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The Nature of Belief Inhibition in Thinking: How Reasoning Impairs Memory

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Human thinking often relies on prior knowledge and intuitive beliefs. For example, when asked whether taking the plane is safer than taking the car many people overestimate the risks of flying because of the dreadful images of crashing planes and terrorist attacks they intuitively think of. The problem is that although belief-based reasoning can sometimes be useful, our beliefs will often cue erroneous responses that conflict with the logically appropriate response. In these cases the logical system will need to override the intuitive response and inhibit the belief-based system. Hence, it is claimed that sound reasoning in the case of a belief-logic conflict requires that people temporarily discard their beliefs and refrain from taking them into account. Such a belief inhibition or decontextualisation process is considered as one of the most fundamental higher-order cognitive abilities (e.g., Stanovich & West, 2000).

Despite the popularity of the inhibition claim in reasoning and decision making studies it is surprising to note that the basic processing characteristics have not been specified. A crucial example concerns the scope of the inhibition. Some authors seem to postulate a general inhibition process where the whole belief-based reasoning system would be temporarily shut down in case of a conflict. Others prefer a more focused view where only those specific beliefs that were cued in the reasoning task would be blocked.

A second issue that needs to be addressed is the exact nature of an inhibition failure. Indeed, the fact that people err on the conflict problems might have two very different reasons. Consistent with popular belief, it might be that people simply fail to engage in logical, analytic thinking: People might not notice that their beliefs are erroneous from a logical point of view and consequently do not even initiate an inhibition process. Alternatively, one might suggest that people at least attempt to inhibit their beliefs but simply fail to complete it. The answer to this question has very crucial implications for the debate on human rationality (e.g., see De Neys, 2006).

Based on the available reasoning data it is hard to decide between the different claims. Here we demonstrate how a classic procedure from the memory literature can be adopted to solve the problem. In a series of experiments participants solved standard reasoning problems where beliefs and logic conflicted or not (i.e., conflict and no-conflict problems). After each reasoning problem participants were presented with a lexical decision task. Half of the strings that were presented were non-words. Half of the presented words were 'target' words that were closely related to the beliefs that were cued in the reasoning task. The other half of the

words were completely unrelated to the cued beliefs. It is well established in memory studies that when people have to temporarily neglect information or avoid using it, recall of this information will be distorted. Hence, temporarily putting your beliefs aside during reasoning should also hinder subsequent recall of these beliefs and associated knowledge. Hence, if people really attempt to discard their beliefs when solving conflict problems one would expect to see longer lexical decision times on the target words after people solved a conflict vs. no-conflict problem. The scope of the inhibition can be tested by examining the impact of solving a conflict problem on the unrelated words. If the inhibition is belief specific, unrelated words will not have been inhibited while solving the conflict problems and consequently their recall should not be distorted. Therefore, only targets words should show longer lexical decision times. In case people shut the whole belief-based system down, memory access should be generally impaired.

The crucial question with respect to the nature of the inhibition failure concerns the lexical decision times of low span reasoners (e.g., people who err on most or all conflict problems). If low spans err because they do not detect that their beliefs are logically inappropriate and fail to initiate an inhibition process, their recall should not be distorted.

Results. Consistent with the focused inhibition view, lexical decision times only differed for target words that were related to the beliefs cued in the reasoning task. As Figure 1 further indicates, the lowest capacity group who failed to solve any of the reasoning problems correctly also showed the distorted recall. This implies that even the weakest reasoners must detect that their beliefs are erroneous and attempt to inhibit them. Hence, contrary to popular belief, errors should be attributed to a failure to complete the inhibition and not to a failure to engage in logical thinking per se.

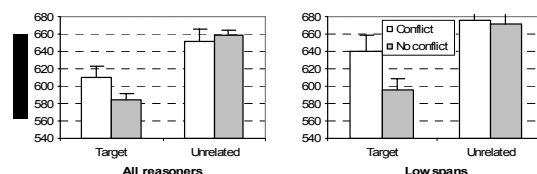


Figure 1: Average lexical decision times (ms).

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