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Research Dialogue

What should we expect from a dual-process theory of preference construction in choice?

Bertram Gawronski

The University of Western Ontario, Canada

Abstract

Dhar and Gorlin (2013) proposed a dual-process framework for understanding the effects of preference construction in choice. Drawing on the distinction operating principles and operating conditions, it is argued that their emphasis on cognitive elaboration fails to specify the mental operations involved in preference construction. This limitation makes their dual-process framework circular and susceptible to the criticism of single-process alternatives. The distinction between associative and propositional processes has the potential to fill this conceptual gap, thereby providing a more thorough understanding of preference construction effects in choice.
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Introduction

Dhar and Gorlin (2013) proposed a dual-process framework for understanding the effects of preference construction in choice. Drawing on the distinction between System I and System II processing (Kahneman, 2003; Stanovich & West, 2000), the authors argue that choice effects can be classified in terms of two distinct categories depending on whether they result from either quick, intuitive processing or careful, deliberate processing. In addition to providing useful conceptual links to contemporary dual-process theorizing, Dhar and Gorlin's review of preference construction effects demonstrates the integrative value of their proposed framework. However, like many of the theories that inspired Dhar and Gorlin's analysis, their framework suffers from various conceptual problems that undermine a thorough understanding of preference construction effects. The main goal of the current comment is to identify these problems and discuss how they can be resolved by more precise theorizing about the mental processes underlying preference construction effects.

Levels of analysis

To illustrate the conceptual problems of Dhar and Gorlin's framework (and the theories that inspired their framework), it is useful to relate dual-process theories to Marr's (1982) three levels of analysis (see Gawronski, Sherman, & Trope, in press). According to Marr (1982) psychological research at the *computational level* is concerned with identifying relations between inputs and outputs. Applied to the question of preference construction, the relevant inputs include the target object, the judgmental task, and the task context; the outputs are the identified preferences. The general goal of research at the computational level is to specify which types of inputs produce which kinds of outputs. Research of this kind differs from research at the *algorithmic level*, which is concerned with the mechanisms that translate inputs into outputs. This level of analysis resonates with the goal of dual-process process theories, in that these theories include hypotheses about the mental processes and representations underlying overt behavior. From this perspective, Dhar and Gorlin's dual-process account of preference construction can be located at the algorithmic level of analysis, because it aims at identifying the cognitive operations by which inputs are translated into outputs. Finally, research at the *implementational level* is concerned with the physical systems

E-mail address: bgawrons@uwo.ca.

that implement the mechanisms identified at the algorithmic level. This approach is prominently reflected in the emerging fields of social neuroscience and neuroeconomics, which are concerned with the neural underpinnings of judgment, decision, and choice. Although less relevant for the current question, some dual-process theories go beyond the algorithmic level by including assumptions about the neural substrates that implement the hypothesized processes (e.g., Lieberman, 2003).

The positioning of dual-process theories at Marr's (1982) algorithmic level helps to clarify their explanatory function by specifying the empirical phenomena that dual-process theories aim to explain (*explanandum*) and the theoretical assumptions that are proposed to explain these phenomena (*explanans*). Whereas research at the computational level aims at explaining observed outputs by identifying the relevant inputs that caused these outputs (*causal explanation*), research at the algorithmic level aims at explaining identified input–output relations by specifying the mental processes that translate inputs into outputs (*mechanistic explanation*). Thus, dual-process theories provide explanations of identified input–output relations by claiming that they are the product of two functionally distinct mental processes. Although this conceptualization may seem somewhat abstract and philosophical, it has important implications for dual-process theories of judgment and choice.

Operating principles vs. operating conditions

An important insight that can be gained from relating dual-process theories to Marr's (1982) algorithmic level is that it resolves the common conflation of operating principles and operating conditions (Gawronski et al., in press). Whereas the concept of *operating principles* refers to the mental mechanisms that translate inputs into outputs, the concept of *operating conditions* refers to the conditions under which a given process operates. Dhar and Gorlin put a strong emphasis on operating conditions by claiming that System II processing depends on the availability of cognitive resources, whereas System I processing is claimed to be resource-independent. However, their account remains vague about operating principles, in that it fails to specify the cognitive operations that translate inputs into outputs. Stating that a given effect does or does not depend on cognitive resources does not specify the mental processes that mediate this effect.

