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A Dual Process Evaluability Framework for decision anomalies

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ABSTRACT

Alternative explanations have been offered to explain consumers' inconsistent preferences in decision problems. We present a Dual Process Evaluability Framework (DPEF) which suggests that the characteristics of the decision problem, including response mode, presentation mode, and choice-set structure, are critical to predicting preference reversals related to decisions under risk and uncertainty, over time, and between product assortments, as well as presentation mode reversals involving joint versus separate evaluations, and response mode reversals involving a combination of choice tasks, monetary value tasks, and attractiveness ratings. Our framework, grounded in evaluability theory and dual process models, predicts how these decision problem characteristics directly affect the ease of evaluation of alternatives which subsequently affects the relative dominance of feeling versus calculation in these tasks. Application of DPEF to previously documented preference reversals, complemented by three studies which test new predictions of DPEF, reveals that DPEF provides a parsimonious explanation for a variety of decision anomalies.

1. Introduction

Revealed preferences that are inconsistent with standard economic models of human decision making have been documented over the past five decades. Numerous specific decision anomalies, including the Allais paradox (Allais, 1953), present bias (Frederick, Loewenstein, & O'Donoghue, 2002), the Ellsberg paradox (Ellsberg, 1961), the zero price effect (Shampanier, Mazar, & Ariely, 2007), the comparative ignorance hypothesis (Fox & Tversky, 1995) and preference reversals between choice and monetary valuation tasks (Lichtenstein & Slovic, 1971), have been explained by various models which are domain-specific (i.e., models which only consider decisions under risk or which only apply to decisions over time) and which are task-specific (i.e., models which only account for changes in the choice set, or which only account for changes in the response mode or the presentation mode). Notably, however, a unifying framework that systematically explains inconsistent preferences across multiple domains of individual choice or across different types of decision tasks has yet to be offered.

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In this research, we propose a Dual Process Evaluability Framework (DPEF) to explain preference reversals[2] across an array of decision problems. Our framework is grounded in two major literature streams on judgments and decisions: evaluability theory (Hsee, 1996; Hsee, Loewenstein, Blount, & Bazerman, 1999; Hsee & Zhang, 2010) and the plethora of dual process models in psychology and economics (Brocas & Carrillo, 2014; Chaiken, 1980; Hsee & Rottenstreich, 2004; Kahneman & Frederick, 2005; Rubinstein, 2007; Sloman, 1996; Stanovich & West, 2000). DPEF, in contrast to past work, suggests that objective features of a decision task, in particular, response mode, choice-set structure, and presentation mode, directly affect the ease of evaluation of choice alternatives. Consistent with theoretical work by Hsee and his colleagues, and with experimental work by Alter, Oppenheimer, Epley, and Eyre (2007) and Inbar, Cone, and Gilovich (2010), DPEF predicts that when the evaluation of choice alternatives is easy, the decision is governed by intuition or feeling-based (System 1) processes, whereas when the evaluation of choice alternatives is difficult, the decision is governed by logical or calculation-based (System 2) processes. DPEF further links evaluability with choice behavior for an array of decision domains and decision tasks involving risk, time, ambiguity, product assortment, and social preference.

We next provide a brief review of well-documented decision anomalies and behavioral decision theory explanations. We proceed with providing the theoretical underpinnings of DPEF, and document that DPEF accounts for a range of preference reversals across decision domains and across decision tasks that are not accounted for by traditional models which are typically domain-specific and task-specific. We then report on three experiments that offer evidence that DPEF provides explanations for novel choice task-attractiveness rating reversals in decisions under risk which, to our knowledge, have not been previously tested. Thus, our research contributes to the understanding of judgment and decision making by offering a framework which predicts how fundamental properties of a decision problem systematically produce well-documented decision anomalies across different decision domains and different decision tasks.

2. Decision anomalies and behavioral decision theories

A large literature has focused on addressing decision anomalies over the past fifty years. In this work, we consider three genres of decision anomalies. First, *choice task reversals* hold the response mode and presentation mode fixed, but vary the choice-set structure. Such reversals typically involve a choice between two alternatives (A and B) in one choice-set and between two different alternatives (C and D) in another choice-set, where the alternatives across choice-sets are related by a normative principle of decision making which is violated by the decision maker's pair of choices. A majority of the well-studied decision anomalies are of this nature (see exemplars in Table 1; CS refers to choice-set). Included are: the Allais paradoxes (Allais, 1953), involving decisions under risk, in which the decision maker chooses between alternatives (referred to as lotteries) with well-defined probabilities (CS-1–CS-4); present biased decisions (e.g., Frederick, Loewenstein, & O'Donoghue, 2002) involving choices between immediate and delayed outcomes (CS-5, CS-6); the Ellsberg paradox (Ellsberg, 1961) involving decisions under uncertainty (or ambiguity) in which there is some missing information about the probabilities of particular events (CS-7, CS-8); and the zero price effect (Shampanier et al., 2007) focused on decisions between product assortments where the item value and cost may vary (CS-9, CS-10). A second genre of decision anomalies, *presentation mode reversals*, includes reversals in which choice alternatives are presented jointly versus separately, while holding the choice alternatives and response mode fixed; the comparative ignorance effect (CS-11) is an example. Third, we consider *response mode reversals* which are a consequence of varying the response mode, while holding choice alternatives and presentation mode fixed; an illustration is contrasting an attractiveness rating task with a monetary valuation task (CS-12).

In addition, we consider several anomalies which have thus far been classified as response mode reversals or as presentation mode reversals in the literature, but which according to our definitions are more appropriately labeled *response mode–presentation mode reversals*, because the design of these problems confounds presentation mode with response mode. For example, the preference reversal between choice tasks and monetary valuation tasks identified by Lichtenstein and Slovic (1971) and replicated by Tversky, Slovic, and Kahneman (1990) and others, is often viewed as a response mode reversal; however, the choice alternatives (lotteries) illustrated in CS-13 were presented jointly, whereas the assessment of monetary value of each lottery was solicited in isolation. Similarly, although Hsee (1996) cites Bazerman, Loewenstein, and White (1992) as the first example in the literature of a presentation mode reversal, Bazerman et al. (1992) elicited choices jointly and attractiveness ratings separately for each alternative (CS-14).

As shown in Table 2, an array of behavioral decision theories have been offered to explain specific decision anomalies. For example, prospect theory (Kahneman & Tversky, 1979), cumulative prospect theory (Tversky & Kahneman, 1992), and the dual system model (Mukherjee, 2010) offer explanations for the Allais common ratio effect, the Allais common consequence effect, and the Ellsberg paradox. Models of hyperbolic or quasi-hyperbolic discounting (Laibson, 1997; Loewenstein & Prelec, 1992) provide an explanation for present bias. The model of probability-time tradeoffs (Baucells & Heukamp, 2012) simultaneously explains the Allais common ratio effect and present bias. Regret theory (Bell, 1982; Loomes & Sugden, 1982) and salience theory (Bordalo, Gennaioli, & Shleifer, 2012) explain the Allais paradoxes and choice task-monetary valuation reversals (Lichtenstein & Slovic, 1971). The contingent weighting model (Tversky, Sattath, & Slovic, 1988) explains

[2] We use 'preference reversal' as a general term for inconsistent responses to decision problems. We note that reversals which shift from a strict preference to an indifference (e.g., the comparative ignorance effect) may be more appropriately labeled as inconsistency or incoherence.