

The Relevance of Alternative Possibilities throughout Cognition

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these four presentations showcase new developments in the emerging research on modal cognition and its relation to norms.

Overview

Research in a number of different fields has independently argued for the importance of providing a place for modality—that is, some way of representing alternative possibilities that could have happened, but actually did not (e.g., Kratzer, 2012; Lewis, 1973; Pearl, 2000). In each of these cases, the key insight has been that people’s understanding of the things that occur is shaped in some central way by their understanding of these alternative possibilities.

Work throughout these fields has emphasized that people do not treat all alternative possibilities equally. Instead, they regard certain possibilities as relevant, while treating others as irrelevant (Portner, 2009; Roese, 1997). Within this research, one consistent theme has been that norms (statistical, moral, conventional, etc.) influence how these alternative possibilities are represented.

This symposium focuses on new empirical and theoretical approaches to the role of modality throughout human cognition, and highlights the role of different norms in modal cognition. Phillips and Knobe present a framework for the psychological representation of modality designed to capture the impact of factors such as probability and morality, and then go on to present new data in support of their proposed approach. Shtulman discusses the development of modal cognition, and reports empirical evidence that statistical and moral norms affect beliefs about what is possible, permissible and real. Kalish presents new research on the modal judgments underlying children’s reasoning about norms. Hitchcock combines research on the *availability* of counterfactual alternatives in developing a framework that accounts for ordinary judgments of causation. As a group,

Phillips & Knobe: The Psychological Representation of Modality

A great deal of research has now demonstrated that our understanding of physics, probability, and morality impact many aspects of cognition. One underappreciated fact about this research is that a judgment that something is statistically *improbable* often has the same impact on cognition as a judgment it is physically *impossible* or morally *bad*. The similarity of these effects can be seen in phenomena as diverse as causal selection, assessments of freedom, counterfactual reasoning, predictions of future actions, and the development of thinking about possibilities.

We offer a unified account of this similarity by proposing that each of these factors is relevant to how people represent *possibilities*. We lay out a modified version of a standard linguistic framework for modality (Kratzer, 2012), which allows us to capture the impact of these factors on cognition, and go on to report new empirical data that support this general account of the psychological representation of modality.

Jonathan Phillips is a postdoctoral researcher in Psychology at Harvard University. Joshua Knobe is a Professor in the Program in Cognitive Science and Department of Philosophy at Yale University. Their work has been published in *Behavioral and Brain Sciences*, *Cognition*, *Cognitive Science*, *Psychological Science*, *Journal of Philosophy*, and *Semantics and Pragmatics*.

Shtulman: Developmental and Individual Differences in Modal Cognition

Modal cognition underlies several facets of everyday learning and problem solving. In this talk, I will discuss the development of modal cognition, focusing on our changing intuitions about physical possibility. The first half will outline the newly emerging consensus that children are more skeptical about physical possibility than are adults. Children initially deny the possibility of any event that defies expectation, improbable or impossible, and not until early adolescence do they reliably differentiate events that violate physical laws from those that violate mere empirical regularities, both in their judgments and their justifications (Shtulman & Carey, 2007). The second half will explore the relation between modal judgments and modally-relevant beliefs, namely, children's beliefs about fantastical beings (Shtulman & Yoo, 2015) and adults' beliefs about moral permissibility (Shtulman & Tong, 2012). Overall, I will argue that differences in the *procedural* aspects of modal judgment can lead to drastically different beliefs about what is possible, what is permissible, and what is real.

Andrew Shtulman is an associate professor of psychology at Occidental College. His interests include conceptual development and conceptual change, and his work has appeared in such journals as *Cognition*, *Cognitive Psychology*, and *Cognitive Science*.

Kalish: Why Not? Children's Normative Evaluations

What sort of modality is involved in children's normative evaluations? At times it seems that young children conflate physical and deontic possibility (e.g., denying that it is possible to violate social norms). There are many types of constraints underlying social norms (e.g., prudence, error-avoidance). One hypothesis is that children make normative evaluations by identifying the specific constraint relevant to an action (e.g., "That's dangerous, so you can't do it."). We will present data suggesting that young children treat violations of conventional norms as wrong in and of themselves. When pressed, children will cite a constraint justifying their normative judgment, but the justifications seem post-hoc (akin to the moral dumbfounding findings of Haidt, 2001). For young children, social norms may determine a set of *available* and *nonavailable* actions, without clearly specifying why.

Charles Kalish is a professor of Educational Psychology at UW-Madison. His interests include the nature of normative concepts, and the role of norms in social cognition. His work on norms has appeared in such journals as *Cognition*, *Child Development*, and *Developmental Psychology*. Anne Riggs is a graduate student in the Department of Psychology at UW-Madison

Hitchcock: Counterfactuals, Norms, and Causal Judgment

There is a tradition in philosophy and legal theory of trying to understand causation in terms of counterfactuals. *C* is said to be a cause of *E* if *E* would not have occurred had *C* been absent. (See, e.g. Lewis 1973.) However, this account yields some verdicts that differ from the causal judgments of most subjects. Drawing on research done in collaboration with Joseph Halpern (Cornell Computer Science), I present a framework for explaining these discrepancies. According to a counterfactual account, causal judgment requires us to consider what would happen in various hypothetical situations. Psychological research has shown that some hypothetical possibilities are more readily *available* than others. Counterfactual availability is strongly influenced by various *norms*, where the norms can be moral, legal, statistical, or functional. (See, e.g. Kahneman and Miller 1986.) Thus, by drawing our attention toward or away from various possibilities, norms can highlight or obscure the counterfactuals that underwrite particular causal judgments.

Christopher Hitchcock is J.O. and Juliette Koepfli Professor of Philosophy at the California Institute of Technology. He works in the philosophy of science with a focus on the role of causal concepts in scientific and everyday reasoning. His articles have appeared in journal such as the *Journal of Philosophy*, the *Philosophical Review*, *Philosophy of Science*, and *Cognitive Science*.

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