

Inferential Conditionals and the Meaning of Some Epistemic Modals

1. Epistemic modals. The meaning of epistemic modals like “must” and “should”, even though widely discussed, is far from being well understood. *Prima facie*, “must” seems to indicate the necessity of whatever it precedes, and hence, it is supposed to quantify over all possible worlds. Yet, it seems perfectly appropriate to assert “It must be raining” when we only see people carrying around wet umbrellas, but not when we have a direct perceptual evidence, that is when we can actually see that it is raining. This observation motivated the view that preceding an assertion with “must” makes it weaker (see *e.g.* Karttunen [1972] or Kratzer [1977]).

Contrary to the mainstream view, von Fintel and Gillies [2010] argued that “must” functions as an evidential marker signaling the presence of an inference. According to those authors, what has been erroneously taken as weakness is simply indirectness of the evidence, and hence there is no reason to doubt that “must” is a strong necessity modal.

Although, as we shall argue, von Fintel and Gillies’s claim that “must” is an evidential marker of an inference is most likely correct, they jumped to their conclusion too quickly, because they failed to take into account the variety of inferences. Might it not be the case that “must” indicates one particular type of inference while, for instance, the weak necessity modal “should” signals a different type?

2. Inferential conditionals. Traditionally, philosophers and logicians classify inferences as certain, often referred to as deductive, or uncertain inferences, which can be further classified as inductive or abductive. Following this tradition, Douven and Verbrugge [2010] proposed a new typology and, accordingly, a definition of inferential conditionals:

Definition 1. A sentence “If P , then Q ” is a (contextual) deductive inferential (DI, for short), inductive inferential (II) or abductive inferential (AI) conditional if and only if Q is, respectively, a deductive, inductive or abductive consequence of P (or $\{P, P_1, \dots, P_n\}$, with P_1, \dots, P_n being background premises salient in the context in which “If P , then Q ” is asserted or being evaluated).

Taking this typology of inferential conditionals as the departure point, we investigated the effect of adding epistemic modals “must” and “should”, as well as “probably”, on the assertability of conditionals representing different types of inferences.

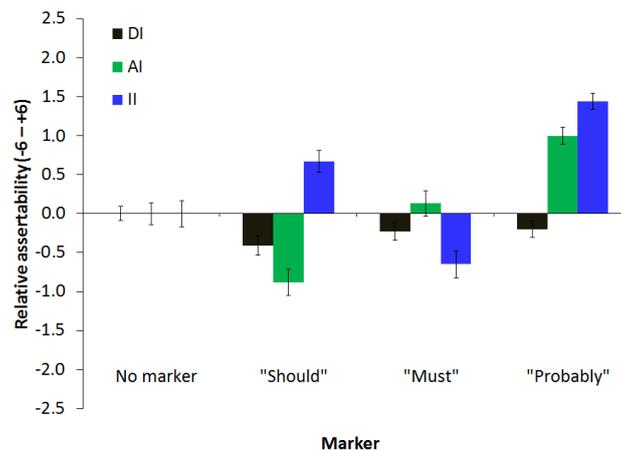
3. The experiment. Participants were presented with vignettes containing contexts and four conditionals (without any marker and with “must”, “should” and “probably” added to their consequent) *e.g.*:

Context: Someone tells you that a nearby village, located in a valley below a dammed reservoir, has been flooded. You doubt that this is true. On the other hand, the dam has been in a rather bad state for some time.

Conditional: If the village has been flooded, then the dam has broken.

We asked the participants to rate the assertability of all four conditionals on the 7-point Likert scale.

4. Results. We measured the relative assertability of conditionals, that is the degree of assertability of a conditional with a marker minus the degree of assertability of the conditional without marker.



Error bars represent 95% confidence intervals.

5. Conclusion. The reported experiment suggests that epistemic modals signal the presence of a specific, rather than any, type of inference. “Must” can be thought of as a marker of an abduction, that is inference to the best explanation. Since abductive inference has been recognised by the participants as defeasible (as indicated by the strong positive effect of “probably” on the AI conditionals), interpreting “must” as a strong necessity modal is highly questionable. Moreover, “must” does not seem to have a weakening effect on the assertion given that its positive effect on the AI conditionals is not significant. By contrast, “should” seems to indicate the presence of induction, and additionally—to weaken the assertion. It is thus possible that the evidential signal is an important constituent of the meaning of the epistemic modals.

References

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