 1991; Murphy & Ross, 1994).

Insight problem solving is an instance in which the solver, being in a state of uncertainty regarding the solution, is likely to form solution strategies based on primary categorizations. *Insight* is an abrupt and unanticipated shift in the solution path that leads the solver to success. Previous studies regard insight as the result of ordinary cognitive processes (e.g., Perkins, 1981; Weisberg & Alba, 1981) or as indicative of a special way of thinking, characterized by a *representational shift*, a restructuring of the elements of the problem (e.g., Knoblich, Ohlsson, & Raney, 2001). Research, thus far, has neither examined: (i) how solvers interpret insight problems *before* they proceed to a solution, or (ii) how category construction and categorical induction during problem solving are involved in the planning and evaluation of strategies to achieve the intended goal.

This study examined the effects of training to construct goal-derived categories on solving insight problems. We hypothesized that participants who received training in considering secondary, goal-derived categories, in addition to primary, taxonomic categories of items, would exhibit better performance on insight problem solving.

Method

Thirty-six undergraduates were randomly assigned to one of three conditions: (i) Control (n = 12), (ii) Alternative Categories Task [ACT] (n = 12), and (iii) Alternative Categories Task with critical items [ACT-C] (n = 12). The Control condition was administered a word association task and then received six insight problems. The ACT condition was given the Alternative Categories Task and then received the six problems. The ACT-C condition received a version of the Alternative Categories Task, which included six

items, each critical for the solution to the problems that followed. The six insight problems were *Charlie*, *Fake Coin*, *Candle*, *Two-Strings*, *Ten Coins*, and *Nine-Dots*. Participants in the ACT and ACT-C conditions also received a hint concerning the relevance of the categorization task to the problem-solving task. Participants were tested individually. Sessions were videotaped with subjects' consent. Participants were given specific instructions to *think aloud* during the experimental tasks (Perkins, 1981).

Results and Discussion

A contrast-based ANOVA on solution rates and times revealed that the ACT and ACT-C conditions outperformed the Control condition, with the ACT-C condition exhibiting the highest performance. Results suggest that the construction of goal-derived, ad hoc categories and the ways these categories are used to guide participants' inferences may predict problem solving. The primary aim of this study was to consider problem solving as an instance of goal-derived categorization. Our findings may offer a new perspective on the mechanisms underlying insight. In addition, although much previous research on categorization focuses on the taxonomic organization of isolated items, this study examined categorization in an ecologically valid and dynamic problem-solving task.

References

- Barsalou, L. W. (1983). Ad hoc categories. *Memory & Cognition*, 11, 211-227.
- Barsalou, L. W. (1991). Deriving categories to achieve goals. In G. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 27, pp. 1-64). San Diego, CA: Academic Press.
- Knoblich, G., Ohlsson, S., & Raney, G. E. (2001). An eye movement study of insight problem solving. *Memory & Cognition*, 29, 1000-1009.
- Murphy, G. L., & Ross, B. H. (1994). Predictions from uncertain categorizations. *Cognitive Psychology*, 27, 148-193.
- Perkins, D. N. (1981). *The mind's best work*. Harvard.
- Weisberg, R. W., & Alba, J. W. (1981). An examination of the alleged role of “fixation” in the solution of several insight” problems. *Journal of Experimental Psychology: General*, 110, 169-192.