Symposium: Using Causal Knowledge

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It is now a virtual truism that background knowledge affects cognition. The course of thinking frequently depends on what is being thought about. Yet beyond this simple admission it is important to develop specific accounts of background knowledge. One way to begin is to recognize that some beliefs are more influential than others. In this symposium we will focus on the role that causal beliefs play in cognition.

Much of our knowledge of the world is organized around ideas of causal relations. As a foundational concept, "cause" figures in a number of cognitive processes. In this symposium, investigators from several sub-disciplines of cognitive science will discuss the influence of beliefs about causal relations. From these presentations we hope we may discern some common patterns and begin to fill in the picture of background knowledge.

Presentations

Learning in Context: The effect of existing causal knowledge on the acquisition of new knowledge.

Michael J. Pazzani
University of California, Irvine

A variety of studies have shown that the existing causal knowledge of the learner affects the induction of new knowledge. Here, we discuss the implications of these findings on the field of knowledge discovery in databases whose goal is to turn data into knowledge. In particular, we present recent results in which consistency with prior causal knowledge affects experts' willingness to use the results of knowledge discovery and discuss how knowledge discovery algorithms may be modified to produce acceptable results.

The Role of Causal Status of Features in Determining Feature Centrality in Categorization

Woo-kyoung Ahn
Yale University

I present studies investigating how the causal relations among features determine the features' centrality in categorization. First, in natural concepts, correlated features that are causally related (e.g., "flies" and "sits in trees" in birds) affect typicality judgments more than causally unrelated ones (e.g., "is shady" and "has bark" in trees). Second, among the causally related features, cause features (e.g., "flies" in birds) were judged to be more central than their effect features (e.g., "sits in trees" in birds). This finding has been demonstrated with natural categories and artificial stimuli.

The pragmatics of causal inference

Denise Dellarosa Cummins
California State University, Sacramento

Causal reasoning is influenced by judgments of causal necessity and sufficiency, which are distinct from logical necessity and sufficiency. When determining causal necessity, reasoners consider possible alternative causes that could produce a particular effect; when determining causal sufficiency, they consider possible factors that could prevent an effect from occurring. The determination of causal necessity and sufficiency constitute the pragmatics of causal inference. A model of causal inference is presented in which the interaction of argument structure and pragmatic content in determining causal inference is detailed. Studies investigating the predictions of this model are discussed.

Children's Inductive Inferences in Natural and Intentional Causal Contexts

Charles Kalish
University of Wisconsin-Madison

Beliefs about causal relations often underlie inductive inferences. If A causes B at T_1, we assume A will cause B thereafter (*ceteris paribus*). However, all causal relations do not support equally strong inferences. In particular we typically believe there is a stronger, more necessary connection between cause and effect in cases of natural (physical) causation than in cases of intentional (voluntary) causation. To what extent are children's inductive inferences sensitive to differences in causal content? I will discuss research suggesting that young children exaggerate the differences between intentional and natural causal relations.