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Knowledge Effects, Conceptual Structure, and Incidental Learning

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A major theme in recent research on concepts has been the influence that theories have on conceptual structure (e.g., Keil, 1989; Murphy & Medin, 1985; Wattenmaker, 1999). The terms theories and knowledge structures refer to informal theories, mental models, and general world knowledge. A second recent theme in research on concepts has been a focus on the types of concepts that are formed as a result of different encoding task, especially incidental and intentional tasks (e.g., Anderson & Fincham, 1996). Research on these two issues has proceeded independently, however.

Consistent with the independence of research on knowledge and research on encoding tasks, the influence of background knowledge has only been investigated with intentional tasks. Intentional tasks represent only a small subset of possible encoding tasks, however. Indeed learners in intentional tasks tend to be highly strategic problem solvers. In natural learning conditions, however, people often develop concepts when they are not in a highly analytic problem solving mode. Thus research on knowledge effects has told us very little about how prior knowledge influences concept formation in a broad range of important encoding tasks.

The present research was designed to examine knowledge effects in incidental tasks. With incidental learning, participants perform an encoding task that is unrelated to categorization. Thus although prior knowledge has been found to have a powerful influence with intentional encoding, knowledge effects might not be as great with incidental encoding. Indeed, in the process of generating hypotheses, participants in intentional conditions often actively search for relevant information. This might lead to more pronounced knowledge effects with intentional encoding

An alternative possibility is that the activation and application of relevant knowledge will occur automatically. If this occurs, then similar types of knowledge might be applied regardless of the encoding task.

In an initial investigation of this topic, Wattenmaker (1999) examined the ability of participants to detect conceptually related feature co-occurrences. The results of these experiments revealed that background knowledge was as beneficial in incidental as intentional conditions. The present research was designed to determine if the Wattenmaker (1999) results would generalize to situations in which the application of background knowledge required more complex processes. To accomplish this, we presented participants with descriptions that could be perfectly partitioned into two categories if an underlying theme that was consistent with prior knowledge was activated.

The results of a control condition indicated that participants rarely formed the knowledge-based categories if they had minimal exposure to the exemplars. This control condition was compared to intentional and incidental conditions. In the intentional condition, participants were told to try to discover groups that the descriptions could be divided into. In the incidental condition, the presence of groups was not even mentioned. Instead, participants were given an unrelated task. After the encoding task, participants in both conditions were given the task that was used in the control condition: all the descriptions were presented and participants were asked to divide them into two groups.

The knowledge-based categories were formed more often in the incidental than the control condition and equally often in the incidental and intentional conditions. These results occurred even though the formation of the knowledge-based categories required that prior knowledge guide the interpretation and integration of features from several dimensions.

Even though applying prior knowledge required elaborate inferential processes, background knowledge had the same degree of influence in incidental and intentional conditions. Thus these experiments provide an important extension of the finding that many types of knowledge effects will be strategy-independent (Wattenmaker, 1999). The results underscore the pervasiveness and power of the influence of background knowledge on concept formation.

References

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