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Proceedings of the Annual Meeting of the Cognitive Science Society

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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

What comes to mind? Ad hoc categories as contextual reweighting of a stable high-dimensional semantic space

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Abstract

Humans rapidly construct ad hoc categories, e.g., generating “beet” for “vegetables to paint with”. Building on feature-based accounts of category representation, we propose an analytic framework in which ad hoc categories are constructed by shifting the base category’s representation (e.g., VEGETABLE) along modifier-relevant dimensions (e.g. suitable for painting) in a high-dimensional semantic space, without an explicit hand enumerated feature search. We operationalize this with off-the shelf semantic embeddings, fitting per-category sparse linear models that predict item generation across 20 categories. Across 9 categories tested for compositional transfer, learned modifier directions improved predicted retrieval when physical constraints generalize across domains (e.g., portability for “that could fit in your pocket”), while transfer was weaker for context-dependent modifiers. The learned axes align with human-rated features, with top-weighted features matching modifier semantics. These results frame ad hoc category construction as contextual reweighting of a semantic geometry, bridging feature-based accounts of conceptual combination with distributional representations.