

Semantic Memory Retrieval During Conditional Reasoning: Every Counterexample Counts

Wim De Neys (Wim.Deneys@psy.kuleuven.ac.be)

Walter Schaeken (Walter.Schaeken@psy.kuleuven.ac.be)

Géry d'Ydewalle (Géry.dYdewalle@psy.kuleuven.ac.be)

Department of Psychology, K.U.Leuven, Tiensestraat 102
B-3000 Leuven, Belgium

Introduction

Reasoning with conditionals involving causal content is known to be affected by retrieval of counterexamples from semantic memory. This study focuses on the characteristics of this search process.

In Markovits' (2000) recent specification of the memory search process, the number of stored counterexamples is important because it determines the probability that at least one can be retrieved. This specification does not address the impact of additional counterexample retrieval. Indeed, the search process is assumed to stop after the successful retrieval of a single counterexample.

The present study tests an alternative specification of the search process. We examine the assumption that the search process does not terminate after the retrieval of a single counterexample and that every retrieved counterexample has an additional impact on the reasoning process. Here, the number of stored counterexamples will be important because it determines the number of counterexamples that can be retrieved and this number would determine the degree to which inferences will be accepted.

Experiment

A generation pretest measured the number of counterexamples (alternative causes or disabling conditions) participants could retrieve for a set of causal conditionals. One month after the pretest, participants were presented a reasoning task with the same conditionals. We looked at participants inference acceptance ratings for each conditional in function of the number of counterexamples they could retrieve for that conditional.

Results showed that every alternative or disabler that can be retrieved has an impact on the inference acceptance. Acceptance of Modus Ponens and Modus Tollens linearly decreased with every additionally retrieved disabler. Likewise, Affirmation of the

Consequent and Denial of the Antecedent acceptance linearly decreased in function of the number of retrieved alternatives.

These graded effects of up to four different numbers of available counterexamples can not be explained if the semantic search process during conditional

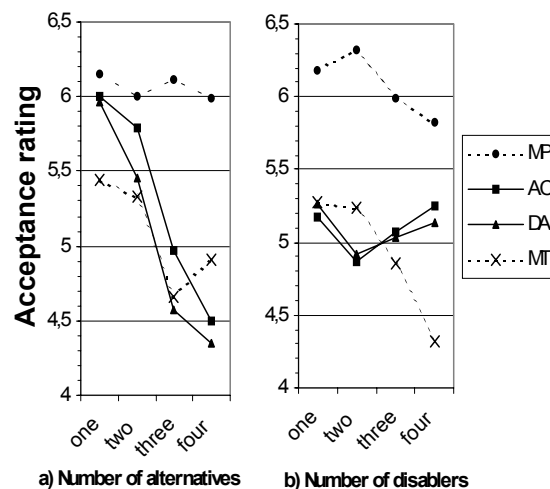


Figure 1. Inference acceptance (7-point scale) in function of the number of alternatives (2a) or disablers (2b) participants could retrieve for a conditional.

reasoning would stop after successful retrieval of a single counterexample. This makes it clear that Markovits' (2000) conditional reasoning model needs to be revised.

References

- Markovits, H. (2000). A mental model analysis of young children's conditional reasoning with meaningful premises. *Thinking and Reasoning*, 6, 335-347.