TRADEOFFS IN CHOICE

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ABSTRACT

To explain tradeoffs in choice, researchers have proposed myriad phenomena and decision rules, each paired with separate theories and idiosyncratic vocabularies. Yet most choice problems are ultimately resolved with one of just two types of solutions: mixed versus extreme. For example, people adopt mixed solutions for resolving tradeoffs when they allow exercising to "license" indulgence afterward (balancing between goals), read different literary genres (variety seeking), and order medium coffees (the compromise effect). By contrast, when people adopt extreme solutions for resolving these exact same tradeoffs, they exhibit highlighting, consistency seeking, and compromise avoidance, respectively. Our review of the choice literature first illustrates how many seemingly unrelated phenomena actually share the same underlying psychology. We then identify variables that promote one solution versus the other. These variables, in turn, systematically influence which of opposite choice effects arise (e.g., highlighting vs. balancing). Finally, we demonstrate how several "mistakes" people purport to make can potentially instead be reinterpreted as mixed solutions for resolving tradeoffs. We conclude with guidance for distinguishing mistakes from mixed solutions.

Keywords

tradeoffs, motivation, substitution, judgment and decision making, behavioral decision theory

Tradeoffs are inherent to choice. For example, when a college student enrolls in additional psychology courses, she has to settle for fewer economics courses. If a theater buff springs for a better view, she has to spend more money. A dieter who enjoys chocolate cake necessarily sacrifices progress toward a weight-loss goal. In each of these cases, people must decide whether and how much to satisfy one consideration at the expense of another. In other words, people resolve tradeoffs in choice.

Previous Annual Review articles have focused on specific facets of tradeoff resolution, examining judgment and decision making (Fischoff & Broomell 2020), licensing and consistency effects (Mullen & Monin 2016), violations of normativity (Shafir & LaBoeuf 2002), and consumer behavior (Simonson, Carmon, Dhar, Drolet, & Nowlis 2001). And some have explored general decision processes, more broadly (e.g., Payne, Bettman, & Johnson 1992).

Our goal in this Annual Review article is a bit different, and twofold: First, we provide an up-to-date review of recent empirical research on choice. We weave together developments across multiple domains—from motivation to behavioral economics to morality—to reveal how they are conceptually linked. Second, we organize these findings around two general principles, observing that most choice problems are ultimately resolved with one of just two types of solutions: mixed versus extreme. To that end, this common denominator helps integrate otherwise disconnected literatures.

Specifically, when people adopt mixed solutions for resolving tradeoffs, they endorse outcomes that partially satisfy multiple considerations; when people adopt extreme solutions, they endorse outcomes that satisfy a single consideration at the complete expense of another. In Section I, we illustrate how this taxonomy underlies and, critically, connects many seemingly unrelated choice effects. That is, when viewed in light of the broader tradeoff resolution

principle, many actually seem to share the same underlying psychology—despite having been treated as distinct and independent phenomena, each paired with separate theories and idiosyncratic vocabularies.

For example, consider variety seeking, which occurs when people switch between various options over time (McAlister & Pessemier 1982; Sevilla, Lu, & Kahn 2019). Compared to balancing, which describes the tendency to switch between pursuit of different goals over time (Fishbach, Dhar, & Zhang 2006), variety seeking is strikingly analogous. Both involve switching over time: between competing tastes for variety seeking and between competing goals for balancing. Or consider yet a different instantiation of variety seeking, which occurs when people select different options from a choice set. This "diversification heuristic" (Read & Loewenstein 1995) parallels the compromise effect, which describes people's tendency to choose middle options (Simonson 1989). Both describe avoidance of maximums within a decision episode: maximum selections of a particular option for variety seeking and maximum levels of a particular attribute for the compromise effect.

So, when do people endorse mixed versus extreme solutions?

In Section II, we answer this question by culling recent work to identify variables that promote one solution versus the other. These variables, in turn, systematically influence the choice effects highlighted in Section I. For example, invoking identity (i.e., viewing a decision as an expression of one's self-concept) promotes extreme solutions, which attenuates balancing, variety seeking and the compromise effect (Shaddy, Fishbach, & Simonson 2020). Section II, therefore, not only helps reconcile potentially competing predictions for when opposite choice effects will arise (e.g., highlighting vs. balancing), but also helps explicate the psychological processes governing tradeoff resolution, more broadly.