To provide a sound explanation of preference construction effects, an integrative dual-process framework should clearly specify the cognitive operations that mediate these effects, not just the boundary conditions of their operation. Otherwise, dual-process accounts involve the risk of conceptual circularity, in that the operation of a given process is inferred from their postulated boundary conditions. For example, although Dhar and Gorlin acknowledge that the interplay of System I and System II processing can be quite complex, they argue that effects that are increased under low elaboration are the product of System I processing, whereas effects that decrease under low elaboration are the product of System II processing. Thus, if any of their predictions about moderating effects of elaboration are disconfirmed, the consequence would be a simple recategorization of the relevant effect. That is, a preference construction effect that

was initially attributed to System I processing would be recategorized as the product of System II processing if this effect turns out to decrease (rather than increase) under low elaboration. Conversely, a preference construction effect that was initially attributed to System II processing would be recategorized as the product of System I processing if this effect turns out to increase (rather than decrease) under low elaboration. In the absence of a clear specification of the operating principles of System I and System II processing, the theory does not impose any constraints on the interpretation of a given result. This limitation is problematic not only because it makes dual-process explanations circular; it also makes them susceptible to the criticism of single-process alternatives, as I outline later in the following section.

What are the operating principles?

Although Dhar and Gorlin do not explicate the operating principles of the processes underlying preference construction effects, their analysis includes a number of propositions that could be interpreted in this manner. Yet, these claims are insufficient for a specification of operating principles, in that they either (1) beg the question of what defines the proposed processes, (2) fail to provide a clear demarcation between processes, (3) are ambiguous about the categorization of a given effect, or (4) are consistent with a single-process account.

A first proposition that might be interpreted as a specification of operating principles is Dhar and Gorlin's assumption that System I processing elicits a rapid feeling of superiority for particular choice options, whereas System II processing fails to elicit such feelings. Although it is theoretically plausible that spontaneous and deliberate preferences have their roots in qualitatively distinct processes, Dhar and Gorlin's specification simply describes the output of System I processing, but it does not specify the mental processes that produce this output. In this sense, the proposed specification of System I processing begs the question of how System I processing translates inputs into rapid feelings of superiority reflected in overt choice preferences.

A second proposition that might be interpreted as a specification of operating principles is Dhar and Gorlin's assumption that System II processing is characterized by comparative (rather than absolute) assessment of attributes. This assumption may be correct in the sense that deliberate analyses of available choice options often involve comparisons of relevant attributes. Yet, it fails to provide a clear demarcation between System I and System II processing, because automatic evaluative responses (presumably elicited by System I processing) are characterized by the same feature. That is, the same neutral object has been shown to elicit an automatic positive response when it is presented in the context of a negative object, but an automatic negative response when it is presented in the context of a positive object (Scherer & Lambert, 2009). Thus, the proposed comparative nature of System II processing fails to provide a clear demarcation, because System I processing is characterized by the same feature.

A third proposition that might be interpreted as a specification of operating principles is Dhar and Gorlin's assumption that

System II directs attention to different features of the available choice options, for instance when people have to choose versus reject one of the available options (Shafir, 1993). Yet, the same attention effect could also be attributed to System I on the basis of Kahneman's (2003) proposition that System I is characterized by the notion of accessibility. To the extent that attention to different features (e.g., positive vs. negative) moderates the accessibility of different information, Dhar and Gorlin's specification remains ambiguous, in that framing effects could also be attributed to System I. Thus, the proposed specification in terms of attentional processes remains ambiguous, in that their effects could be attributed to either System I or System II processing.

