

Models redux: Response to Evans and Over

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The mental model theory provides a general explanation of deductive and inductive reasoning [1] and solves seven problems concerning conditionals [2]. In response to our recent *TiCS* article [2], Evans and Over [3] reject one solution, and defend their recent theory of conditionals. However, their ‘suppositional’ theory is strikingly similar to ours: both rely on mental models; both postulate that individuals make suppositions [4]; both distinguish between intuition and deliberation [5]. Both predict that individuals tend to judge that a conditional is neither true nor false when its if-clause is false (yielding a ‘defective’ truth table); take the denial of a conditional to be the same conditional but with a negated then-clause; and infer that the probability of a conditional is the probability of its then-clause given its if-clause [6,7]. So, what are the differences? First, these responses are correct according to the suppositional theory, but incorrect according to the model theory: what the model theory predicts as the correct responses do occur [6,7]. Second, only the model theory provides a comprehensive and corroborated account of reasoning from counterfactual conditionals [8]. Third, only the model theory includes a mechanism that allows content and context to modulate the core logical meaning of conditionals into an indefinite number of non-logical meanings [4].

Of the aforesaid judgment of the probability of a conditional, Evans and Over state that, ‘[the] mental model theory has no explanation of it; thus, the authors simply deny that the phenomenon exists’. On the contrary, we have reported the phenomenon, and the theory includes two inferential strategies that yield it [6,7]. Our *TiCS* article [2] described one of them (the ‘equiprobable’ strategy), and sketched the other, which we outline below.

We discussed a puzzle [2], which Evans and Over now argue ‘decisively refutes’ the model theory: individuals with a capacious working memory are more likely than others to treat conditionals as having the defective truth table and to make the judgments of conditional probability. The model theory, however, postulates that individuals tend to interpret sentential operators as applying only to main clauses, such as the then-clauses of conditionals [6,7].

This strategy can reduce relational complexity [9] and the number of models of possibilities. It applies to questions about truth, negation, and probability. So, individuals often treat:

- In what cases is it true that if A then B? as meaning: If A then in what cases is it true that B?
- What is the denial of if A then B? as meaning: If A then what is the denial of B?
- What is the probability that if A then B? as meaning: If A then what is the probability that B?

These interpretations yield the defective truth table, the judgments of negation, and the conditional probability inferences. This reduction of the grammatical scope of an operator applies to any sort of sentence with a subordinate clause. With conditionals, intelligent individuals might adopt it, because it reduces relational complexity and the number of models. Hence, the finding does not refute the model theory. The suppositional theory, however, fails to explain the correct responses for the truth, denial and probability of conditionals.

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