Causes Have Greater Inductive Potency than Effects

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Introduction

Frequently, people take a few features about a person (e.g., Jan can't sleep at night) and easily infer others (e.g., Jan is probably tired). The current study examines the influence of causal relations among known features on inferences to unknown features. The main idea is that cause features have greater inductive potency than effect features. Consider a situation with two features (X and Y) known about a person. Those who believe that X causes Y in this person would be more likely to draw inferences from X than from Y, whereas those who believe that Y causes X in this person would be more likely to draw inferences from Y than from X.

This idea is consistent with findings that people weight causes more heavily than effects in categorization (e.g., Ahn & Kim, 2000) and work on causal essentialism showing that people commonly infer many features from an unseen cause when reasoning about natural or social kinds (e.g., Gelman, 2003). However, parallel distributed models of reasoning posit no special role for causal status and argue that any inductive potency differences can be attributed to the fact that causes covary coherently with more properties than do effects (Rogers & McClelland, 2004). Two experiments examined this issue while holding associations of cause and effect features with the to be inferred features constant.

Experiments

To investigate whether the causal status of features affects inductive strength we presented participants with pairs of mental disorder symptoms with reversible causal relations. For example, in a given question participants saw *either* "J.M.'s large mood swings cause him to have social anxiety" (X→Y) or "J.M.'s social anxiety causes him to have mood swings" (Y→X). *All* participants then made inductions regarding the presence of two additional features. In a pretest, one of these features was judged to be highly associated with feature X but not with Y ("J. M. engages in reckless behavior") and the other feature to be highly associated with Y but not with X ("J. M. blushes easily"). Participants judged the likelihood of the individual having each of these features on an 11-point scale (0: not at all – 10: completely certain). Seven items were used.

We predicted that cause-associated features would be rated higher than effect-associated features. Thus, given X→Y, X-associated features would be judged higher than Y-associated features, whereas the reverse is true for Y→X. Forty undergraduates (Experiment 1) and 32 clinical psychologists, social workers, and psychiatrists (Experiment 2) completed the experiment online.

Results and Discussion

As predicted, cause-associated features were rated significantly more likely than effect-associated features by both undergraduates, $t(39)=3.09$, $p<.01$, and by clinicians, $t(31)=2.97$, $p<.01$. Since the *same features* were judged across the two causal orderings, this suggests that it was causal status alone, and not the greater coherent covariation of the causes that produced the stronger inductive potency. Instead, the results demonstrate the importance of directional causal explanations on feature inferences. This study also suggests the practical implication that clinicians' beliefs about inter-symptom relations will affect their inferences about other unknown features patients may have.

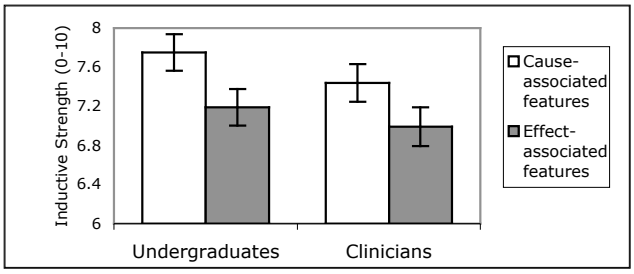

Figure 1: Inductive strength as it varies by causal status.

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