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Boundary Conditions of Knowledge Partitioning

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Knowledge partitioning is the theoretical notion that knowledge can be held in independent non-overlapping parcels, which may result in people making contradictory decisions for identical problems in different circumstances (eg. Lewandowsky & Kirsner, 2000). Knowledge partitioning has been demonstrated with experts, with non-expert participants in a function learning paradigm (Lewandowsky, Kalish & Ngang, 2002), as well as with non-expert participants in categorization tasks involving both numeric (Yang & Lewandowsky, 2003) and perceptual stimuli (Yang & Lewandowsky, 2004). In each instance, a normatively irrelevant context cue (such as a verbal label or stimulus color) served as the basis for the contradictory resolution of an identical problem.

The present study explored the boundary conditions of knowledge partitioning in categorization. Given the considerable evidence that integral stimuli are processed differently to separable stimuli (e.g., Garner, 1974) and that categorization that involves a verbalizable rule is often different from categorization that does not (e.g., Maddox, Ashby, & Bohil, 2003), the presence of partitioning in categorization could be affected by these two distinctions. We examined whether or not people would partition their knowledge in four conditions: When categorization rules were or were not verbalizable, and orthogonally when the to-be-categorized stimuli were comprised of psychologically separable or integral dimensions.

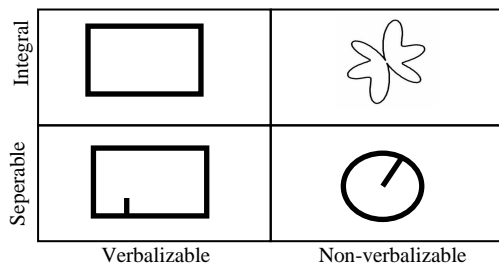


Figure 1: The four stimulus conditions of Experiment 1

Method

Experiment 1 had four conditions with 16, 16, 17 and 22 participants per condition (see Figure 1). Experiments 2 and 3 (see Figure 2) each had one verbalizable, integral condition with 17 and 21 participants respectively; the rectangle stimuli in these experiments were presented with a counter-clockwise rotation of 10 degrees about their bottom left corners.

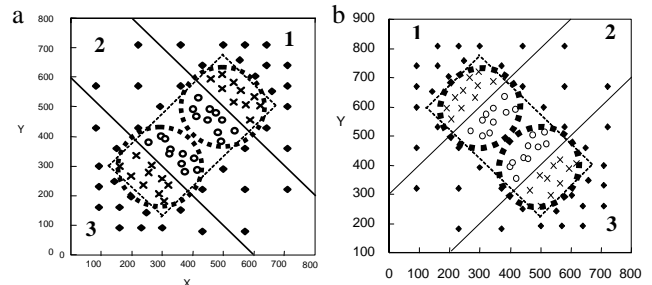


Figure 2. Category structures of (a) experiments 1 & 2 and (b) experiment 3

Results & Discussion

Partitioning was observed across all combinations of verbalizability and integrality/separability except when the task was integral and verbalizable. In that case, people learned the task very rapidly and to a higher level of proficiency. When task difficulty was increased in an additional experiment, without disrupting the integral and verbalizable properties of the stimulus, partitioning emerged. Thus, partitioning in categorization is not sensitive to the nature of stimuli but is instead determined by task complexity.

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