Rationality vs Intelligence

Research Papers

Grimm, J., & Richter, T. (2024). Rational thinking as a general cognitive ability: Factorial structure, underlying cognitive processes, and relevance for university academic success. Learning and Individual Differences, 111, 102428.

Burgoyne, A. P., Mashburn, C. A., Tsukahara, J. S., Hambrick, D. Z., & Engle, R. W. (2023). Understanding the relationship between rationality and intelligence: a latent-variable approach. Thinking & Reasoning, 29(1), 1-42.

Overview

Rational thinking, our ability to override gut reactions with clear, analytical reasoning, goes beyond raw intelligence. A simple example of rational thinking that differs from intelligence is resisting a "gut" answer on a tricky problem, like the classic "phone and case" problem. A phone and a case cost £110 together. The phone costs £100 more than the case. How much does the case cost? The intuitive but incorrect answer is often £10. Rational thinking involves stepping back, questioning that first response, and systematically working through the problem to get the right answer: ± 5 ($\pm 5 + \pm 105$). This shows rational thinking because it requires overriding an automatic response and analysing carefully, whereas intelligence might measure raw problem-solving speed or memory but not this reflective process.

Key Findings

Study 1: Rationality vs. Intelligence (Burgoyne et al) In this analysis, rationality shows its unique strength, standing apart from intelligence. Using a mix of tasks to test cognitive biases, Burgoyne and colleagues found that rationality aligns with fluid intelligence, working memory, and especially attention control-but remains distinct. It's not just what you know; it's how you manage automatic responses and sustain attention to solve problems. These findings suggest rationality taps into areas intelligence tests miss, giving it unique real-world value.

Study 2: Rationality as a Predictor of Success (Grimm & Richter) Grimm and Richter reveal rationality's punch in academia. Their study shows that rational thinking is crucial for navigating the self-driven, decision-heavy world of university life. Testing for biases like belief and ratio bias, they identified a general rationality factor that strongly predicts academic performance, even when intelligence is accounted for. Rational thinkers excel at systematic analysis, a skill essential for higher education's complex demands.

Four measures of Rational Reasoning	
Cognitive	Ability to override intuitive but incorrect
Reflection	answers with reflective thinking.
Belief Bias	Ability to judge arguments based on logic
Resistance	rather than personal beliefs.
Ratio Bias	Tendency to favour absolute over relative
Resistance	probabilities.
Disjunctive	Evaluating all possible outcomes before
Reasoning	making a decision.



If a Smartphone and case cost £110 and the Smartphone costs £100 more than the

..... then how much does the case cost?

Methods

Burgoyne et al used structural equation modelling on a sample of 331 participants to examine relationships between rationality, fluid intelligence, working memory, and attention control. Grimm and Richter assessed 299 participants using bifactor analysis to test rationality as a general cognitive factor through tasks on biases like belief bias and ratio bias.

Insight

These studies confirm rationality isn't just about smarts, it's about focus, control, and resisting snap judgments. By enhancing rational skills, we gain an edge in both personal decisions and academic success.

