



UC San Diego Cognitive Science

Chaolan Lin's Dissertation Defense

Beyond the Seen: Representation-Reality Alignment in Technology-Mediated Environments

Wednesday, June 10, 2026

2:30 – 4:30pm, Cognitive Science Building, Room 180

Abstract:

In technology-mediated environments, perceptual information is filtered, transformed, or augmented, requiring observers to infer social, physical, and agentic states from perceptual evidence. I characterize this challenge as representation-reality alignment (RRA): The process through which humans coordinate perception, action, and inference to evaluate how perceptual representations correspond to underlying reality and guide behavior accordingly. Across three chapters, I examine how children and adults interpret mediated information when perceptual input provides ambiguous or indirect evidence about the world.

Chapter 1 asks how children aged 4 to 6 years infer a video chat partner's visual access from the self-view. Children increasingly used the self-view as evidence of another person's visual perspective with age; explicit reasoning emerged earlier than spontaneous action-based use. Chapter 2 asks how children aged 3 to 6 years judge whether perceptual features in augmented reality reflect physical reality or digital augmentation. Perceptual conflict increased active exploration, and exploration supported more accurate reality judgments; younger children relied more on physical inspection, whereas older children engaged more in causal testing to resolve perceptual discrepancies. Chapter 3 asks how adults infer internal capacities in a highly humanlike robot from cues of musical engagement. Holding the robot's movements constant, musical-motion synchrony and contextual cues increased perceived warmth and competence of the robot, while reducing feelings of discomfort; effects were partly explained by beliefs about the robot's ability to perceive and understand music.

Together, these findings suggest that technology-mediated environments place common inferential demands on cognition, requiring observers to evaluate how perceptual information relates to underlying social, physical, and agentic states while coordinating perception, action, and inference to guide behavior. This dissertation advances RRA as a framework for understanding how people navigate technology-mediated environments.

Committee members:

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