Research Dialogue

A dual-system framework to understand preference construction processes in choice

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Abstract

Building on the dual-system theory of judgment, we propose an intuitive and deliberate framework for understanding the effects of preference construction in choice. We argue that while certain choice effects can be attributed primarily to rapid, unintentional, and intuitive processing, others arise from intentional and deliberate processing. We use this distinction to group choice effects previously identified in the literature, discuss evidence in support of the dual-system framework of preference construction, and propose new research directions. Since the defining property of intuitive versus deliberate mental processes is the degree to which they engage working memory, the proposed framework sheds light on how these previously identified effects will change with conditions such as the availability of cognitive resources. We conclude by calling for additional research to explore the interplay between intuitive and deliberate processing to determine which processes are implicated in generating a preference, as well as research on new moderators of choice effects based on the difference in the amount of willful information processing that underlies decision making.

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Introduction

Although normative theories of choice in classical economics often treat preferences as invariant across different elicitation techniques and contexts, a major finding in empirical choice research is that preferences are constructed and not just revealed in the process of choice (Bettman, Frances Luce, & Payne, 1998), meaning that preferences are often not consistent across different choice environments (Dhar & Novemsky, 2008). Preferences have been shown to vary systematically due both to differences in elicitation techniques (called “task effects”; e.g., choice versus ratings) and differences in the “choice context,” or the set of alternatives under consideration (Simonson & Tversky, 1992).¹ Research on how context and preference elicitation techniques affect choices became popular with BDT researchers to illustrate preference construction: the notion that preferences are often generated on the fly while making a decision, rather than being pulled from a master list in memory (Bettman et al., 1998). In this article, we propose a dual-system framework for understanding processes that underlie choice effects² previously identified in the literature.

We extend the dual-system framework used to understand human judgment (Kahneman & Frederick, 2002) to explain choice effects that were previously believed in the literature to arise as a result of deliberate, effortful processing. We begin with a brief review of the theoretical frameworks previously proposed in the literature to understand preference construction

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¹ The term “task effect” refers to a shift in the relative choice share of the target option resulting from a change in preference elicitation, whereas the term “context effect” refers to a shift in the relative choice share of the target option resulting from a change in the set of available options.

² Throughout this article we use the term “choice effect” to refer to both task and context effects.
in choice. Next, we introduce the dual-system framework and show how it can account for previously identified choice effects. We classify context and task effects into two groups, proposing that certain choice effects arise mainly from intuitive processing and require little deliberation, whereas others can be attributed primarily to deliberate thought and effortful comparisons among options. We then explore conditions under which more intuitive versus deliberate choice effects are more likely to emerge. Choice effects that arise as a result of deliberate processing should attenuate when working memory is taxed or willful information processing is inhibited, as under manipulations such as depletion, load and time pressure. On the other hand, choice effects that arise primarily as a result of intuitive processing should increase under these conditions. Finally, we consider open questions in the literature that the dual-system framework may help to resolve, propose new areas for inquiry, and offer predictions based on the proposed framework.

A theoretical framework for understanding preference construction in choice

Intuitive versus deliberate processing in judgment and choice

In their review of the BDT literature, Payne, Bettman, and Johnson (1992) pointed to preference construction as one of the most important ideas to emerge from the literature over the past two decades because it challenged the economic assumption that preferences are stable and follow axiomatic principles such as consistency and regularity. Slovic (1995) similarly noted that studies of task effects were useful to demonstrate that preferences are highly sensitive to the way in which a choice problem is presented. According to Slovic, not only do documented “preference reversals” violate procedure invariance, the economic tenet that preferences should be stable across different elicitations, but they also raise questions about whether preferences can be defined or even said to exist. More than a decade later, Simonson (2008) noted a growing consensus among researchers that preferences are inherently constructive and largely determined by the choice context, the task characteristics, and the description of options.

In the past two decades, a number of different frameworks have been proposed to explain why preferences vary with the context of the decision or task at hand. Two of the best known frameworks, the accuracy–effort and the Choice Goals framework, both explain preference construction in choice by appealing to people’s tendency to use different decision strategies based on the context or the task at hand. Payne (1982) and Johnson and Payne (1985) originally proposed the accuracy–effort framework for understanding how decision makers choose among strategies. The framework features a cost–benefit approach in which each decision strategy can be characterized by its accuracy and the amount of effort required to make a given decision. Decision makers consciously select a strategy to balance between their desires to make a more accurate decision and to minimize cognitive effort. This framework accounts for choice effects by proposing that different contexts and elicitation techniques change the amount of effort required for a given decision strategy, as well as the accuracy of that strategy. Different contexts and elicitation techniques thus lead to different choice outcomes by pushing people to use different strategies, which correspond to their goals of both minimizing effort and increasing accuracy. Bettman et al. (1998) extended the original effort–accuracy framework in two important ways. Their Choice Goals framework proposed that the accuracy and effort goals in the effort–accuracy framework should be supplemented with two additional goals people hold: the goal to minimize the experience of negative emotion during decision-making and the goal to maximize the ease of justification of a decision outcome. The authors describe how these additional goals can explain the phenomenon of preference construction in a way that the effort and accuracy framework alone cannot.

Consistent with the notion that justification is an important goal in choice, Shafir, Simonson, and Tversky (1993) proposed another theoretical framework for understanding preference construction in choice, centered on the notion of providing reasons for one’s choices. They argued that decision makers are concerned with justifying their choices to themselves and to others. In order to do so, they shift their attention from choosing options to choosing reasons. The authors explained certain context effects, such as the compromise effect and the attraction effect, by appealing to reason-based choice. However, they focused on a subset of findings in the literature that could be considered through the lens of justification and did not seek to explain other context and task effects.

Since most researchers in the BDT field assumed that making a choice necessitates deliberate comparisons among available options (Simonson & Tversky, 1992) and effortful processing (Bettman, 1993), the proposed frameworks generally assume that the process of choosing is entirely deliberate, even when decision makers only partially process information. As a result, choice researchers generally studied conscious choice strategies that decision makers intentionally use to simplify choice: heuristics such as elimination by aspects (EBA) or lexicographic choice (Bettman et al., 1998; Frederick, 2002).

On the other hand, research in social psychology in the last few decades has revealed that intuitive processes—such as nonconscious, automatic processes—play an important role in people’s judgments. For example, priming certain concepts nonconsciously can motivate behavior outside of awareness (Aarts & Custers, 2008), in part by activating stereotypes and self-concepts, which in turn affect behavior (Wheeler, DeMarree, & Petty, 2007; Wheeler & Petty, 2001). Situational cues can also activate goals that operate out of awareness (Bargh, 2002; Chartrand & Bargh, 2002), guiding behavior toward the same outcomes as consciously set goals, but operating without conscious awareness or effort (Chartrand & Bargh, 2002; Chartrand, Huber, Shiv, & Tanner, 2008). In addition, research on “thin slicing” behavior has revealed that observers can make judgments with above-chance accuracy about an individual’s traits such as intelligence, aspects of their personality, or teaching ability from observations of expressive behaviors as short as thirty seconds. Observers pick up on non-verbal cues that are so subtle that they are transmitted and decoded unintentionally and below conscious awareness (Ambady & Rosenthal, 1992). The wealth
of findings that intuitive processes play an important role in judgment further suggests that intuitive processes are likely also implicated in choice.