Finally, in Section III, we explain how this tradeoff-resolution framework not only parsimoniously organizes the choice literature, but also potentially offers a new perspective on various "mistakes" people purport to make. That is, many such mistakes may actually instead reflect mixed solutions for resolving tradeoffs. For example, people often make decisions that are inconsistent with long-term goals (Hofmann, Friese, & Strack 2009). In other words, dieters sometimes eat doughnuts. But these "failures" of self-control are usually judged according to whether they fully satisfy a single consideration (e.g., a long-term goal). When judged with respect to how they partially satisfy multiple considerations, however—*both* a short-term and long-term goal, for example—they may not be mistakes at all. Eating a doughnut while dieting simply reflects a mixed solution when it is a reward for finishing a marathon; it is a mistake when it results from an inability to exercise willpower.

SECTION I: VARIATIONS ON A THEME

In Section I, we review five choice-effect pairs, each of which comprises a choice effect reflecting a mixed solution and a choice effect reflecting an extreme solution (Table 1). This taxonomy demonstrates that these choice effects are neither universal—because their opposites sometimes arise—nor particularly unique—because they can be sorted according to a single theoretical criterion.

Table 1. Choice effects that reflect mixed or extreme solutions for resolving tradeoffs between different considerations

Mixed solutions	Extreme solutions	Considerations
• Balancing between goals	• Highlighting a single goal	• Goals
• Variety seeking	• Consistency seeking	• Tastes, preferences
• The compromise effect	• Compromise avoidance	• Attributes
• Secular values	• Sacred versus secular values	• Values, morals, principles
• Scope sensitivity	• Scope insensitivity	• Magnitudes

Balancing Versus Highlighting

Balancing and the licensing effect reflect mixed solutions for resolving tradeoffs between competing goals. Balancing occurs when people switch between pursuit of different goals over time (Fishbach & Dhar 2005); a licensing effect describes situations in which past behavior excuses actions that would otherwise generate negative attributions for the self (Monin & Miller 2001). Both occur when progress toward a focal goal liberates pursuit of a conflicting goal (Fishbach, Zhang, & Koo 2009; May & Irmak 2014). So, for example, purchasing "green" (i.e., environmentally friendly) products causes people to cheat and behave less altruistically (Mazar & Zhong 2010). Licensing can also occur "vicariously," such that the past moral action of others licenses the present immoral action of the self (Kouchaki 2011; Newman & Brucks 2018). In each of these cases, people pursue and partially satisfy conflicting goals over time, rather than fully satisfying a single goal.

The opposite of balancing is highlighting, which reflects an extreme solution for resolving tradeoffs between competing goals. This occurs when people prioritize and take actions consistent with a focal goal. Importantly, motivation is strongest near goal completion (Koo & Fishbach 2012; Wadhwa & Kim 2015; Jhang & Lynch 2015). So borrowers accelerate

debt repayment when they are close to paying off a loan (Brown & Lahey 2015), donors accelerate giving when they are close to hitting a funding target (Dai & Zhang 2019), and consumers accelerate purchasing when they are close to earning a reward (Kivetz, Urminsky, & Zheng 2006). When people highlight, they stick to a single goal and repeatedly pursue it until it is fully satisfied.

Whether a goal-related action is interpreted as a sign of commitment or progress can determine which solution people adopt (Fishbach et al. 2009). Specifically, when people construe a goal-related action as a sign of progress, they balance, subsequently shifting to pursuit of conflicting goals—a mixed solution. Highlighting arises when people interpret an action as an expression of commitment (Gal & McShane 2012), inferring that a focal goal is within reach and important (Schrift & Parker 2014). As a result, people prioritize it over others in subsequent choice and behave consistently—an extreme solution. Broadly speaking, increasing commitment to a particular goal has the implicit effect of decreasing commitment to conflicting goals. It thus becomes less important to find a mixed solution.

Variety Seeking Versus Consistency Seeking

Variety seeking reflects a mixed solution for resolving tradeoffs among different tastes or preferences. It occurs when people switch between options over time (McAlister & Pessemier 1982) or select different options within a given choice set (Mittelman, Andrade, Chattopadhyay, & Brendl 2014; Ratner & Kahn 2002). When people seek variety, they partially satisfy multiple considerations—choosing, for example, different snacks for different days of the week.

Variety seeking occurs for several reasons. First, diversification can increase stimulation (Etkin 2016; Gullo, Berger, Etkin, & Bollinger 2018; Huang, Liang, Weinberg, & Gorn 2019)

and thus slows satiation (Galak, Kruger & Loewenstein 2013). It also confers a sense of control and productivity (Etkin & Mogilner 2016; Yoon & Kim 2018) and ameliorates decision anxiety (Jeong, Christensen, & Drolet 2016), in part, by hedging against the risk that future tastes will change (Salisbury & Feinberg 2008).

