

## The GIST of Concepts

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### Abstract

A unified general theory of human concept learning based on the idea that humans detect invariance patterns in categorical stimuli as a necessary precursor to concept formation is proposed and tested. In GIST (generalized invariance structure theory) invariants are detected via a perturbation mechanism of dimension suppression referred to as dimensional binding. Structural information acquired by this process is stored as a compound memory trace termed an ideotype. Ideotypes inform the subsystems that are responsible for learnability judgments, rule formation, and other types of concept representations. We show that GIST is more general (e.g., it works on continuous, semi-continuous, and binary stimuli) and makes much more accurate predictions than the leading models of concept learning difficulty, such as those based on a complexity reduction principle (e.g., number of mental models, structural invariance, algebraic complexity, and minimal description length) and those based on selective attention and similarity (GCM, ALCOVE, and SUSTAIN). GIST unifies these two key aspects of concept learning and categorization. Empirical evidence from three experiments corroborates the predictions made by the theory and its core model which we propose as a candidate law of human conceptual behavior.

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