The role of intuitive reasoning has also been explored in the judgment and decision making (JDM) literature, particularly, in the domain of making probability judgments in Kahneman and Tversky’s “heuristics and biases” research program. When making judgments, people tend to rely on intuitive heuristics, rules of thumb that spontaneously come to mind and are uncontrollable. Kahneman and Tversky (1972) argued that when making a probability judgment, people tend to rely on the representativeness heuristic, meaning that they judge the subjective probability of an event by the degree to which that event is similar to the parent population in its essential features. For example, most people estimate that the exact order of births of girls and boys GBBG in families with four children is more likely than GGGG, even though both sequences are about equally likely, because GBBG better reflects the proportion of boys and girls in the population and is thus more representative. This probability judgment is rapid and intuitive—GBBG “feels” more likely without the need to do an explicit calculation. The judgment springs to mind easily and with high confidence. In contrast to choice heuristics such as EBA and lexicographic choice, which people intentionally use to simplify a decision, people who rely on the representativeness heuristic do hold the goal to make an accurate probability judgment. They do not choose to use a heuristic to simplify the judgment and are unaware that they are using a heuristic.

Many other kinds of heuristic judgments, such as the ratio bias effect (Denes Raj, 1994), are a product of intuitive processes because they arise as a result of an answer spontaneously coming to mind after a rapid evaluation and intuitively “feeling” as the right response. In contrast, the conscious choice heuristics previously identified in the literature are deliberate and take cognitive effort to apply, so that decision makers are aware that they are using heuristics strategically to simplify the decision (Frederick, 2002). The process of heuristic judgment is not fully unconscious, in that the solution does not just surface in people’s minds outside of awareness with no volition, but does require some conscious awareness and rudimentary calculation. However, previous researchers on the dual-process theory of human reasoning have pointed out that both intuitive and deliberate processing can have conscious and unconscious aspects (Evans, 2010b; Evans & Stanovich, 2013). Thus, consistent with previous research, we consider these kinds of heuristic processes to be intuitive because these judgments are rapid and do not tax working memory, compared to the more effortful cognitive operations that decision makers would have to perform to arrive at the mathematically correct answer (Evans & Stanovich, 2013).

The analysis above suggests that intuitive processing plays an important role in people’s judgments. We expand on this finding and propose that intuitive processing likely also plays an important role in choice. We seek to incorporate both intuitive and deliberate processes in our proposed framework. We build on the dual-process theory of human reasoning and judgment (Kahneman, 2003; Kahneman & Frederick, 2002) to explain the interplay between deliberate and intuitive processes and their influence on preference construction in choice.

The dual-system theory of judgment

One of the most important theoretical developments in the understanding of human behavior has been the emergence of dual-process models: models that classify cognitive processes into two main categories—intuition and reason (cf: Epstein, 1994; Sloman, 1996). Stanovich and West (2000) coined the terms System I and System II to represent these two reasoning processes: the former, quick and heuristic-based, and the latter, deliberate and rule-based. Kahneman (2003) and Kahneman and Frederick (2002) applied the terms System I and System II to propose that the human mind consisted of both an intuitive system, which was rapid, automatic, nonconscious, and an evolutionarily newer cognitive system, which was slower, deliberate, conscious, and controlled.3

The main defining features of System I are automaticity and minimal demands on working memory (Evans & Stanovich, 2013). That is, System I operates through the workings of associative memory: different associations spontaneously spring to mind without willful control. While we can intend to make a certain judgment, we cannot intentionally control the process of arriving at that judgment when System I generates the response. We do not “do” System I processing; it happens to us (Kahneman, 2011). The tendencies to be rapid, unconscious, and uncontrollable are all correlates of System I processing, but not necessary features (Evans & Stanovich, 2013). The main defining features of System II processing, on the other hand, are the capacity for hypothetical thinking and the engagement of working memory. System II processing is willful and tends to be effortful, although the extent to which it requires effort and taxes working memory can vary. When we engage in System II processing, we “do” the processing; it does not spontaneously happen to us (Kahneman, 2011). The tendencies to be slow, conscious, and controlled are correlates of System II processing, but are not necessary features (Evans & Stanovich, 2013).

The System I/System II theory of human reasoning has been applied primarily to understand biases in judgments under uncertainty (Kahneman, 2003). The theory is rooted in a simple, powerful idea that the intuitive and affective system is fast and automatic and that it unconsciously evaluates incoming stimuli and influences all subsequent higher-level thinking (Zajonc, 1980). Building on this idea, Kahneman and Frederick (2002) argued that System I proposes an intuitive answer to judgment problems, while System II monitors System I’s response by evaluating the quality of the proposals and then either endorsing a proposal, overriding it, or modifying it. In this view, intuition can never force a judgment, since conscious, deliberate reasoning can override the intuition.4 It is important to note that both System I

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3 Consistent with Evans and Stanovich (2013) and Stanovich and Toplak (2012), we use System I and System II to refer to Type I and Type II processing, as was the intent of the original authors (cf: Sloman, 1996), rather than to two distinct brain systems, or “old” and “new” minds (cf: Epstein, 1994).

4 In some situations the System I response can still influence System II; for example, System II may be biased by the first intuitive response as it modifies it, as is the case in anchoring and adjustment (Kahneman & Frederick, 2002).
and System II are always active simultaneously. Some previous treatments (Kahneman & Frederick, 2002; Stanovich, 2011) have conceptualized System I as coming online and generating a response first and System II as then checking the response. This idea is common because System I tends to be rapid and tends to generate a response that comes to mind before the decision maker is done consciously deliberating. The intuitive response thus tends to be integrated into the deliberation process and can influence the resulting preference.

In general, when System II is engaged, it may change the System I response because considerations that people view as important when processing deliberately can be different from the ones that stand out intuitively. In these cases, System II overrides the System I preference and determines the judgment that gets expressed. However, System II monitoring tends to be somewhat lax (Kahneman, 2003) because deliberate processing is effortful and requires both ability and motivation to engage (Stanovich, 2011). Since intuition often generates a response more quickly and System II tends to accept the response, intuitive judgments—including erroneous ones—are frequently expressed. According to this model, judgment biases result from the conjunction of two failures: System I generating an incorrect intuition—because of the biases specific to associative memory—and System II failing to either detect or to correct the faulty intuition. Thus, when the System I intuition is very strong, or when a decision maker is distracted or depleted and unable to process more deeply, System II may fail to detect an error, allowing an incorrect System I judgment to be expressed.5

Although the dual-system reasoning framework has been widely applied to explain judgments as diverse as probability estimates (Kahneman & Frederick, 2002) and moral judgments (Haidt, 2007), the influence of intuitive versus deliberative processes has not been advanced to explain preference construction in choice, mainly because choice has been thought to require predominantly deliberate processing (Bettman et al., 1998; Payne et al., 1992). Indeed, most traditional choice heuristics—such as elimination by aspects or lexicographic choice—are System II heuristics that result from conscious and deliberate processing. Decision makers intend to simplify the decision by focusing on only some subset of attributes and are consciously aware that they are using a shortcut, even if their choice of strategy may not be well thought-out. Most judgment heuristics, on the other hand, have been thought of as System I heuristics that result from rapid, uncontrollable processing (Frederick, 2002).

In this dialogue, we propose a novel framework of choice effects, suggesting that each context and task effect can be thought of as arising primarily from either intuitive or deliberate processing. Consistent with Frederick (2002), we propose that certain preferences are determined more by intuitive processing, whereas others arise from deliberate processing. While both reasoning systems are active concurrently and undoubtedly interact to form a preference, we argue that preferences are determined more by intuitive processing in cases where System I generates a strong intuition in favor of an option, because in that case System II is less likely to change the response. Preferences are determined predominantly by System II, on the other hand, either when System I does not generate a strong intuition in favor of an option or when System II is particularly engaged and motivated to modify the System I preference. Our framework proposes a novel grouping of choice effects that allows for a richer understanding of the mechanism through which they operate. We describe the proposed framework below and then group choice effects previously discussed in the literature as arising primarily from intuitive or deliberate processing.

A dual system framework to understand preference construction effects in choice

We propose that preference construction in choice may arise primarily as a result of either System I processing generating an intuitive response, System II activating deliberate processing, or an interaction of the two. Suppose that a person is faced with a choice among several options, as is often the scenario in many choice studies. We propose that intuitive System I processing is rapidly activated as the affective system comes online to automatically evaluate the incoming stimuli. Then, one of several outcomes can occur.

