Cognition 170 (2018) 76–82

Contents lists available at ScienceDirect

Cognition

journal homepage: www.elsevier.com/locate/cognit

Original Articles

Reasoning strategies modulate gender differences in emotion processing

Henry Markovits[a,*], Bastien Trémolière[b], Isabelle Blanchette[c]

[a] Université du Québec à Montréal, Canada
[b] Université de Nîmes, France
[c] Université du Québec à Trois-Rivières, Canada

ARTICLE INFO

Keywords:
Reasoning
Emotion
Dual process
Reasoning strategy
Gender differences

ABSTRACT

The dual strategy model of reasoning has proposed that people's reasoning can be understood as a combination of two different ways of processing information related to problem premises: a counterexample strategy that examines information for explicit potential counterexamples and a statistical strategy that uses associative access to generate a likelihood estimate of putative conclusions. Previous studies have examined this model in the context of basic conditional reasoning tasks. However, the information processing distinction that underlies the dual strategy model can be seen as a basic description of differences in reasoning (similar to that described by many general dual process models of reasoning). In two studies, we examine how these differences in reasoning strategy may relate to processing very different information, specifically we focus on previously observed gender differences in processing negative emotions. Study 1 examined the intensity of emotional reactions to a film clip inducing primarily negative emotions. Study 2 examined the speed at which participants determine the emotional valence of sequences of negative images. In both studies, no gender differences were observed among participants using a counterexample strategy. Among participants using a statistical strategy, females produce significantly stronger emotional reactions than males (in Study 1) and were faster to recognize the valence of negative images than were males (in Study 2). Results show that the processing distinction underlying the dual strategy model of reasoning generalizes to the processing of emotions.

1. Introduction

There is now a great deal of evidence that people reason in different ways, even when given what appear to be completely equivalent logical problems. There are many characterizations of this difference, which reflect different theoretical approaches to reasoning. For example, several varieties of dual process theories (Evans & Stanovich, 2013; Kokis, Macpherson, Toplak, West, & Stanovich, 2002; Sloman, 1996) postulate a distinction between heuristic and analytic processes (although recently these processes have been given a variety of different names). Analytic processes are conceived of as working memory intensive processes that have at least the potential to generate reasoning that is consistent with logical norms. Heuristic processes are thought of as more rapid and more closely tied to memory and belief. Many decades of research have clearly shown that human reasoning is far from logical, and that people make errors in reasoning that indicate use of extra-logical factors, such as belief, etc. Dual process theories have been constructed in order to attempt to explain such results (although even this distinction has been put into doubt (Kruglanski & Gigerenzer, 2011). However, despite many decades of research into this distinction, there is no satisfying characterization of the nature of the underlying processes (although see Evans & Stanovich, 2013; Morewedge & Kahneman, 2010, for some ideas) nor is there any clear way of distinguishing between use of heuristic and analytic processes.

There is however a recent model of reasoning that has the potential to clarify this latter question. This is the dual-strategy model of reasoning (Verschueren, Schaeken, & d'Ydewalle, 2005), which was originally conceived as a way to integrate two competing models of reasoning, probabilistic theories (Evans, Over, & Handley, 2003; Oaksford & Chater, 2007) and mental model theories (Johnson-Laird, 2001; Johnson-Laird & Byrne, 2002). This model suggests that one of the major distinctions in the way that people make inferences is the way that information related to the associations between the components of a conditional (the antecedent and the consequent terms) – which is either explicitly or implicitly presented through premise content – is processed. For brevity, we refer to this as statistical information. The importance of statistical information in deduction is supported by the many studies that have shown that the inferences that people make for what are identical forms of inference depend on the specific content of the premises (Cummins, 1995; Cummins, Lubart, Alksnis, & Rist, 1991;

* Corresponding author at: Département de psychologie, Université du Québec à Montréal, Montréal, Québec, Canada.
E-mail address: henrymarkovits@gmail.com (H. Markovits).

http://dx.doi.org/10.1016/j.cognition.2017.09.012
Received 27 February 2017; Received in revised form 15 September 2017; Accepted 17 September 2017
0010-0277/ © 2017 Elsevier B.V. All rights reserved.

Markovits, 1984; Markovits & Vachon, 1990; Thompson, 1994, 1995). These studies suggest that when people reason with familiar premises, they will activate knowledge about the premises (Quinn & Markovits, 1998), which includes activation of networks of alternative antecedents and/or disabling conditions, among others. This information allows some statistical estimation of the probability that a given conclusion will be true, given the premises. The dual strategy model postulates that people can use this information in two different ways. What has been called a *statistical* strategy translates such information directly into a subjective likelihood of a putative conclusion, derived using a rapid, intuitive procedure. A *counterexample* strategy uses a more working-memory intensive process to examine this information base for the conscious presence of cues to validity, such as presence or absence of potential counterexamples. It should be noted that the latter strategy is potentially consistent with a variety of different theoretical approaches. It is initially derived from mental model theory, since counterexample generation is a key part of this theory (Byrne, Espino, & Santamaria, 2000). However, the concept of probabilistic validity (known as p-validity; Evans, Thompson, & Over, 2015; Singmann, Klauer, & Over, 2014) would generate the same pattern of inferences on the diagnostic problems as the one that characterizes the counterexample strategy. The p-validity model is in many respects isomorphic to the mental model description of the counterexample strategy. Irrespective of the underlying debate about the exact nature of reasoning, the dual strategy model postulates an important qualitative difference in the way that people process information about premises. For brevity and continuity, we will continue to refer to the two strategies as *statistical* and *counterexample*, although in the present context, the key distinction will be the extent to which these two strategies capture a key difference in the way that information is processed.

