Investigating the Effect of Reinforcement Levels on Conceptual Fear Generalization

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Abstract

Objectives: In fear generalization, conditioned fear responses are observed for novel stimuli sharing perceptually or conceptually similar properties with the conditioned stimulus. The reinforcement levels of the unconditioned stimulus impact fear generalization. Fear generalization can be studied using the category-based conditioning model, in which individuals are conditioned to members of a category rather than a single stimulus. The current study explored the effect of UCS reinforcement on conceptual fear generalization due to category-based similarity using a visual UCS.

Methods: The participants included twenty-two healthy individuals aged 18-21 years. A category-based conditioning paradigm was used. The conditioned stimuli were exemplars from four categories, i.e., animals, insects, appliances, and mechanical tools. The unconditioned stimulus was an aversive image selected from the International Affective Picture System. The experiment comprised two phases: fear acquisition and generalization. In acquisition, exemplars from the four stimulus categories were presented with varying levels of UCS reinforcement (0%, 37.5%, 62.5%, and 100%). In generalization, new unreinforced exemplars from each category were presented. A one-way ANOVA was performed to compare the effect of reinforcement during fear acquisition and generalization.

Results: A significant effect of reinforcement on the UCS expectancy and CS-UCS contingency ratings were observed. Notably, only the continuous reinforcement category demonstrated substantial changes, while the partial-reinforcement level failed to reach the significance level. UCS expectancy ratings increased with increasing certainty of UCS occurrence in the generalization phase.

Conclusion: Our results may help to understand how fear generalizes to conceptually related stimuli based on the certainty of the UCS occurrence.

Keywords: conceptual fear generalization; reinforcement level; fear conditioning; learning

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