First, System I may generate a strong preference in favor of one of the options, and that option may rapidly stand out as the superior choice. We define an option as “standing out” if that option feels superior with little engagement of working memory and without having to exert effort to compare attribute values (Evans & Stanovich, 2013; Stanovich & Toplak, 2012). Consider two options $x$ and $y$ which vary on two attributes, where $x$ is superior to $y$ on both attributes. In this case, the affective reaction to $x$ will be more positive than the affective reaction to $y$, leading System I to generate a strong preference in favor of $x$. These affective reactions arise from not only impressions of $x$ and $y$’s attributes, but also the relationship between them—dominance in this case—and cues from the choice context or task at hand. These differential affective reactions are then translated into the conscious belief “Option $x$ is clearly better than $y$,” which System II can then either endorse or further evaluate. Whereas past research has described choice as a deliberate process because “when a decision maker is presented with a matrix of numbers summarizing the attributes of six different apartments...no intuitive computation generates an impression of which option is best” (Frederick, 2002, p. 548), we suggest that some relationships such as dominance are so compelling that they do...
generate an affective reaction and may be apparent without willful, effortful processing.

Besides the content of the choice set, another factor that might contribute to a weaker or stronger intuitive response is fluency, the metacognitive feeling of ease or difficulty, that can accompany the decision (Sanna & Schwarz, 2007). We argue that the choice context, the preference elicitation technique, or feelings of fluency or familiarity that arise from the choice environment, may all cause an intuitive preference to be either easier or more difficult to generate, leading the decision maker to hold the preference with higher or lower confidence. In turn, the confidence with which the decision maker holds the intuitive preference also affects the likelihood that System II will endorse, rather than override, the preference (Thompson, Prowse Turner, & Pennycook, 2011.) As Evans and Stanovich (2013, p. 33) put it, “Disposition to override intuitions is a function of several factors, including the metacognitive feeling of rightness of the initial intuition.”

In many choice contexts, however, no single option elicits a strong intuitive preference. System I does not generate a strong intuition in favor of an option when the affective reaction to each option is about equally positive or negative. If none of the options stand out in System I, the lack of a strong intuitive preference will act as a signal to System II that it needs to exercise greater effort in processing information, by trading off attribute values, for example, in order to generate a preference. Consider a situation where option $x$ is superior to option $y$ on one attribute but inferior on another, so that no option stands out. The lack of an intuitive preference from System I processing means that System II will carefully consider attribute information for each option, resulting in a more deliberate evaluation. This premise is also consistent with experimental findings that the experience of metacognitive difficulty during the judgment process—the feeling that making a choice is difficult or that one is unsure about one’s preferences—activates System II processing (Alter, Oppenheimer, Epley, & Eyre, 2007). It is important to note that while engaging System II involves conscious effort, the amount of effort invested depends on factors extraneous to the choice set, such as the amount of time or processing capacity the decision maker has or his or her desired level of accuracy. Therefore, even when the lack of a strong intuitive preference signals that System II should exert effort in processing information, decision makers may still process information selectively if they are pressed for time, tired, or distracted, choosing to rely instead on certain choice heuristics (Evans & Stanovich, 2013; Stanovich, 2011).

Contrary to the classical economics assumption of perfect information processing, we propose that when System II processes information, it has certain limitations that can affect choices that people make. System II processing does not mean rational processing, as understood in neoclassical consumer choice theory: both System I and System II are susceptible to systematic biases (Evans, 2007a; Evans & Stanovich, 2013; Stanovich, 2011). Because human conscious processing has limited bandwidth and because System II is not always fully engaged, System II cannot integrate all available information, but instead relies on a subset of information made salient by the choice environment. Specifically, based on findings in the choice literature, we propose that deliberate processing implicates two general principles when making a choice: 1) focusing on readily accessible content and on salient comparisons among the presented alternatives and their attributes, making System II susceptible to choice effects (Simonson, 2008; Simonson, Bettman, Kramer, & Payne, 2012) and 2) seeking reasons or justifications for choices (Shafir et al., 1993). We next explore how both of these considerations systematically affect people’s choices under System II processing.

First, the decision maker’s tendency to assign relative rather than absolute subjective values to the different options in the choice set can affect the choice outcome. Assigning absolute preference values to options is a difficult task because people are limited in their memory and processing capacity and simply cannot store preferences over all possible attribute values in memory. Instead of pulling up stored values of all attribute combinations when generating a preference, decision makers spontaneously compute those values using inputs that include not only their accessible likes and dislikes, but also elements of the choice environment, such as the task at hand or the choice context (Dhar & Novemsky, 2008; Simonson, 2008). Attending to the local environment focuses decision makers on the most salient comparisons among options. Thus, the choice context and the way in which the question is asked may draw attention to certain local comparisons, affecting the choices that people make.

Second, in addition to relying on context to make certain comparisons, people also shift their choices to align with goals that come into play under conscious deliberation. Bettman et al. (1998) suggested that when decision makers process information deliberately, they choose in line with two main goals: the goal to maximize ease of justification and the goal to minimize negative emotion during decision making. Consistent with this notion, when processing deliberately people are more likely to seek justifications for their choices and become concerned with choosing not necessarily the option that will provide the highest benefit—because that benefit is often difficult to quantify—but the option that is easiest to justify to themselves or to others (Shafir et al., 1993).

In summary, when a decision maker faces a choice among several options, System I processing is rapidly activated to evaluate the stimuli. If System I generates a strong intuition in favor of an option and System II is not motivated to process deeply, System II will often accept that response, and the decision maker will choose that option with high confidence. However, if no option stands out as superior under System I processing, this will act as signal to System II that it needs to process information more carefully in order to generate a preference. We view System II as boundedly rational because of people’s inherent cognitive processing limitations (Mullainathan & Thaler, 2000), leading to two consequences. First, because System II relies on relative evaluations, different contexts and tasks may change the weights that decision makers assign to attributes, leading them to make...
different choices. Second, the goal to justify their choices leads
decision makers to perceive certain options as more or less
attractive.

Using a dual-system framework to classify preference
construction effects in choice

Our review of preference construction in choice is structured
in three sections. The first section describes choice effects that in
our view can be classified as arising primarily due to intuitive
processing: cases in which System I generates a strong preference
for one of the options, which System II is likely to accept. We
examine how certain choice contexts cause an option to stand out
in attractiveness without careful deliberation and consequently
lead decision makers to choose the intuitively appealing option.
We consider how intuitive assessments and the choice context
interact to produce systematic effects in both deferral choices
(whether to choose) and selection choices (which option to
choose.) The second section classifies kinds of choice effects that in
our view arise from more deliberate processes: cases in which
System I does not generate a strong preference, leading System II
to play a greater role in determining choice. Under deliberate
processing, considerations about relative comparisons and
concern for justification become important drivers of selection
and deferral choices. The concluding section then draws on the
dual-system framework to make new predictions and propose
directions for future research.

System I choice effects

I. Whether or not to choose (deferral choices)

An important decision that consumers face is whether or not
to make a choice. Unlike most choice experiments, where
participants are forced to choose, people can forgo making any
purchase in a real world environment. Below, we evaluate how
the interaction of intuitive processing and the choice environ-
ment can impact the perceived attractiveness of an option and
consequently the decision of whether or not to choose.