Markovits and colleagues have used this distinction to construct a simple diagnostic test to differentiate between these reasoning strategies (Markovits, Lortie Forgues, & Brunet, 2012). The most often used version presents reasoners with a series of 5 Affirmation of the consequence (AC) problems (P implies Q, Q is true) accompanied by explicit frequency information that indicates the existence of a relatively low level (10%) of potential counterexamples to the implied conclusion (P is true). Another series of AC inferences is interspersed with this, with the relative frequency of counterexamples close to 50%. Use of a counterexample strategy would lead to rejection of all 10 inferences, since all inferences have some counterexamples. However, a probabilistic evaluation would give a higher likelihood of the 10% conclusions, which would lead to a greater level of acceptance of the 10% conclusion than of the 50% conclusions. A subsequent series of studies have provided strong evidence for the reality of the distinction between these two strategies (Markovits, Brisson, & de Chantal, 2015a, 2015b, 2016; Markovits, Brisson, de Chantal, & Thompson, 2017; Markovits, Brunet, Thompson, & Brisson, 2013; Markovits et al., 2012). Importantly, Markovits et al. (2013) have shown that when people are asked to make inferences under time constraint, they strongly tend towards using a statistical strategy, but if given more time, the same reasoners will use counterexample strategies more often, suggesting that the distinction between strategies does indeed capture an important difference in processing information used in reasoning. Supporting this, are results that in the absence of specific constraints, statistical reasoners use less time to make inferences than do counterexample reasoners (Markovits et al., 2017).

Although the basic model supposes that the key distinction between the strategies is the way that information is processed, there is also the possibility that the diagnostic test is simply distinguishing between reasoners who are more or less “logical”, if this is defined as the ability to make inferences that conform to the classical rules of logic. More specifically, it might be the case that counterexample reasoners, who respond more logically on abstract problems (Markovits et al., 2012) might simply have a better understanding of logical validity. There are different sources of evidence that make this interpretation unlikely. First, there is clear evidence from several studies that counterexample (and statistical) reasoners vary their responses to identical logical forms as a function of presence of counterexamples (Markovits et al., 2012), something that is inconsistent with the principles of logical validity. In addition, reasoners who use a counterexample strategy when given unlimited time, uniformly produce statistical patterns when given limited time (Markovits et al., 2013), once again suggesting that counterexample reasoners do not have a stronger understanding of validity. More directly, Markovits et al. (2016) examined the relation between responses to the MP inference, for which the logically valid response is to accept the conclusion, and strategy use. They found that statistical reasoners produce higher levels of logically correct responding on MP inferences when explicit information is provided, while counterexample reasoners produce higher levels of logically correct responding when implicit information is provided. Overall, these results are consistent with the basic idea that the distinction between strategies is strongly related to differences in information processing, and much less clearly related to understanding of logical validity. Finally, it should be noted that the cited studies have examined the same population with the same procedures as those used in the following studies (see also Supplementary material for additional data reinforcing the idea that the basic understanding of task parameters does not differ between statistical and counterexample strategies.).

These studies provide a strong empirical base for the dual strategy model as a model of the different ways that people reason, and indicate that the diagnostic procedure does indeed capture an important component of this distinction. Both empirical results and the underlying model also suggest that the distinction between these strategies is determined by the way that information stored in memory is processed in order to make an inference. This information may be processed either associatively, or the same information can be processed in a more conscious, working memory intensive manner. Thus, although studies examining the dual strategy model have focussed on conditional reasoning, both the underlying model and empirical results suggest that these strategies are not limited to approaches to deductive reasoning problems, but represent a broader distinction in the way that people process information when reasoning, one that corresponds to the basic heuristic/analytic distinction underlying dual process models.

For example, a recent study has indeed extended the dual-strategy model to one of the key effects that has been used to justify the usefulness of a heuristic/analytic distinction, the effect of conclusion belief on reasoning (Evans, Barston, & Pollard, 1983). Conclusion belief is a form of information that is associated with a broader processing of premise characteristics over and above that required to make strictly logical inferences. The dual-strategy model would thus predict that statistical reasoners would be more influenced by this factor. Consistent with the preceding analysis, in three separate studies, the effect of belief was found to be greater for reasoners using a statistical strategy than for those using a counterexample strategy (Markovits et al., 2017). Thus, both the theoretical description of the underlying models and some empirical results clearly suggest that the processing distinction underlying the dual strategy model represents a broader approach to judgment. In other words, while the distinction between statistical and counterexample strategies was designed to specifically distinguish between two different ways of making conditional inferences, these results suggest that they are correlated with a more general form of information processing generally corresponding to the intuitive (heuristic) vs analytic modes postulated by dual process theories. In this context, it should be noted that we are not making a strong statement about the specific nature of the two strategies. It is quite possible that the statistical strategy involves some degree of conscious processing, while the counterexample strategy involves some degree of automatic processing. However, previously cited evidence that shows that (1) time constraint generates almost complete use of the statistical strategy, (2) people using a statistical strategy make faster inferences than those using a counterexample strategy, and (3) people using a statistical

Download English Version:

https://daneshyari.com/en/article/5041401

Download Persian Version:

https://daneshyari.com/article/5041401

Daneshyari.com