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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Metacognitive Insight into Event Completion during Everyday Event Perception

Permalink

<https://escholarship.org/uc/item/9ht2n66c>

Journal

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

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Publication Date

2026

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Peer reviewed

Analogy as reuse in mental model construction

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Humans construct mental models to navigate novel situations, yet how they do so efficiently remains poorly understood. Recent resource-rational accounts have explored what representations should be constructed under computational constraints, but leave open how humans actually discover them – and how prior solutions might be reused in the process. We argue that analogy serves as a core mechanism, enabling people to reuse solution-relevant structure from past experience. Formalising analogies as partial homomorphisms between decision problems, we sketch a framework in which abstract modules, extracted from previous experiences, serve as composable building blocks for new mental models. When a child learns that a password is "like a key," they import not just surface similarity but functional structure: transition dynamics, possible actions, and effective strategies. This modular reuse points toward a process-level account of how humans construct situationally appropriate representations, and connects classic work on analogy with computational approaches to bounded rationality.