Intuitive processes can affect a purchase decision when
consumers are considering whether or not to purchase a single
option. Researchers have noted that people tend to focus on
explicitly presented options and fail to spontaneously consider
non-salient alternatives. When a single option they are consid-
ering is appealing, consumers may feel an impulse to buy the
attractive good and do not spontaneously consider other uses of
their money. However, bringing alternative uses of the money to
mind engages System II to a greater extent and prompts consumers
to deliberate the pros and cons of the purchase, causing them to be less likely to purchase. Consistent with this
notion, Frederick, Novemsky, Wang, Dhar, and Nowlis (2009)
showed that merely reframing the option to “forgo a purchase” as
the option to “forgo the purchase and to keep the money for other
purchases” significantly decreased the rate of purchase of a target
good. In one problem, participants imagined that a DVD that they
really wanted was on sale for $14.99 and were asked whether
they would choose to buy the DVD. Seventy-five percent chose
to buy the video when the forgo-purchase option was “not to buy
this entertaining video,” but only 55% chose to buy it when the
forgo-purchase option was “not to buy this entertaining video
[Keep $14.99 for other purchases.]” In the absence of an explicit
reminder that they could keep the $14.99, participants were more
likely to act on their first impulse to buy the attractive video.
However, when reminded that they could keep the money for
other purchases, participants engaged in more deliberate
processing and weighed the costs and benefits to spending the
$14.99 on the DVD. As a result of the greater reliance on
deliberate processing and making tradeoffs, more participants
chose to save the money for later.

The presence of multiple alternatives in a choice set can also
impact the intuitive confidence in one’s preference for a specific
option, and consequently the decision of whether to choose or to
defer choice. When one of the options in the choice set dominates
others, that option stands out as intuitively attractive even without
having to make careful comparisons. In contrast, when the choice
set contains options that are relatively equally attractive, the
choice set does not generate an intuitive preference for any option,
and System II plays a greater role in making a decision. When two
options are equally attractive, justification does not provide a clear
reason for choosing one versus the other, and as a result, the
decision maker may be more likely to defer the choice. Consistent
with this argument, Dhar (1997) (see also Shafir et al., 1993)
hypothesized greater choice deferral when two options are equally
attractive than when one of the two options stands out in
attractiveness. In one study, control participants evaluated two
options in four different product categories: speakers, answering
machines, laptop computers, and electric shavers. In one
condition the options were matched on attractiveness, and
participants decided whether to buy one of them or to defer the
choice and search for more information. Another group saw one
of the same options as the control group and a second alternative
that was inferior to the first. Across all four categories, purchase
incidence was 26% higher in the presence of the inferior,
dominated option than in the set with two equally attractive
options. For example, in the laptop computer category, 70% chose
to buy one of the computers in the presence of the inferior option,
whereas only 50% chose to buy when the two options were equally
attractive. This finding demonstrates that a dominant option stands
out as intuitively attractive, making it easier for decision makers to
choose that option without the need for further deliberation.

Whereas the examples so far focused on certain options
standing out in a choice set, in other instances, certain attributes
of individual options may stand out. People’s attention is spontane-
ously drawn to novel and unique features that appear in a visual
scene. Unique features can be thought of as “figures” that pop out
of the rest of the visual scene, or “ground.” Consistent with the
notion that unique features tend to capture attention, prior
research has shown that people disproportionately attend to
unique features in decision making tasks (Houston & Sherman,
1995; Tversky, 1977). As a result, sets of options with shared bad
and unique good attributes (unique-good pairs) will appear more
attractive than sets with shared good and unique bad attributes
(unique-bad pairs). To illustrate how the context can influence the
initial assessments of attractiveness of the choice set and,
subsequently, the decision to defer choice, consider the following.
two options in a vacation choice (Dhar & Sherman, 1996). The alternatives in the first version of the question were part of a “unique-bad” pair such that they shared their good features, but had unique bad features.

Place A: Beautiful scenery, pollution problem, plenty of nightspots, expensive, good museums, and long travel time.

Place B: Beautiful scenery, overcrowded, plenty of nightspots, possible bad weather, good museums, and poor transportation.

On the other hand, in the “unique-good” version of the scenario Places A and B were described as follows:

Place A: Beautiful scenery, pollution problem, good museums, expensive, plenty of nightspots, long travel time.

Place B: Good restaurants, pollution problem, good theaters, expensive, attractive beaches, long travel time.

Note that the good features stand out more in the “unique-good” pair, and the bad features—in the “unique-bad” pair. The differential prominence of the good and bad features causes the “unique-good” and “unique-bad” choice sets to appear differentially attractive as a whole even under quick processing. Dhar and Sherman (1996) demonstrated that people are more likely to choose from unique-good pairs than from unique-bad pairs, consistent with the finding that people are more likely to choose an option from a more attractive choice set. They showed participants one of the two sets of stimuli (either the unique-good or unique-bad) and asked them to either select one of the options or to continue looking (the no-choice option). Across four different choice problems, the mean share of the no-choice option was 17% higher in the unique-bad scenarios. The evidence is consistent with the notion that people found the choice between the two unique-bad pairs to be more difficult because the unique-bad options looked less attractive. We posit that the effect of attending to unique over shared features on likelihood of choosing occurs because unique options tend to stand out. The effect is thus predominantly intuitive and does not require careful processing.

While the choice context can increase or decrease the intuitive attractiveness of certain choice sets, variables in the environment unrelated to the choice set can also influence the feeling that arriving at a preference is difficult. Novemsky, Dhar, Schwarz, and Simonson (2007) argued that choice deferral can also be influenced by preference fluency, the subjective feeling that forming a preference is easy or difficult, and that extraneous factors in the environment can affect this feeling. As a result, when options are easy to process, they are perceived as more attractive, leading to higher choice incidence, whereas when options are difficult to process, they are perceived as less attractive, leading to higher levels of choice deferral. This subjective feeling of fluency is intuitive and affects decision makers outside of awareness, unless their conscious attention is drawn to the feeling, in which case the effects of the fluency attenuate.

In line with this account, Novemsky et al. (2007) hypothesized that low fluency would lead to greater choice deferral because people would incorrectly attribute their feeling of choice difficulty to uncertainty in their preferences and hence choose to defer. However, this effect should hold only if participants incorrectly attribute their feeling of difficulty to the decision. If a cue informs participants that their difficulty arises for another specific reason, such as a difficult font, then participants should correctly attribute the processing difficulty to the font and no longer infer that the decision is difficult to make. Novemsky et al. (2007) manipulated fluency by presenting the same choice alternatives, a pair of cordless telephones, printed in either an easy-to-read or a difficult-to-read font. Participants could either choose one of the two options presented or defer the choice. Additionally, half of the participants in each condition also saw a sentence that stated “This information may be difficult to read because of the font,” a disclaimer that prompted participants to attribute processing difficulty to the hard-to-read font. In the absence of the additional instructions, 41% of participants deferred choice in the hard-to-read font condition compared to only 17% of participants in the standard font condition. However, when the instructions mentioned that the font may be difficult to read, only 16% of participants in both conditions deferred choice. The researchers interpreted the results as follows: participants forced to decipher the hard-to-read font incorrectly interpreted their struggling as difficulty articulating a preference, leading them to defer the choice. This process happened unconsciously, outside of decision makers’ awareness. When they were told that the font was causing their processing difficulty, however, the difficulty was brought to participants’ conscious awareness, engaging System II. System II compared attribute values more systematically, so that participants found it easier to generate a preference and were more likely to make a choice. These results demonstrate that intuitive appeal of a choice set can be manipulated by other factors in the environment, specifically through changing the subjective fluency of the experience, which can in turn affect choice incidence.

II. What to choose (selection choices)

Intuitive processes can also increase or decrease the attractiveness of certain options in a choice set rather than the choice set as a whole. A dominant option that is superior on all attributes generates a strong intuitive preference. The attraction effect, or asymmetric dominance, is similar to the dominance situation in that the asymmetrically dominant option looks intuitively appealing in comparison to a choice set where the same option is no longer dominant. The attraction effect refers to the situation where the addition of an inferior, or dominated, third alternative, a’, to a set of alternatives [a, b] enhances the choice of alternative a, to which a’ is most similar. For example, the addition of a $625 high-quality TV set to a set consisting of a $600 high-quality TV and a $400 low-quality TV may increase the choice share of the $600 high-quality TV because it is better than the other high-quality TV on price and at least as good on quality. The introduction of an inferior option a’ makes option a, the dominant option seem more attractive in comparison—a now elicits a more positive affective reaction—leading to an increased choice of option a. In contrast to the three option choice set, where option a immediately stands out because it dominates a’, note that a
does not have any advantage in the choice set \([a, b]\) (the $400 low-quality and $600 high-quality TVs in the above example) because each option is superior on one of the attributes.

