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The Perceived Dilution of Causal Strength

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Abstract

Dependency theories of causal cognition, like causal Bayes net theory, postulate that the strength of causal links is independent of the causal structure in which they are embedded. We propose a new theory that postulates that people's concept of causality is richer, and that predicts an influence of causal structure on strength intuitions. According to the theory, people's concept of causality involves the idea that causal powers behave like phenomena studied in fluid dynamics: Continuous causes are assumed to spread their capacity across causal pathways, akin to fluids running through pipe systems. The theory predicts a perceived dilution of causal strength. A series of experiments ($N = 3,733$) and a meta-analysis corroborate the theory. For common causes, people perceive the strength of individual links to decrease with the number of links. In causal chains, people perceive a link strength gradient. This dilution effect disappears for genuinely binary causal variables.