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Are Simpler Strategies less Error-prone in Inference from Memory?

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Inferences from Givens vs. Memory

The adaptive toolbox approach to decision-making holds that people possess a repertoire of strategies and that they adapt to the characteristics of the task environment by selecting the appropriate one from that repertoire (Gigerenzer, Todd, & the ABC Research Group, 1999). For example, Gigerenzer et al. have suggested that people rely on simpler strategies when cognitive costs of information search are high. Bröder and Schiffer (2003) tested this hypothesis by observing people's strategy selection in a condition in which people could search for information on a computerized display, information from givens, or alternatively had to retrieve information from memory – inference from memory. Bröder and Schiffer found more participants relied on the simpler, noncompensatory strategy Take the Best (TTB; Gigerenzer et al., 1999) compared to other more information-intensive strategies in the inference from memory compared to inference from givens condition. Bröder and Schiffer argued that given "the assumption that retrieving pieces of information sequentially from memory causes cognitive costs in terms of time, effort, and *error proneness*, the tendency to use noncompensatory heuristics like TTB seems fairly adaptive" (emphasis added; p. 289). The present work aims to test the assumption that the simple TTB is less error-prone compared to more information-intensive strategies when used in inference from memory.

Simulation

I used the elementary information process (EIP) framework (Payne, Bettman, & Johnson, 1993) to model two simple inference strategies, TTB and Tally (Gigerenzer et al., 1999). The EIP framework is a production-system theory which allows constructing different strategies using the same basic EIP building blocks, such as READ (read a value of an option into working-memory), COMPARE (compare the values of two options in working-memory), ADD (add a value to a tally concerning an option), and DECIDE (choose an option). The rationale for using this framework is it allows changing the efficiency of basic decision components independent of differences between strategies. The two strategies combine EIPs differently. For each decision, TTB searches for information on the options concerning the most valid cue (READ), compares the options on that cue (COMPARE), and chooses the option for which the cue speaks (DECISION). If the cue does not discriminate the process is repeated with the second most valid cue, and so on until a decision is made. Tally looks up information on each cue (READ) and computes a tally for each option (ADD), it then compares the two tallies (COMPARE) and makes a decision (DECISION).

I modelled the effect of making inferences from memory by increasing the error in EIPs shared by TTB and Tally: READ and COMPARE. The rationale underlying this manipulation is that retrieving information from memory may lead to failed retrievals (READ) or errors in comparing cues in working-memory (COMPARE). I simulated 1000 decisions of TTB and Tally between all paired-comparisons of 16 options possessing 4 binary cues. The average results can be observed in Figure 1. The manipulation of errors in READ suggests Tally is a more robust strategy particularly for large proportions of error. However, the opposite prediction resulted from the manipulation of COMPARE. An empirical study asking participants to execute TTB and Tally in givens and memory conditions is currently under way to test these predictions.

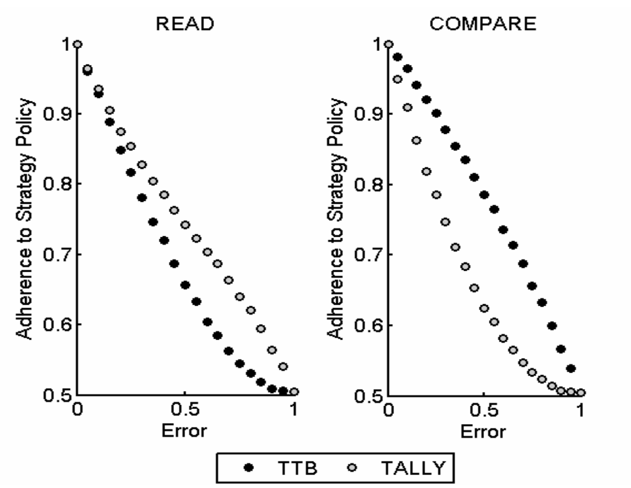

Figure 1: Proportion of errors of TTB and Tally as a function of errors in EIP (READ, COMPARE).

References

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