

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Feature, Alignment, and Supervision in Category Learning: A Comparative Approach With Children and Neural Networks

Permalink

<https://escholarship.org/uc/item/59h6v4hd>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 48(0)

Authors

Qiu, Fanxiao

Leong, Oscar

Publication Date

2026

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

Feature, Alignment, and Supervision in Category Learning: A Comparative Approach with Children and Neural Networks

Fanxiao Wani Qiu*

Oscar Leong†

Abstract

Understanding how humans and machines learn from sparse data is central to cognitive science and machine learning. Using a matched task design, we compare children and convolutional neural networks (CNNs) in a few-shot semi-supervised category learning task. Both learners received mixtures of labeled and unlabeled exemplars while supervision (1/3/6 labels), target feature (size, shape, pattern), and perceptual alignment (high/low) are systematically varied. We find that children generalize rapidly from minimal labels but show strong feature-specific biases and sensitivity to alignment. CNNs show a different interaction profile: added supervision improves performance, but both alignment and feature structure moderate the impact additional supervision has on learning. These findings show that comparisons between humans and machines should be controlled and sensitive to task structure. Comparing accuracy alone may hinder a more nuanced understanding of the conditions that differentially support success in each system.

*Department of Psychology, University of Southern California (email: fanxiaoq@usc.edu)

†Department of Statistics and Data Science, University of California, Los Angeles (email: oleong@stat.ucla.edu)