In one of many demonstrations in the literature, Simonson and Tversky (1992) tested the attraction effect in a real choice study by asking participants to select either a roll of paper towels or a box of facial tissues from a set of three options. Participants could choose one of the options to keep at no cost in exchange for participating. In one version, respondents were presented with a high-quality brand of tissues and two brands of paper towels, where one brand was higher quality than the other brand. In the other version, they were presented with the high-quality brand of paper towels and two brands of tissues, where one brand of tissues was higher quality than the other. Participants could touch all of the products, so that it was clear that the high-quality tissues were superior to the low-quality tissues, and therefore were intuitively appealing, and that the high-quality paper towels were superior to the low-quality ones. In the choice set with two kinds of paper towels 63% of participants chose the high quality paper towels and only 28% chose the high-quality tissues. On the other hand, in the set with two kinds of tissues, participants were relatively more likely to choose the tissues: 52% chose the high-quality paper towels and 42% chose the high-quality tissues. The finding that the market shares of both the high-quality paper towels and tissues were significantly enhanced when they were superior to another option in the same category indicates that the presence of the less attractive alternative increased the choice share of the more attractive alternative in the same category. This happened because the mere presence of the lower quality paper towels, for example, made the high-quality paper towels stand out as more attractive in contrast. This process is intuitive—the high-quality paper towels feel more desirable than the high-quality tissues, and decision makers do not have access to reasons behind this feeling.

It is important to point out that while the attraction effect has sometimes been explained using justification-based processes that are deliberate and effortful, the emerging view is that the effect is predominantly intuitive. In fact, Simonson and Tversky (1992) originally described the principle of tradeoff contrast as perceptual and compared it to an optical illusion: the same product may appear more attractive on the background of less attractive alternatives, just as the same circle may appear large when surrounded by small circles, but small when surrounded by large circles. In line with this account, Simonson (1989) found that most participants did not have conscious access to the reason that they chose the asymmetrically dominant option: few participants justified their choice of \(a\) on the basis of its advantage relative to the inferior option \(a'\). Most explanations that participants gave for choosing \(a\) focused on its superiority on the dimension on which it was better than the other option \(b\), suggesting that the dominant option was intuitively appealing.

More recently, more direct evidence has emerged that the mental processes underlying the attraction effect are intuitive. Depletion of cognitive resources, which impairs deliberation and amplifies reliance on intuitive processing (Masicampo & Baumeister, 2008), leads to an increase in the attraction effect: participants are more likely to choose the dominant option when under load than when they have ample cognitive capacity to contemplate their choice (Pocheptsova, Amir, Dhar, & Baumeister, 2009). These findings support the notion that the attraction effect arises due to intuitive processing. Later in this review, we discuss why some effects that arise from intuitive processing may increase with deliberation, and hence have been incorrectly classified as originating due to System II processes.

In summary, many choice effects arise because properties of the choice environment, such as the task at hand or the context, make one of the options stands out from the others, based primarily on intuitive processing. People are less likely to defer choice when the whole choice set is more intuitively attractive, and they are more likely to choose an option when it stands out in a choice set. So far we have reviewed evidence that the presence of a dominant or highly attractive options makes a decision feel easy, causing people to be more likely to make a choice (Dhar, 1997; Dhar & Sherman, 1996) or a purchase (Frederick et al., 2009). In addition, other factors such as ease of information processing also contribute to intuitive attractiveness and higher choice incidence (Novemsky et al., 2007). A dominant option is more intuitively appealing and, as a result, is more likely to be chosen than an equally attractive, but non-dominant option, as illustrated by the attraction effect (Simonson, 1989; Simonson & Tversky, 1992). Having explored the effects that arise due to the interplay of the choice environment and intuitive processing, we now turn to context and task effects that arise due to effortful and deliberate mental processes.

**System II choice effects**

According to our proposed framework, when none of the options stand out under quick System I processing, people will rely on System II processing more heavily in order to choose. Under deliberate processing, decision makers often rely on local comparisons of attribute values that are made salient by the choice environment and choose in line with the goal to justify their choices. They tend to shift their strategy from choosing over options to choosing over reasons when engaging in deliberate weighing of tradeoffs, seeking reasons in order to resolve the conflict and justify their choices to themselves and to others (Shafir et al., 1993). The process of seeking justifications and relying on local comparisons can affect the choices people make.

In addition to System II’s inherent tendency to rely on local comparisons and to seek justifications for choices, elements of the choice set or explicit instructions can also prompt more System II processing by making decision makers more concerned about justifying their choices. The choice literature has looked at accountability manipulations and properties of choice sets that increase concern about justifying choices and, in turn, spur effortful deliberation. We first start with choice and task effects that arise primarily due to System II’s inherent tendency to rely on local comparisons and then move on to studies that explore how elements of the task or context prompt more System II processing.
Reliance on local comparisons and justification

Since people have difficulty evaluating absolute attribute values, they tend to gravitate to available relative evaluations when making tradeoffs (Simonson, 2008). This tendency to rely on local relative evaluations along with the goal to justify choices makes people susceptible to context effects such as the compromise effect. In the absence of absolute preferences over all available goods, people perceive an option as more attractive if it is the middle, or compromise, option rather than an extreme option, because compromise options have less severe disadvantages and are therefore easier to justify choosing (Simonson, 1989; Simonson & Tversky, 1992).

In a test of the compromise effect, an option \( z \) is added to a pair of options \( x \) and \( y \) that vary on two or more attributes, so that either \( x \) or \( y \) becomes the middle option with intermediate values on all attributes, and the choice share of \( x \) relative to \( y \) is compared when \( x \) is the middle option to when \( x \) is an extreme option. Simonson predicted that the choice share of \( x \) relative to \( y \) would be higher when \( z \) was introduced, making \( x \) a compromise option, than when \( x \) was an extreme option relative to \( y \). For example, in one study (Simonson & Tversky, 1992), participants chose a camera from either a choice set containing two, or one containing three cameras. In the two-option set containing a Minolta X-370 for $169.99 and a Minolta 3600i for $239.99, 50% of participants chose each camera. In another condition, a third option, a Minolta 7000i for $279.99 was added, making the Minolta 3000i the compromise option. When the Minolta 7000i was added, 22% chose the X-370, 57% chose the 3600i, and 21% chose the 7000i. The addition of the top-of-the-line 7000i increased the relative popularity of the 3600i to the X-370 from 50% to 72%. We argue that the compromise effect arises because decision makers, when faced with a choice among options that are all about equally attractive, consciously deliberate among options and seek to justify their choice. One of the most salient justifications is to choose the compromise option, which has intermediate attribute values, because it has smaller disadvantages compared to the other two options.

