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Evidence for Incremental Restructuring in a Spatial Insight Problem

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Introduction

Despite much research, the exact nature of restructuring in insight remains unclear. Metcalfe and Wiebe (1987) originally offered evidence towards insight occurring suddenly. Other researchers, though, have suggested that it occurs incrementally. In a think-aloud analysis of insight problem solving, Fleck and Weisberg (2004) noted that solvers regularly demonstrated a number of smaller restructurings before reaching solution.

Durso, Rea, and Dayton (1994) attempted to track restructuring by having participants rate the relatedness of word pairs while solving a riddle. They found that solvers rated solution-relevant word pairs as becoming gradually more similar as they approached solution.

This study investigated whether evidence towards incremental solution could be found by having participants rate the importance of problem features while solving a spatial insight problem. Additionally, we tested the assumption that having subjects rate primarily relevant-to-solution features would affect the pattern of restructuring.

Method

Thirty-eight undergraduates from the University of Illinois at Chicago participated in this experiment for course credit. Participants received the “Triangle of Coins” spatial insight problem shown in Figure 1.

Every minute, subjects indicated how important certain problem features were going to be to solution. In one condition, solvers rated all problem features on importance. In the second condition, solvers rated only 3 problem features, 2 of which were important (items 1 & 10 in the figure below) and 1 which was not important (item 5).

As in Durso et al, subjects’ ratings were summarized by their initial and final ratings, and ratings from the two timepoints before solution. The distance between the initial and Final-2 timepoints varied based on how long the subject took to complete the problem.

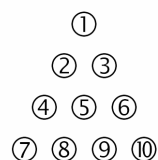


Figure 1: Triangle of Coins Problem. Make the triangle point to the bottom of the page by moving only 3 “coins.”

Results

A repeated measures analysis of variance revealed that solvers’ ratings of important items increased linearly, $F(1,19) = 30.46, p < .05$, and ratings of unimportant items decreased linearly with time, $F(1,19) = 23.37, p < .05$, as shown in Figure 2. Subjects given the partial rating task also provided higher ratings for the important items overall, $F(1,19) = 5.08, p < .05$.

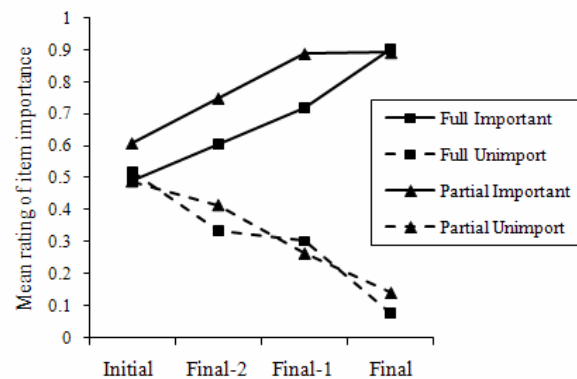


Figure 2: Mean importance ratings of important items and unimportant items as a function of time and group.

Conclusion

These results provide evidence towards an incremental account of insight, with subjects showing a linear increase in ratings of important-for-solution items and a decrease in ratings of unimportant items as they approached solution. The difference between rating conditions suggests that the partial rating condition may have provided solvers with hints toward the solution, as these subjects considered the important items to be generally more important.

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