

Order Effects in One-shot Causal Generalization

Bonan Zhao

The University of Edinburgh, Edinburgh, United Kingdom

Neil Bramley

University of Edinburgh, Edinburgh, Scotland, United Kingdom

Abstract

We introduce a novel task exploring how people make causal generalizations over the abstract features of the objects involved in a causal interaction. Specifically, we investigate how people generalize from a single observation of two simple objects in which one (the agent, or cause) interacts with another (the recipient, or effect) resulting in some feature change(s). In line with recent demonstrations of human strength in few-shot concept learning, we find strong and systematic patterns of generalizations that are well explained by a Bayesian inference model favoring simpler causal rules. However, we also identify a clear order effect depending on what order generalizations are made. To capture the observed patterns, we develop a causal hypothesis generation model that takes peoples natural generalization tendency and the order effect into consideration, and outperforms plain Bayesian inference both in computational efficiency and in match to the behavioral data.