Research Dialogue

Refining the dual-system theory of choice

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Abstract

We are highly sympathetic to Dhar and Gorlin’s goal of developing a dual system theory of choice. But we do feel that the proposal could be changed and clarified in a few ways. Specifically, we believe that the evidence suggests that the systems operate in parallel, not sequentially. In addition, the relation between intuitive/associative processing and affect remains unresolved, a vagueness that is especially troublesome for the problem of choice. Relatedly, the description of System I as perceptual requires further explanation and refinement. Finally, we reconsider the attribution of the compromise effect to deliberative processing and propose an alternative explanation, one that reveals one aspect of the interaction between intuitive and deliberative processes. While further specification and testing of predictions are necessary, the proposal by Dhar and Gorlin makes a substantive contribution toward understanding how choices are made.

Keywords: Dual systems; Choice; Reasoning; Intuition; Affect

Introduction

We applaud Dhar and Gorlin’s (henceforth DG) effort to apply a dual-systems framework to choice. Although the general idea is not new (see Slovic, Finucane, Peters, & MacGregor, 2007), DG’s proposal has the virtue of generality and of seriously considering the cognitive processes underlying choice. DG’s central suggestion is that specific choice phenomena arise from the processing of each system, with intuitive processes resulting in the attraction effect—or asymmetric dominance—and deliberative processing leading to compromise and enhancement effects. By applying this simple and yet powerful concept to choice behavior, DG are able to explain a handful of data and also to make counterintuitive, divergent predictions concerning the effects of time pressure and cognitive load on choice. These predictions deserve to be tested.

We have four comments to make on the framework proposed by DG. First, following Kahneman and Frederick (2002), DG treat the systems as sequential, System II processing following System I. We believe that the evidence suggests that the systems operate in parallel. Second, by applying a dual-systems framework to choice, the authors make strides toward bridging the reasoning and decision-making literatures, and thus bring us closer toward an understanding of the relationship between thinking and doing. There have been attempts to bring dual-systems frameworks of reasoning developed by, for instance, Epstein (1994), Evans and Over (1996), and Sloman (1996), to decision making (see Darlow & Sloman, 2010). But extending the domain of dual-systems theories raises additional questions, most obviously concerning the nature of System I. In the reasoning tradition, System I has generally been considered intuitive and associative. In contrast, this system has been viewed as affective and valuation-based in the decision-making literature (Slovic et al., 2007). We have some quibbles with DG’s resolution of this contrast. Third, DG suggest that System I operates at a fairly superficial level, characterizing it as processing on perceptual input. They assert for instance that "dominant options stand out because they seem "perceptually more attractive in comparison" (p. 22). They further propose that intuitive reactions are predicated on the ability to perceive the valence of the attribute with the senses (p. 37). In turn, this means that visual attributes (like “the beauty of a scene”) and sensory attributes (enjoyment of a particular food or drink) will generate an intuitive reaction, while numerical attributes (price of an object) and non-sensory attributes (durability) will not. This is distinct from other conceptualizations of System I, which have described it as associative (Sloman, 1996) or affective (Slovic et al., 2007). We
will argue that DG’s characterization of System I does not do it justice. Finally, we will turn to deliberative biases in choice behavior. DG suggest that, just as the intuitive system is prone to biases when choosing between options, the deliberative processing leads to its own biases. We first suggest an alternative understanding of the compromise effect, which relies on intuitive rather than deliberative processing. We then consider the interaction between the intuitive and deliberative system and the implications this has for choice behavior.

**Sequential or parallel?**

DG refer to two phases of processing (p. 10), evidence that they subscribe to the view that System II processing only occurs under certain circumstances and that it is subsequent to System I processing. This view has been called the “default-interventionist view” (De Neys & Glumicic, 2008; Evans, 2007; Kahneman & Frederick, 2005). In contrast, Sloman (1996) described systems that compute in parallel, sometimes serving up simultaneous contradictory beliefs (the “parallel-competitive” position). In truth, the systems necessarily interact in complicated ways, often co-operating to produce complex interactions (cf. Sloman, in press). Nevertheless, the question remains whether the systems should be seen as operating sequentially or in parallel.

De Neys (e.g., De Neys & Glumicic, 2008) has run a number of experiments addressing this question. The parallel-competitive position is the clear winner. In brief, the evidence shows that people who generate an incorrect response on conjunction fallacy and base-rate neglect tasks are slower and less confident than when they generate correct responses. This suggests that a deliberative process is inhibiting them even when the final answer comes from intuition. So the deliberative process must be active prior to completion of the intuitive response. Corroborating evidence from an entirely different paradigm comes from Doll, Hutchison, and Frank (2011).

This fact suggests a different interpretation of the role of fluency in deferral of choice. Following Novemsky, Dhar, Schwarz, and Simonson (2007), DG suggest that disfluency causes people to assume they are engaged in a difficult choice and therefore defer it. The parallel-competitive view stays closer to the original view of Alter, Oppenheimer, Epley, and Eyre (2007): Disfluency causes people to rely more on deliberative processing, and, in the absence of a clear rule to choose by, are then more likely to defer choice.

The general lesson here is that it may not be possible to assign every choice phenomenon to deliberation or intuition. Some of them arise due to how the systems interact.