The previous section on intuitive effects in choice discussed how a dominant option intuitively stands out in a choice set because of its advantages on all attributes. However, whereas the attraction effect is an extreme form of tradeoff contrast and a System 1 process, a milder form of tradeoff contrast, where no option has an absolute advantage over another, called the enhancement effect, can also affect choices. This form of tradeoff contrast requires decision makers to compare the values of both attributes and to perform mental calculations in order to determine which option provides a better relative value. In the enhancement effect, the option that benefits from, or is enhanced by, tradeoff contrast does not have an absolute advantage on any attribute and does not elicit an intuitive reaction. However, it is easier to justify choosing because it offers a better tradeoff rate of one attribute for another than the other two options. The enhancement effect occurs when tradeoff contrast between two options \( x \) and \( z \) makes option \( y \) look more attractive in comparison because \( y \) provides a better level of one attribute in exchange for giving up some amount of the second attribute than either \( x \) or \( z \) (Simonson & Tversky, 1992). Option \( y \) is thus easier to justify choosing, although identifying that \( y \) is the better option requires effortful processing and calculation to figure out the relevant tradeoffs between attributes. Consider the following example from Simonson and Tversky (1992): a consumer faces three options for gasoline: 87 octave gasoline for $1.01 per gallon, 90 octave gas for $1.08 a gallon, and 93 octave gas for $1.21. Participants were told that higher octane gas improves the performance of most cars. The 90 gas for $1.08 a gallon is the “enhanced option” in this case because it provides higher octane at a cheaper price than the octane-per-dollar rate implied by comparing the 87 octave to the 93 octave gas.

Conversely, System II processes can also result in a detraction effect where tradeoff contrast between \( x \) and \( z \) makes option \( y \) look relatively worse because \( y \) provides a smaller gain on one of the attributes in exchange for giving up a certain amount on the other attribute than either \( x \) or \( z \). Suppose, as before, that a consumer faces a choice among three types of gasoline: 87 octave for $1.01 per gallon and 93 octave for $1.21 per gallon as before, and now 90 octave for $1.14 a gallon. Now, the 90 octave option is relatively unattractive when viewed in the context of the 87 and the 93 options. The 90 option does worse in the triad than in either one of the pairs (a choice set with 87 and 90 octave only, or one with 90 and 93 octave only) because there is no opportunity to compare tradeoffs within a pair of options. The 90 option had a relatively higher share in the triad than in either of the pairs in the enhancement scenario and a relatively lower share in the triad than in either of the pairs in the detraction scenario (Simonson & Tversky, 1992).

The tendency to rely on local comparisons that are made salient by the choice environment also leads to different choices depending on whether decision makers are asked to choose or reject one of two options, a task effect first identified by Shafir in 1993. In addition, consistent with the notion that System II tends to search for justifications, or reasons, for choices (Slovic, 1975), this effect has also been explained through decision makers’ tendency to construct reasons in order to resolve conflict and justify their choices to themselves and to others (Shafir et al., 1993).

Shafir (1993) designed two kinds of options, called enriched and impoverished, or all-average, options: an enriched option is one that has both positive and negative features, while an impoverished option has features that are all average. Shafir (1993) argued that, in line with the compatibility principle, some attributes become more salient than others because of the task at hand—positive attributes are more salient and get weighted more heavily in choosing than in rejecting, whereas negative attributes are more salient and get weighted more heavily in rejecting than in choosing. For example, Shafir asked participants to imagine that they were on a jury of a child sole-custody case following a divorce and had to decide to

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7 Relative choice share of \( x \) is defined as the choice share of \( x \) divided by the sum of the choice shares of \( x \) and \( y \). In this example, the relative choice share of the 3000i is \( 50/(50 + 50) = 50\% \) in the 2-option set and \( 57/(57 + 22) = 72\% \) in the 3-option set.
which of two parents to award custody. In this case, Parent A is the impoverished, or all-average option, and Parent B is the enriched option. The descriptions of the parents are presented below:

Parent A: average income, average health, average working hours, reasonable rapport with the child, relatively stable social life.

Parent B: above-average income, minor health problems, lots of work-related travel, very close relationship with the child, extremely active social life.

In one version of the problem, participants were asked to which parent they would award custody, while in another version they were asked to which parent they would deny custody. While the majority (64%) chose to award custody to Parent B and 33% chose to award to Parent A, the majority (55%) also chose to deny custody to Parent B. Thus, Parent B was the majority choice for both being awarded custody and for being denied custody. Originally, Shafir (1993) explained this result through people’s tendency to focus more on attributes that were made salient because of their compatibility with the task at hand. Subsequently, Shafir et al. (1993) also invoked the principle of justification, arguing that those attributes are salient because people seek reasons for choosing an option when deciding which option to choose and focus on reasons for rejecting an option when deciding which to reject. While there are no compelling reasons to award or deny custody to Parent A, who is unremarkable, there are good reasons both to award custody to Parent B (a very close relationship with the child) and to deny Parent B custody (health problems, absences due to frequent travel.)

Effects of task and context on System II processing

As shown above, System II processes lead to context and task effects based on System II’s use of relative evaluations and concern about justifying choices. In addition, the choice context itself and the explicit task instructions can be structured to induce greater concern for justification in consumers. We discuss such effects below.

One way to increase decision makers’ concern about justification is to hold them more responsible for their choices. Tetlock and Boettger (1994) demonstrated that for decisions in the lab that are made to look consequential, people who feel accountable for their decision are more likely to defer the decision or to pass it off to someone else, particularly when the decision is difficult. Participants were asked to play the role of an FDA official and decide whether or not new drugs, described as expected to save a certain number of lives, but possessing varying risk levels, should be allowed to enter the US market. Half of the participants had to decide whether or not new drugs, described as expected to save a certain number of lives, but possessing varying risk levels, should be allowed to enter the US market. Half of the participants had to decide which of two parents to award custody, while in another version they were asked to which parent they would deny custody. While the majority (64%) chose to award custody to Parent B and 33% chose to award to Parent A, the majority (55%) also chose to deny custody to Parent B. Thus, Parent B was the majority choice for both being awarded custody and for being denied custody. Originally, Shafir (1993) explained this result through people’s tendency to focus more on attributes that were made salient because of their compatibility with the task at hand. Subsequently, Shafir et al. (1993) also invoked the principle of justification, arguing that those attributes are salient because people seek reasons for choosing an option when deciding which option to choose and focus on reasons for rejecting an option when deciding which to reject. While there are no compelling reasons to award or deny custody to Parent A, who is unremarkable, there are good reasons both to award custody to Parent B (a very close relationship with the child) and to deny Parent B custody (health problems, absences due to frequent travel.)

Researchers can also increase System II processing and concern for justification by drawing attention to reference options. Dholakia and Simonson (2005) proposed that encouraging comparison between a reference set (a set of background options from which consumers cannot choose, but which they can see to get a sense of the price-quality tradeoff) and a set of target options can lead to more cautious choices, such as greater choice of compromise over extreme options and of lower-risk over higher-risk options. Reference options engage deliberate processing by encouraging comparison among options and trading off of attributes and, as a result, increase concern about justifying one’s choices. Dholakia and Simonson (2005) tested two types of choices, among others, in a lab experiment: a set with a compromise alternative and two extreme alternatives, and a set with a risky gamble and a safer gamble. In each compromise problem participants in the reference-set condition sequentially considered two choice sets, each containing three cameras. Half of the participants were explicitly asked to “please consider how these products compare with the products you saw earlier,” while the other half saw both sets but were not instructed to compare them. Participants in the control group saw only the choice set without the reference set and were asked to choose one of the three cameras.

Participants asked to compare the products were more likely to make a safe choice both in the compromise and in the gamble scenarios. For the extreme versus compromise choices, participants chose among three cameras that varied on quality and price. Those asked to compare the cameras chose the compromise camera 72% of the time, compared to 56% of those who merely saw both sets and 58% of those in the control condition who saw only the target set. In the gamble scenario, 63% of participants who compared sets of gambles chose the safer over the riskier gamble, whereas only 51% of participants who merely saw both sets and 51% of those who saw only the target set chose the safer option. It is noteworthy that providing explicit instructions to compare the target set to the reference products induced more System II processing and elicited more active weighing of attributes that when participants were not asked to compare. This in turn increased concern for justification and led participants to choose safer options. However, merely providing the reference products did not lead participants to consider the reference option in their choice process. These findings suggest that the extent to which System II processing is engaged can be quite variable and can depend on task instructions. In general, people are often unmotivated to exert more effort to make tradeoffs unless directly asked to do so or prompted by cues in the choice environment.

