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A cognitive computational model of mindsets

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Abstract

An individual's intelligence mindset describes their implicit beliefs about whether intelligence is fixed (fixed mindset) or malleable (growth mindset). Here, we introduce a computational framework to unify and build upon findings in the mindsets literature. We postulate that individuals maintain a mental model of others' skill, in which current skill is the sum of innate skill (1) and skill acquired from experience (growth potential (2) times fraction of potential realised (3)). An observed current skill level is consistent with multiple combinations of (1), (2), and (3). To disambiguate, the model observer performs probabilistic inference, which requires priors. In particular, we conceptualise a fixed mindset using a high-variance prior over innate skill and a low-variance, low-mean prior over growth potential. Through proofs and simulations, we demonstrate that our model accounts for empirical findings in terms of the latent psychological processes. Our results offer promise for a computational cognitive science of mindsets.