Finally, a third proposition that might be interpreted as a specification of operating principles is Dhar and Gorlin's assumption that System I processing involves choices over options, whereas System II processing involves choices over reasons. Again, although it seems theoretically plausible that reasons play a more important role in deliberate analyses of choice options, one could argue that the proposed specification merely involves different kinds of information that are used under different processing conditions. Such a specification would be consistent with competing single-process accounts attributing preference construction effects to a single epistemic process of rule-based inference (e.g., Kruglanski & Gigerenzer, 2011). According to these accounts, both intuitive and deliberate judgments are the outcome of the same inferential process, which is claimed to produce different outcomes depending on the salience, complexity, and content of the considered information. To the extent that processing resources are low, people are assumed to rely on salient information of low complexity. Yet, when people deliberate about the available choice options, they are assumed to integrate information that is less salient and more complex. To the extent that information about choices versus reasons differs in terms of salience and complexity, there should be systematic differences in the use of the two kinds of information depending on whether elaboration is high or low. Yet, in this case, the moderation of choice effects by cognitive elaboration does not indicate the operation of two functionally distinct processes, but the differential use of information varying in terms of salience and complexity.

What a dual-process theory should tell us

To provide a clear understanding of preference construction effects, I argue that a dual-process theory should specify (1) the operating principles of the proposed processes, (2) the exact interplay of the two processes, (3) how the two processes respond to task demands and contextual features, and (4) the conditions under which the two processes are claimed to operate. Because Dhar and Gorlin's dual-process framework fails to address Point 1, its assumptions remain vague with regard to Points 2 and 3, and circular with regard to Point 4. In the remainder of this comment, I offer some suggestions for how these issues can be resolved. Toward this end, I draw on the work that I conducted with Galen Bodenhausen investigating the role of associative and propositional processes in evaluation (Gawronski & Bodenhausen, 2006, 2011). Although dual-process theories are sometimes treated as

different formulations of the same basic idea, our associative-propositional evaluation (APE) model differs from other theories (e.g., Kahneman, 2003; Lieberman, 2003; Smith & DeCoster, 2000; Strack & Deutsch, 2004) in various regards. As for the current question, one of its most important features is that it draws a sharp line between operating principles and operating conditions (Gawronski & Bodenhausen, 2007, in press), thereby avoiding the conceptual problems outlined in this commentary.

The central assumption of the APE model is that affective reactions (conceptualized as *implicit evaluation*) and evaluative judgments (conceptualized as *explicit evaluation*) are the outcomes of two functionally distinct processes. Whereas affective reactions are claimed to be the outcome of associative processes, evaluative judgments are claimed to be the outcome of propositional processes. Associative processes are further specified as the *activation* of associations in memory; propositional processes are defined as the *validation* of momentarily activated information. Associative activation is constrained by the similarity between features of input stimuli and existing representations in a process of pattern matching. Propositional validation is constrained by the consistency of activated information, in that inconsistency is assumed to signal the presence of erroneous belief components (cf. Gawronski, 2012). Thus, inconsistency requires a reassessment of validity before an evaluative judgment can be made.

According to the APE model, choice decisions are never the product of a single process (e.g., either System I processing or System II processing), but always involve both associative and propositional processes. On the one hand, choice decisions are conceptually equivalent to evaluative judgments, and thus the outcome of propositional processes. On the other hand, propositional processes require input from associative processes, in that the latter provide the information that is used for making an evaluative judgment. Thus, choice decisions can be moderated by any factor that influences (1) the mental concepts that are activated by associative processes (e.g., descriptions of a sausage as 20% fat vs. 80% lean activating different associations; see Levin, Schneider, & Gaeth, 1998) and (2) the validation and subsequent use of momentarily activated information for an evaluative judgment (e.g., choice vs. rejection task influencing the relative weight that is given to positive vs. negative information; see Shafir, 1993). From this perspective, preference construction effects should not be classified *a posteriori* on the basis of whether they depend on the availability of cognitive resources. Instead, they should be classified a priori on the basis of whether a given factor influences the activation of information in memory or the validation of momentarily activated information.