Finally, the size of the choice set can also activate the need to justify one’s choices. The need for justification may be higher in a larger choice set because a large set is perceived as more difficult to choose from (Berger, Draganska, & Simonson, 2007; Iyengar & Lepper, 2000). Additionally, people experience greater regret
after choosing from a larger set (Inbar, Botti, & Hanko, 2011), also suggesting that the desire to justify one’s choice may be higher in a larger set. Building on this idea, Sela, Berger, and Liu (2009) investigated whether a larger choice set may lead people to choose options that are easier to justify, or, in this case, more virtuous options. The researchers compiled a tray with fruit and cookies and placed it at the entrance to a building, encouraging people walking by to help themselves to one item from the tray. They manipulated the size of the assortment on the tray: the large assortment contained six types of cookies and six types of fruit, whereas the small assortment contained two types of fruit and two types of cookies. Participants were more likely to choose a piece of fruit over a cookie when choosing from a larger assortment than a smaller assortment: 55% of passers-by chose fruit over cookies in the smaller assortment, whereas 76% chose fruit over the larger assortment. It seems that merely presenting people with a larger choice set activated a greater need for justification and increased people’s tendency to make a more virtuous choice that is easier to defend.8

In this section we have reviewed choice effects that arise primarily as a result of thoughtful and effortful processing. When System II processing is the basis for preferences, people tend both to seek justifications for their choices and to rely on relative cues in the choice set. When choosing among several options, the goal to justify one’s choice along with reliance on relative comparisons pushes people to favor the middle, or compromise, option over extreme options or an enhanced option that offers a better tradeoff rate between two attributes over relatively inferior options (Simonson & Tversky, 1992.) Additionally, varying the choice set or task instructions can change the degree of concern for justification. We reviewed findings that holding people more accountable for their choices (Tetlock & Boettger, 1994), drawing consumers’ attention to reference products (Dholakia & Simonson, 2005), and providing a larger set of options (Sela et al., 2009) all activate concern about justifying choices, which lead participants to defer choice or to choose compromise, safer, and more virtuous options. We now turn to some conclusions and suggestions for future research, motivated by our framework and observations from the reviewed studies.

Conclusion and suggestions for future research on choice effects

This article proposes a dual-system framework to understand the mental processes involved in preference construction and to account for a variety of choice effects previously identified in the literature. We show that certain types of choice effects can be attributed to intuitive System I processing, particularly in cases where System I generates a strong preference in favor of an option. Other effects, on the other hand, arise from the deliberate comparisons and justification processes indicative of System II, particularly when System I does not generate a strong preference and System II must exert more effort to evaluate options. However, one limitation of our grouping of various choice effects as arising from intuitive or deliberate processing is that there has been little prior research systematically testing which mental processes are involved in choice and how the choice effects might vary with time pressure or availability of mental resources.

There has been some direct evidence from recent research that some choices are primarily driven by intuitive processes, whereas others arise as a result of greater thought and deliberation. Since choice effects that arise due to System II processing require the engagement of working memory to emerge, manipulations that impair working memory should decrease the amount of System II processing and attenuate the size of these effects (Evans & Stanovich, 2013). Our framework predicts that choice effects that occur due to deliberate processing, such as the compromise effect, should decrease under manipulations such as time pressure, load, and depletion. Indeed, Pettibone (2012) finds that the compromise effect decreases under time pressure. In addition, consistent with the notion that depletion of cognitive resources tends to impair deliberate decision making and amplify reliance on intuitive processing (Masicampo & Baumeister, 2008), depletion of mental resources has been shown to attenuate the compromise effect (Poehltsprova et al., 2009).

Conversely, since choice effects that arise due to System I processing require little engagement of working memory, any experimental manipulation that reduces the decision maker’s ability to deliberate should increase reliance on intuitive processing and the size of these effects, to the extent that System I does generate a preference in favor of one of the options. For example, if the attraction effect arises due to intuitive processing, as we propose, it should increase under time pressure, cognitive load, and depletion, because System II is less likely to modify the intuitive response under these circumstances. Indeed, the attraction effect has been shown to increase both under time pressure (Dhar & Nowlis, 1999) and depletion of mental resources (Poehltsprova et al., 2009). In addition, Mao and Oppewal (2012) found that decision makers who tend to rely on more intuitive reasoning (as measured with the Rational Experiential Inventory (Epstein, Pacini, & Heier, 1996)) are more susceptible to the attraction effect than those who score low on intuitive thinking.9 These findings are

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8 It is noteworthy that while providing reference products in Dholakia and Simonson (2005) did not spontaneously prompt concerns about justification, it seems that increasing the number of options in a choice set did do so. Future research can explore the kinds of environmental cues that activate System II processing and why some cues are better at doing so than others.

9 We would like to be cautious here and acknowledge, as Evans and Stanovich (2013, p. 18), that differences in the tendency to rely on intuition may not actually imply greater use of System I because “thinking dispositions are not expected to be differentially associated with Type I or Type II processing.” However, they further note (p. 34) that one factor which increases the tendency to override intuitions is “thinking dispositions that are inclined toward rational thinking and are disinclined to accept intuitions.” Therefore, people who have a more intuitive thinking style may express more System I responses, to the extent that they are more likely to accept their intuitions and are less likely to override them. Given that individual differences in processing have been relatively understudied, future research can shed light on the conditions under which different thinking styles can lead to greater expression of System I processing.
consistent with our proposition that attraction is primarily a more intuitive System I effect. Future research could examine the impact of additional moderators that have a similar effect on processing, such as cognitive load and distraction.

Note that manipulations that decrease the amount of deliberate processing in which decision makers are able to engage—manipulations such as time pressure, load, and depletion—lead to greater expression of a System I response only to the extent that System I does generate a response. Suppose a decision maker is faced with a choice set which contains an asymmetrically dominant option. In most cases where the dominant option stands out as intuitively appealing, load would lead to less System II monitoring and overriding, and hence greater choice of the dominant option. However, if System I does not generate a preference for the dominant option, as, for example, when the decision feels difficult because of low fluency, then taxing cognitive resources would not lead to greater attraction effect, because there would be no intuitive preference to begin with. In these situations, loading working memory would generate more noise, as decision makers choose more randomly, and would increase reliance on simplifying choice heuristics. In other words, taxing working memory should not only decrease System II processing, but also shift System II processing towards simplified System II heuristics, such as reliance on a favorite brand or the cheapest available option. In the future, it would be useful to study how cognitive load and time pressure may differentially increase expression of System I versus System II heuristics.

Consistent with the discussion above, we propose that some minimal amount of time may be necessary for System I to generate a preference in favor of one of the options in a choice set where one option asymmetrically dominates another. Although depletion tends to increase the attraction effect by shifting processing to be more intuitive (Pocheptsova et al., 2009), recent research (Pettibone, 2012) has revealed that the attraction effect decreases under extreme time pressure. Pettibone (2012) finds that, as the time allotted to participants to choose among three options that vary on two attributes decreases from eight seconds, to six, to four to two seconds, the attraction effect decreases. However, the increased choice share of the dominated option in the two- and four-second conditions relative to the six- and eight-second ones may have occurred because participants did not have enough time to process all attribute values, so that none of the options generated an intuitive impression of being superior. Participants may be making more noisy choices in those conditions. Future research could examine how severe time pressure may affect both intuitive and deliberative choice processes. In summary, while research on different kinds of choice effects did not directly test whether these effects arise due to intuitive or more careful, deliberate processing, there is evidence based on moderators that these effects indeed vary in the kind of processing that leads to the effect.

