

# Examining Individual Differences in Within-Category Variability Reasoning

**Olympia N. Mathiapparanam**

University of Rochester, Rochester, New York, United States

**Pablo Leon Villagra**

Brown University, Providence, Rhode Island, United States

**Daphna Buchsbaum**

Brown University, Providence, Rhode Island, United States

**Karl Rosengren**

University of Rochester, Rochester, New York, United States

## Abstract

Cognitive developmental research suggests that people exhibit essentialist biases when reasoning about categories, leading them to underestimate within-category variability. However, prior accounts have been limited by small datasets per participant and a reliance on cohort-level analyses. We developed a Markov Chain Monte Carlo with People (MCMCp) task using ladybeetles as a model species. In the task, participants select the best version of a ladybeetle, and complete surveys assessing their biology knowledge and essentialist reasoning. We conducted individual-level analyses, focusing on hue—the feature participants reported using most to guide their MCMCp decision-making. Preliminary findings reveal variation in adult and children’s category variability reasoning, with some participants accepting greater diversity in ladybeetle hue, while others showed more constrained, essentialist-like responses. We discuss these findings in relation to biology knowledge and essentialist reasoning, highlighting the importance of individual-level analyses in revealing factors that shape complex category reasoning and perceptions of within-category variability.