Do Alternative Categorizations Improve Problem Solving? Evidence from a Verbal Protocol Analysis

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Introduction

Implications of Categorization for Problem Solving

Problem solving refers to cases in which participants construct plans with the aim to move from a problem state to a goal state. Despite their focus on participants' problem-solving strategies, problem-solving theories have not adequately examined how solvers navigate their knowledge to interpret problems or to plan strategies toward goals. In earlier work (Chrysikou, in press) it was argued that success in ill-defined tasks depends on the solvers' ability to construct *goal-derived* categories (Barsalou, 1983), namely categories that are formed *ad hoc* to serve specific goals (e.g., *things with which to defend yourself in a parking lot*). Two experiments employing a novel paradigm provided evidence in support of this hypothesis. The results of Experiment 1 (N = 140) showed improved problem-solving performance after participants were trained to construct goal-derived categories by means of an alternative categorization task. In this task participants were asked to provide alternative categorizations for common items (e.g., *a shoe could also be something to pound a nail into the wall with*). The findings of Experiment 2 (N = 80) demonstrated that the positive effects of the training in category construction can be obtained without participants being explicitly informed regarding the relevance of training to problem-solving, as was the case in Experiment 1.

The quantitative results obtained from these studies provided evidence for the involvement of categorization in problem-solving processes. In particular, the improved problem-solving performance that was observed after training in alternative categorizations was attributed to participants' enhanced ability in ad hoc category construction, which was argued to be critical for problem-solving success. However, those findings do not address directly whether participants who received the goal-derived categorization training indeed constructed more ad hoc categories during problem solving, which would account for their improved performance. The aim of the present study was, therefore, to investigate through an extensive analysis of verbal protocols (see Ericsson & Simon, 1993) whether participants who engaged in the alternative categorization training prior to problem solving were more likely to construct goal-derived categories involving the elements of the problems being used.

Method

Verbal protocols that were collected from two thirds of participants in Experiments 1 (N = 560) and 2 (N = 312), while they were solving six insight problems, were transcribed and segmented for analysis. The problems used were: *Charlie*, *Fake Coin*, *Prisoner and Rope*, *Pyramid and Dollar Bill*, *Candle*, and *Two-String*. Two independent raters, blind to the purposes of the study, coded all protocols for the presence of goal-derived, and, specifically, ad hoc categorizations of the elements of each problem. Inter-rater reliability reached satisfactory levels and all discrepancies between raters were resolved in conference.

Results and Discussion

Contrast-based ANOVA comparisons on the number of participants' goal-derived categorizations in Experiment 1 revealed differences in the number and variability of goal-derived categorizations during problem solving dependent on the presence or absence of the training. Similar findings were obtained in Experiment 2. Results support previous research (Chrysikou, in press) and have implications for theories of problem solving and categorization.

References

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