Another important aspect is that propositional reasoning can be more or less effortful. Counter to Dhar and Gorlin's claim that engaging System II is always effortful, the APE model argues that the amount of cognitive resources required by propositional reasoning depends on (1) the amount of the considered information and (2) the complexity of the required inferential steps. After all, the reasoning processes underlying choice decisions always involve a propositional validity assessment regardless of the amount and the complexity of this information. Thus, identifying a moderating influence of cognitive elaboration does not indicate whether a given choice effect is due to associative or propositional

processes. It simply indicates that the underlying inferences are more or less effortful. Yet, as I outlined above, such a conclusion remains silent about the mental operations that translate inputs into outputs, which is captured by the distinction between associative and propositional processes.

A final important feature is that associative and propositional processes do not operate in isolation but mutually interact with each other. The idea of process-interactions resonates with Dhar and Gorlin's argument that System II processing may either reject or bolster preferences generated by System I, and sometimes leave such preferences unchanged. In terms of the APE model, these three cases can be interpreted as reflecting the reliance on affective reactions in making evaluative judgments, which depends on the outcome of the propositional validation process. To the extent that the affective reaction resulting from activated associations is consistent with other momentarily considered information, it will typically be regarded as valid and therefore be used for evaluative judgments and choices. If, however, the affective reaction resulting from activated associations is inconsistent with other momentarily considered information, consistency has to be restored before a judgment or choice can be made (cf. Festinger, 1957). In such cases, the affective reaction may be rejected as a valid basis for judgments and choices. Finally, in the absence of information supporting the validity of the affective reaction resulting from activated associations, people may lack confidence in the validity of their affective reaction, which may lead them to deliberately search for information that is consistent with their affective reaction. Each of the three cases has been extensively studied using implicit measures to capture affective reactions (i.e., outcome of associative processes) and explicit measures to capture evaluative judgments (i.e., outcome of propositional processes). Examples include the differential reliance on affective reactions after introspection on feelings versus reasons (e.g., Gawronski & LeBel, 2008), the rejection of affective reactions that are inconsistent with other information (e.g., Gawronski, Peters, Brochu, & Strack, 2008; Gawronski & Strack, 2004), and the validation of affective reactions through selective search for confirmatory information (e.g., Galdi, Gawronski, Arcuri, & Friese, 2012).

Importantly, the APE model specifies not only the conditions of "bottom-up" effects of associative on propositional processes; it also includes specific assumptions about the conditions of "top-down" effects of propositional on associative processes, in which processes of propositional reasoning change the momentary activation of associations (Gawronski & Bodenhausen, 2006, 2011). A critical factor in this regard is whether propositional reasoning involves the affirmation versus negation of newly activated information. Whereas affirmation of newly activated information is assumed to lead to corresponding outcomes of associative and propositional processes, negation is assumed to affect the outcome of propositional, but not associative, processes (e.g., Deutsch, Gawronski, & Strack, 2006; Gawronski, Deutsch, Mbirkou, Seibt, & Strack, 2008). Applied to the current question, both bottom-up and top-down effects are essential to understand the nature of preference construction effects in choice, because they imply that a direct effect on one process can have indirect effects on the other process. Hence, a more precise classification

of preference construction effects should be based on whether (1) a given factor *directly* influences the activation of information in memory or the validation of activated information, and (2) the postulated change in one process leads to *indirect* change in the other process (cf. Gawronski & Bodenhausen, 2006, Table 1). Although the original goal of the APE model was to provide a better understanding of the mental processes underlying evaluation, its core assumptions are equally applicable to choice. As such, it offers a potential answer to the missing part in Dhar and Gorlin's framework by specifying the operating principles of associative and propositional processes and their respective contribution to preference construction effects in choice.

Conclusion

In sum, I wholeheartedly agree with Dhar and Gorlin's argument that dual-process theories can offer valuable insights into preference construction effects. However, to avoid ambiguous post-hoc categorizations and circular explanations, it is important to provide a clear specification of the proposed processes in terms of their operating principles. Simply describing one process as more effortful than the other makes dual-process theorizing not only circular, but also susceptible to the criticism of single-process alternatives. The distinction between associative and propositional processes has the potential to fill this conceptual gap, thereby providing a more thorough understanding of preference construction effects in choice.

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