Informative Counterfactuals

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There is a rich body of literature devoted to the *truth conditions* for counterfactual conditionals, but very little work on the *informative use* of such expressions. How does the felicitous utterance of a counterfactual update the common ground? In (1), for example, a certain kind of covariance is asserted, but no mechanism explaining this covariance is explicitly provided. We present a theory of informative counterfactuals that embraces this explanatory underspecification while remaining firmly grounded in one of the dominant theories of counterfactual truth evaluation: structural equation modeling (Pearl 2000).

In recent years, causal modeling has risen to prominence in the analysis of counterfactuals. A structural equation model (SEM) represents causal (in)dependencies graph-theoretically, with the resulting structure playing a crucial role in the determination of "counterfactual shifts". While there is still disagreement as to the exact implementation of such shifts (see Pearl 2000; Hiddleston 2005), the fundamental theory has engendered much interest in the cognitive sciences generally and, more recently, in linguistics specifically (see Kaufmann 2013).

We adopt the basic SEM framework, though we treat the attendant graph-theoretic structure not as a given, but as a *goal*. In particular, we model updating with a counterfactual as a two-stage process: first, a partial SEM is constructed that captures, in a precise sense, the given counterfactual; second, this partial SEM is merged with the causal structure already present in (an enriched version of) the common ground. Thus, we separate the task of *understanding* a counterfactual from that of *integrating* this understanding with an extant body of knowledge.

Consider again the counterfactual conditional in (1); perhaps the most straightforward way of capturing it with a SEM is shown in Figure 1, which encodes a direct causal dependence of B on A. In an important sense, however, this representation is unsatisfying: surely Alice's attendance at the party does not literally cause Bob to be elsewhere; the relationship is governed by other factors. In essence, what is missing here is an *explanation*—at some appropriate, contextually determined level of detail—of why Alice's attendance results in Bob's absence. We propose a tripartite typology of explanation: ADDITIONAL CAUSE, COMMON CAUSE, and INTERMEDIATE CAUSE, exemplified respectively by the SEMs in Figures 2-4 and the follow-ups (2)-(4). Context or pragmatics might favor one type of explanation over another, but in general, hearers may entertain multiple explanations for a given counterfactual; indeed, resolving such uncertainty is arguably one of the primary purposes of communication.

It is interesting to note that *reversing* the causal relationship as in Figure 5 (so that A depends causally on B) is rejected as an interpretation of (1), though it can be licensed with a double-auxiliary construction as in (5). The connection between such "backtracking" counterfactuals and the double-auxiliary construction has been studied (Arregui 2005; Iatridou 2000); notably, however, even though COMMON CAUSE is also typically taken to be a case of backtracking, it is available without the double-auxiliary, suggesting an important distinction between the backtracking in Figure 5 versus that in Figure 3.

Finally, consider the counterfactual in (6). Each of (1) and (6) is acceptable on its own (at least in a context where it is understood that Alice and Bob have a son Doug), but taken together, they are problematic. We show that our framework predicts both their individual tenability and their joint infelicity, the latter a consequence of how counterfactual explanations generated in the first stage of the update process are integrated into the common ground.

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(1) If Alice had gone to the party, Bob would have stayed home.

(2) Bob hates Alice, and therefore avoids her.

(3) Alice and Bob have a young son Doug, and always arrange in advance (by flipping a coin, say) for at least one of them to be home to watch him.

(4) Alice brings her cat wherever she goes, and Bob is deathly allergic to cats.

(5) If Alice had gone to the party, Bob would have had to have stayed home.

(6) If Alice had gone to the party, Doug would have been home alone.

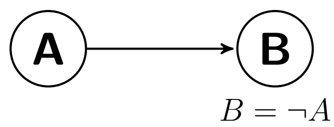

Figure 1: Direct dependence.

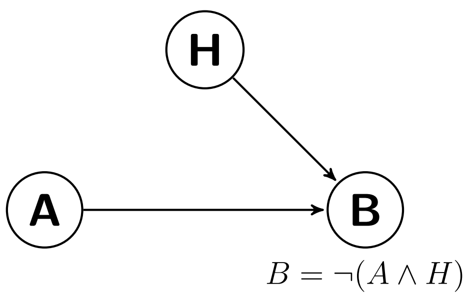

Figure 2: Positing an additional cause.

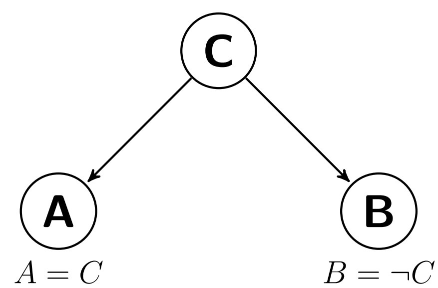

Figure 3: Positing a common cause.

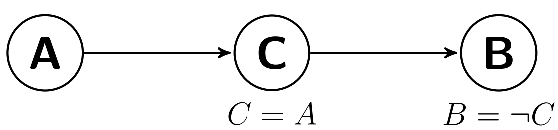

Figure 4: Positing an intermediate cause.

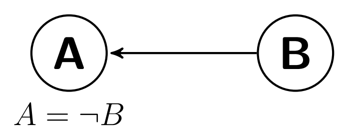

Figure 5: A classical backtracking explanation.

References

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