One important yet unresolved question is the kind of assessments and formats of presenting information which elicit intuitive preferences when making a choice. While we posited that dominance relationships and high fluency of information processing may often elicit intuitive reactions, in addition, certain forms of information presentation may be more likely to generate intuitive preferences than others. We propose that attributes to which people are more likely to have an intuitive reaction are those that are inherently more evaluable because people can easily perceive their valence with their senses. For example, attributes that are visual (design, aesthetics, the beauty of a view) or sensory (the pleasantness of a food or beverage, outdoor temperature) are likely to generate an intuitive preference. On the other hand, attributes that are abstract, numerical, and non-sensory, such as the price of a good, the processing power of a computer, a good’s ease of storage or transportation, or its durability, are less likely to generate an intuitive response, unless the choice set makes certain comparisons salient, which allow System I to easily generate a preference.10

Based on the above proposal, it would be interesting to examine how different formats of presenting the same information about options may make certain attributes more or less evaluable, causing differences in reliance on intuitive processing and resulting in different preferences. Specifically, choices that people make may change based on a visual versus a numerical representation of the same attributes. For example, an apartment with a nice view may stand out more easily as the better option over an apartment with a poor view when the view is presented pictorially rather than described verbally, because the visual image is more likely to generate a positive intuitive impression of the apartment with the good view. On the other hand, a larger apartment may stand out more when size is described numerically (e.g. 800 vs. 900 square feet) because the numerical description makes the difference between 800 and 900 more apparent than would a picture of the floor plans with dimensions of the two apartments. Future research could examine how different formats of presenting information may lead to different mental processes and may generate useful insights for understanding which options decision makers would prefer.

It is important to consider the interplay between System I and System II processing in forming preferences. Although we posited that certain choice effects arise when a specific option stands out from others intuitively, people in most choice situations do have the opportunity and ability to continue to engage in at least some effortful processing. Note that two situations are possible: System I can either generate an intuitive preference for a certain option, or fail to generate one. First consider how System II impacts outcomes when System I generates a preference for a specific option. Theoretically, System II can either reject, leave unchanged, or even bolster the System I preference. We posit that the exact outcome will depend on whether System II favors the same considerations.

10 Note that even attributes that are difficult to evaluate can elicit an intuitive reaction in a choice, but not a judgment, setting. This is because attributes that are not inherently evaluable become more evaluable in the presence of a comparison product. For example, a computer that dominates others because of its greater RAM can stand out as the superior option even though RAM may not be inherently evaluable, because the RAM can be compared to that of other computers, leading to the intuitive attraction effect. As a result, intuitive preferences may still emerge in choice tasks from non-evaluable attributes.
that were intuitively attractive under System I or whether System II identifies other considerations as more important.

In many cases where System I generates an intuitive preference for one of the options, System II may deem the choice as good enough and may not engage in more effortful processing. In other cases, System II may exert effort in processing information and may bolster System I’s choice of the intuitively appealing option. This occurs when an option stands out intuitively for the same reason that is it is favored under more deliberation. Systems I and II then agree on the same option as the best choice and work together, leading to System II’s bolstering of the System I response. Thus, it may seem surprising at first that the attraction effect, which we believe to be an intuitive effect, actually increases when participants are asked to justify their choices (Simonson, 1989).

One reason this might occur is because the dominant option is perceived as both intuitively attractive and also as the option that is easier to justify. When the same option is both intuitively appealing and also evokes compelling reasons in favor of choosing it, System II is likely to support System I’s intuitive preference for that option, leading to the persistence of, or even increase in, intuitive choice effects under more effortful processing.

We propose that manipulations that increase the need for careful deliberation, such as asking participants to verbally justify their choices or to make them in public, may not be a good test of whether an effect arises due to intuitive or deliberate processing, even though increasing justification does increase System II involvement. This is because in situations where System I does generate a preference, choice effects due to intuitive processing may be unchanged or even bolstered under manipulations that trigger System II processing. Even though in previous research justification of choices has been used as a manipulation to induce more careful, deliberate processing (Simonson, 1989; Simonson & Nowlis, 2000), we propose that better moderators to identify the mental processes underlying choice are ones that load working memory and thus suppress System II processing—such as depletion and cognitive load—or ones that decrease the amount of deliberate thought in which decision makers can engage, such as time pressure. We argue that effects that increase under these manipulations are primarily generated by intuitive processing, whereas those that are attenuated arise as a result of deliberate processing.

In other choice contexts where System I generates a preference, options that are favored by intuitive processing may be different from the ones that are favored by deliberate processing. In this case, an increase in effortful processing or need for justification can reduce System I effects. As discussed above, visual or aesthetic features such as the color and style of a jacket or attractiveness of a product design can generate intuitive impressions, whereas numerical attributes such as the size of the jacket or the functionality of a product are less likely to do so. A jacket in a favorite color but a size too small may be more intuitively appealing than one that is the right size but in a less preferred color. In such cases, a consumer would likely choose the one that is the better fit when engaged in more deliberate thinking. Similarly, an apartment with a great view but with poor amenities may be more desirable on first impression than an apartment with a mediocre view but with great amenities; however, many people would prefer the latter when deliberating more. We predict that in cases such as these, increasing effortful processing may increase the choice share of the option with the less intuitively appealing, but more easily justifiable attribute (cf: Shiv & Fedorikhin, 1999). This domain of research where the intuitive impression is in conflict with the reasoned, deliberate preference has been underexplored and is a fertile area for future research that could test our predictions.

Finally, consider how System II affects choice outcomes when System I does not provide an intuitive preference—such as in the case of enhancement and detraction effects described earlier. In such instances, decision making under time pressure or cognitive load may also look different from the pattern of choices when System II is allowed to operate uninhibited. When deliberate processing is impaired, decision makers will rely more on System II heuristics and simplified choice strategies, such as lexicographic decision rules, or will choose at random, because no option intuitively stands out as the superior one. As discussed earlier, this kind of choice process may occur under extreme time pressure. Even though the enhancement and attraction effects in choice have been previously treated as interchangeable effects in the literature (Simonson & Tversky, 1992), our framework draws a wedge between these effects by focusing on the underlying process. We suggest that the enhancement effect requires deliberate processing in order to arise and that it would attenuate under time pressure or under load, whereas the attraction effect would increase under time pressure and load.

The discussion above raises some important limitations of System II processing: although System II is characterized as making deliberate comparisons among the available options, its operations are boundedly rational—it is imperfect due to limited human cognitive ability (Evans & Stanovich, 2013; Mullainathan & Thaler, 2000). It engages in confirmatory processing, is susceptible to relative evaluations, and is goal driven, tending to operate differently depending on the task at hand. System II operations can be thought of as thinking “harder,” but not necessarily “smarter.” Thus, while System II does consider attribute values more carefully, it is reference-dependent and attends only to local comparisons that are accessible because attention happened to have shed light on them (Simonson et al., 2012). System II may therefore fail to integrate all information into one larger picture, focusing only on local comparisons that enter its field of vision (Dhar, Nowlis, & Sherman, 2000). Overall, even though System II has the power to override System I’s responses, unconscious System I processing may still largely determine what information comes under System II’s attentional spotlight.

In this article we have grouped choice effects previously identified in the literature as arising either from intuitive System I or deliberate System II processing. We believe that this framework has several advantages. First, it sheds light on distinct cognitive processes that make decision makers susceptible to different aspects of the choice environment, such as the choice context and the task at hand, when they make choices. Second, the framework makes predictions about moderators of choice effects—how
different context and task effects will be attenuated or amplified under time pressure, depletion, or cognitive load. We argue that researchers can determine whether an effect arises due to System I processing by testing whether it is augmented when deliberate processing is limited. We hope that future research will identify the cognitive processes that underlie the two systems and lead to these and other choice effects. Researchers could explore other moderators of these effects as well as individual differences in susceptibility to different choice effects, in order to shed light on other fundamental differences among these two kinds of effects. Finally, future research can extend the dual-system framework to understand how preferences shift with changes not only in context and preference elicitation, but also with other aspects of the decision environment.

References


