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Can Verbalization Improve Insight Problem Solving?

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Aims

In the present study, we investigate whether verbalization, which is regarded to disrupt the insight problem solving, can improve the insight problem solving. In particular, we experimentally determine whether failure-focused verbalization facilitates constraint relaxation and insight problem solving.

Method

Participants

Sixty-three undergraduates from the University of Tokyo participated in this study. They were randomly assigned to either of the two following conditions: *reflective verbalization* and *irrelevant verbalization (control)*.

Task

A T puzzle was used as an insight problem task. The puzzle involved arranging four wooden pieces in such a way that they formed the letter “T.”

Procedures

Prior to solving the problem, the participants each were presented with a sheet of paper with a 2/3-sized image of the letter “T.” Thereafter, they were asked to arrange the four wooden pieces in the shape of the letter “T.” They were also notified of the following two rules: (1) the time limit for the experiment was 15 min and (2) the sheet of paper would be taken away before they began working at the puzzle. In both the conditions, the participants were interrupted 5 min after they began solving the puzzle. Thereafter, the verbalization phase was introduced.

During the verbalization phase, participants in the reflective verbalization condition were given 3 min to write down the ways they thought inappropriate for solving the problem. Correspondingly, those in the irrelevant verbalization condition were asked to describe in detail for 3 minutes what they were studying and interested in.

Once all the participants had provided their explanations, they were instructed to resume solving the puzzle. The participants worked at the puzzle either until they had arrived at the correct solution or until the time limit (10 min) had expired. The entire experiment was videotaped.

Results and Discussions

Since sixteen participants arrived at the correct solution prior to the verbalization phase, the data pertaining to these participants were excluded from the analysis.

Firstly, we compared the solution rate in each condition. The solution rate in the reflective verbalization condition (0.38) was higher than that in the irrelevant verbalization condition (0.13). A Fisher’s exact test revealed that the difference in the solution rate was marginally significant ($p = .093$).

Secondly, on the basis of the dynamic constraint relaxation theory (Hiraki & Suzuki, 1998), we examined the effects of reflective verbalization on the relaxation of inappropriate constraints in the insight problem solving. The rate of constraint violation in each condition was submitted to an analysis of variance (ANOVA), along with condition (reflective or irrelevant verbalization: *between* the participants) and time (before or after the verbalization: *within* the participants) as independent variables. The results revealed that with respect to both the object-level and the relational constraints, the interaction between the conditions and time was significant ($F(1, 41) = 18.04, p < .001$; $F(1, 42) = 11.34, p < .01$, respectively). The interaction indicated that there were no significant differences in the violation rates between conditions before the verbalization phase; however, in the reflective verbalization condition, the violation rates deviated more frequently than those in the irrelevant verbalization condition after the verbalization phase.

The results supported the hypothesis that failure-focused verbalization has a facilitative effect on constraint relaxation and insight problem solving. Therefore, it can be concluded that verbalization does not always disrupt insight problem solving.

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Reference

Hiraki, K., & Suzuki, H. (1998). Dynamic constraint relaxation as a theory of insight. *Cognitive Studies: Bulletin of the Japanese Cognitive Science Society*, 5, 69-79.