Abstract of Doctoral Thesis

Title: The Study of Unconscious Process in Insight Problem Solving: An Examination Using Priming Methods

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The goal of this study was to explore the mechanisms of unconscious processes in insight problem solving. Insight problems require people to view the problems in a novel way to achieve the solution. There is a large body of evidence showing that the process of insight problem solving is governed by unconscious processes. For example, a previous study showed that a hint can help people solve insight problems even when it is presented subliminally. The present research focused on three questions about subliminal hints. First, which is an important factor for using hints, convergent thinking or depletion of cognitive resources? (Study 1) Second, although the phenomenon wherein hints can hinder insight problem solving has already been observed, why does this negative effect occur? (Study 2) Third, although it is possible for unconscious processes to select or ignore subliminal hints as relevant or irrelevant information in problem solving, what is the mechanism of such unconscious selection? (Studies 3 and 4) We conducted a series of separate studies to answer these three questions.

In Study 1, we failed to find evidence for the influence of convergent thinking and depletion of cognitive resources on the effect of hints. Study 2 demonstrated that hints hindered problem solving for those who have strong inhibitory function. The results of Study 3 did not support the hypothesis about unconscious selection; however, we found that memory retrieval markedly impaired finding solutions for insight problems. Study 4 indicated that unconscious processes would select hints according to the activity level of problem representation and inhibitory function.

Taken together, these studies suggest the following three conclusions. First, effective inhibitory function may suppress not only exogenous cues, but also the endogenous generation of the solution. Second, conscious memory retrieval impaired finding solutions for insight problems because memory activation may suppress the generation of the solution. Third, the unconscious selection of hints may be based on the degree of activity of problem representation.