**Affect, intuition and deliberation**

The relations among affect, intuition, and deliberation require further specification. While there is general agreement that System II can be characterized as deliberative, the nature of System I is more uncertain. Some previous accounts have described affect as integral to intuitive processing (Epstein, 1994; Slovic et al., 2007), while others have proposed that the results attributed to affect can be explained by appeal to intuition alone (Darlow & Sloman, 2010). Resolving the role of affect in the dual-systems framework is critical to the characterization of choice. For DG, intuition serves the function of making one option “stand out” relative to others, with this standing out critically based on a feeling that the chosen option is better. Thus, the intuition determining preference is the result of an affective evaluation of each option. This dovetails nicely with the work of Slovic et al. (2007), who proposed the affect heuristic: When making a decision, people consult the affective tags associated with the object or event under consideration, which provide an efficient and simple source of information for generating an answer. For instance, it has been demonstrated that when hoping to get a red jellybean and deciding between an option of picking from a bowl containing 9 red jellybeans out of 100 (9% chance to win) or a bowl with 1 red jellybean out of 10 (10% chance), most participants choose the bowl with the lower probability but higher number of opportunities to succeed (Denes-Ray & Epstein, 1994). Slovic and colleagues attribute this to the fact that 9 feels better than 1, an affective response. However, this choice preference can be explained without reference to affect; people may apply the generally correct heuristic that choosing the option that has more possibilities of winning is best (Darlow & Sloman, 2010). Similarly, when participants are choosing between a $625 high-quality TV, $400 low-quality TV and $600 high-quality TV, one possibility is that the $600 high-quality TV dominates because it is perceptually more attractive, as DG suggest. However, another possibility is that participants first compare the two high-quality TVs in an effort to reduce options. Simply because of the numeric value of each ($625 vs. $600), the first option is worse. Note that this does not require an affective evaluation of $625 compared with $600, only a numeric evaluation. Once this comparison is complete, the participant has a piece of supportive evidence for the $600 TV: it is at least better than one other option. Now, comparing the final two options, the $600 high-quality TV and the $400 low-quality TV, the participant incorporates the new supportive evidence and is thus biased to choose the high-quality TV. DG report compelling evidence that this kind of effect is intuitive, not deliberative, but they do not show that the appropriate intuition arises due to an affective response.

**Perceptual intuition**

DG describe System I as perceptual, a new characterization as far as we know. System I is usually considered to involve some combination of associative (Sloman, 1996) and affective (Slovic et al., 2007) processing. The characterization of System I as perceptual is consistent with the frequent claim that System I is relatively fast in that perceptual judgments are also capable of being made quickly and without much deliberation (although this does not mean that they cannot be made slowly and deliberately). And System I does seem to focus at times on surface features or properties of objects, those attributes that are apparent without much consideration. For instance, System I cares that there are 9 ways of getting the red jellybean rather than 1, and does not consider the total number of jellybeans within each bowl. In the same vein, the perceptual system will
report that two lines are different lengths if they appear to be different, as in the Müller-Lyer illusion, despite the fact that deliberative reasoning and analysis reveal that they are the same. DG go further by suggesting that only perceptible attributes of an object or event are capable of generating an intuitive reaction; non-sensory, abstract, or numerical attributes do not. Thus, the intuitive appeal of a new sleek laptop over a clunky desktop computer when viewed together will not be overcome by a description of the two computers that points out that the desktop computer has twice the processing capacity.

However, DG’s analysis is inconsistent with their own characterization of what occurs in the attraction effect. In their example, a $600 high-quality TV is more perceptually attractive than the $625 high-quality TV, thus increasing the choice of the $600-high-quality TV versus the $400 low-quality TV. However, it is unclear how any of these options are perceptually attractive if intuitive responses cannot be based on numerical ($600) or abstract (high-quality) attributes. How such a result could be explained by non-perceptual intuitive processing has been offered above. The result seems challenging for a perceptual characterization of System I.

Compounding the problem is evidence that, at least in some cases, dominance is not perceived intuitively. Kahneman and Tversky (1972) report cases of non-transparent dominance in which the dominance relation can only be discerned by combining options. This undermines DG’s claim that the relation is, in general, intuitively accessible.

### Deliberative biases

What about the deliberative biases that DG ascribe to System II? DG propose that the source of System II bias is the justification requirement, or the need to have a reason for why a particular decision was reached, whether externalized or not. When a choice between options is difficult and not intuitively resolvable, System II begins selecting reasons to make a particular choice rather than selecting options. This undermines DG’s claim that the relation is, in general, intuitively accessible.

**Conclusion**

The framework proposed by DG is a significant and important contribution, building upon and extending the work already done in both the dual-systems and choice literatures. This framework could serve as a bridge between reasoning and decision-making. It also raises issues that are ripe for further investigation, including the role of affect in dual-systems theory in general and in choice specifically. Additionally, DG extend the concept of System I to encompass perceptual processing. Nevertheless, much of the evidence in support of the current theory is indirect at best, a fact the authors acknowledge. In addition, there are inconsistencies between the perceptual conceptualization of System I and the biases that DG attribute to it, namely the attraction effect, that require resolution. Finally, the interaction between deliberation and intuition in the dual-systems conceptualization of choice is not yet clear and further theoretical and experimental work is needed. These limitations notwithstanding, the work done by DG is a substantive step toward a greater understanding of how the mind chooses among alternatives.

### References


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