The Relations Between Causal (x2) and Counterfactual Reasoning, the Hindsight Bias and Regret (and the kitchen sink)

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The research areas of causal and counterfactual reasoning, hindsight bias and regret, have often been studied in isolation, sometimes studied in pairs, and occasionally studied in triads. I suggest that there are common mechanisms shared by these judgments that explain how, when, and why they will (a) be similarly or differently affected by information and (b) influence each other.

To start, I distinguish two types of causal reasoning: the types of judgments we make in science when we have multiple examples of causes and effect and the types of judgments we make in law when we want to figure out the cause of a one-time only event. In the former, an important cue to causality is covariation -- a cause is something that increases the probability of an effect above its usual probability. I then draw an analogy to the latter -- and assume that a causality judgment about a person or event is a function of how much that person or event increases the probability of the eventual outcome above its "baseline" probability (i.e., its natural probability of occurring).

$$C \approx p(Oafter) - p(Obefore)$$

The equation above represents how a causality judgment is a function of the estimated probability of the eventual outcome occurring after the target cause has occurred [p(Oafter)] and the estimated probability of the eventual outcome occurring before the target cause has occurred [p(Obefore)].

But for one-time events, how can people make probability judgments? I suggest that such judgments rely on pre-existing knowledge -- especially of previous covariations and causal mechanisms -- and counterfactual reasoning. The equation below expands the one above by putting each estimate over 1 (i.e., p(Oafter) + p(~Oafter) = 1).

$$C \approx \frac{p(Oafter)}{p(Oafter) + p(\sim Oafter)} - \frac{p(Obefore)}{p(Obefore) + p(\sim Obefore)}$$

That causality relies on counterfactual information in this manner explains the "if-only" and "even-if" effects -- ways in which considering counterfactuals affects causal judgments. For example, if someone takes an unusual route home, and then is in a car accident, she might think "If only I had taken my usual route." That counterfactual thought would increase the estimate of p(~Obefore), decrease the fraction on the right, and increase the causality assigned to the decision to take the unusual route.

The relation to the hindsight bias is clear: When do people make these probability estimates? Typically after events have unfolded. Thus, the hindsight bias is implicit in causality judgments. However, these equations also suggest ways in which the hindsight bias can be de-biased and, in particular, which kinds of counterfactuals should be most effective in doing so.

Finally, I argue that regret is both a counterfactual and causal emotion -- it depends on knowing that what you might have done could have changed an outcome. Our studies compare measures of causality with measures of regret. We find that regret depends on the difference between an actor's perceived causality for the (negative) outcome given his actual decision and the imagined causality for that outcome had an alternative decision been made. (Again, such causality judgments are made in hindsight.) Our experiments use this relation to explain "action" and "inaction" effects in regret judgments.

I hope to relate these analyses to other types of reasoning.

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Relevant Publications

Spellman, B. A., Kincannon, A., & Stose, S. (in press). The relation between counterfactual and causal reasoning. Invited chapter to appear in D. R. Mandel, D. J. Hilton, & P. Catellani (Eds.), *The psychology of counterfactual thinking*. London: Routledge Research.

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