The opposite of variety seeking is consistency seeking, which reflects an extreme solution for resolving tradeoffs among different tastes or preferences. Psychologists have long argued that people not only inherently desire consistency (Cialdini, Trost, & Newsom 1995; Festinger 1957), but also infer their preferences from consistent behavior (Bem 1972). Consistency seeking can arise when people wish to express loyalty (Love, Staton, & Rotman 2015). So, for example, participants primed with the concept of loyalty preferred a collection of songs by the same artist, rather than a collection of songs by different artists. A mixture of different songs by different artists would have served as a relatively weak expression of loyalty (Fishbach, Ratner, & Zhang 2011). People also form habits, which are learned dispositions to repeat past tendencies (Galla & Duckworth 2015; Neal, Wood, & Drolet 2013). And repetition reflects an extreme solution.

The Compromise Effect Versus Compromise Avoidance

The compromise effect (Simonson 1989) reflects a mixed solution for resolving tradeoffs among attributes. It describes the tendency for options in a choice set to gain share when they become intermediate (vs. extreme) options. Unlike extreme options, which have a maximum or minimum level of a particular attribute, “compromise” options have intermediate levels of all attributes. For example, when deciding between stair climbers with (a) two-year warranty and four resistance levels and (b) a three-year warranty and three resistance levels, 37% of

participants chose (b). However, when a third option was added to the choice set—(c) a stair climber with a four-year warranty and two resistance levels—the choice share of (b) increased to 61% (Sheng, Parker, & Nakamoto 2005). Recent findings suggest that the compromise effect is basic to decision making, occurring even in low-level tasks (e.g., people similarly prefer "medium" shapes; Trueblood, Brown, Heathcote, & Busemeyer 2013). It is also described as extremeness aversion (Chernev 2005), further implying a mixed solution—the opposite of an extreme solution.

The compromise effect arises when people make choices based on reasons (Simonson 1989) and is sometimes characterized as an implication of loss aversion (Kivetz, Netzer, & Srinivasan 2004). Specifically, for an option with the maximum level of one attribute and the minimum level of another, the relatively disadvantaged attribute "looms larger." This is why, for example, "maximizers" (i.e., people predisposed to search for the best rather than merely acceptable options) are more likely to exhibit the compromise effect (Mao 2016). Choosing the middle option blunts loss aversion because it does not require "giving up" on any particular attribute, thereby partially satisfying multiple considerations.

Other times people exhibit compromise avoidance (Simonson & Tversky 1992), which reflects an extreme solution for resolving tradeoffs among attributes. It arises when people have limited cognitive resources (Lichters, Brunnlieb, Nave, Sarstedt, & Vogt 2016; Pettibone 2012) and are not restricted to a single selection (Cheng, Chang, Chuang, & Yu 2012). For example, when participants could only choose one pain medication, they exhibited the compromise effect, selecting the option offering moderate relief for a moderate duration. But when they could choose any number of options, they preferred a combination of extreme options, choosing one option offering immediate relief for a short duration and another offering delayed relief for a

long duration (Bonezzi, Chernev, & Brough 2012). Each individual choice reflects an extreme solution, but taken together these choices represent a mixed solution and are guided by the same principle that yields balancing, variety seeking, and the compromise effect.

Sacred and Secular Values

Unwillingness to make "taboo tradeoffs" (Tetlock, Kristel, Elson, Green, & Lerner 2000) reflects an extreme solution for resolving tradeoffs between different types of values, typically between those sacred and secular. For example, the prospect of exchanging something sacred (e.g., a human organ) for something secular (e.g., money) elicits moral outrage, anger, and disgust. When faced with such tradeoffs, people become inflexible in negotiation and insensitive to cost-benefit analyses. Protecting sacred values from tradeoffs with secular values is thus an extreme solution. So, for example, although a market for buying and selling human organs could make people better off on average (i.e., increasing availability for recipients and compensation for donors; Roth 2007), it is an unappealing mixed solution because people do not typically wish to *partially* satisfy their moral convictions. Only absolute resistance will do (Scott, Inbar, & Rozin 2016).

Secular values, however, do not benefit from such protection from tradeoffs (McGraw, Schwartz, & Tetlock 2011). Thus, when making purchases that reflect secular goals (e.g., a gift for an acquaintance), consumers are more willing to search and negotiate for lower prices—that is, seek a favorable balance of price and quality—relative to when making purchases that reflect sacred goals (e.g., expressing love toward a relationship partner; McGraw, Davis, Scott, & Tetlock 2016). Indeed, consumers regularly weigh and make tradeoffs between these secular

considerations (e.g., price and quality; Carmon & Simonson 1998; Paolacci, Burson, & Rick 2011).

Notably, people will treat sacred values more like secular values when it is in their self-interest. For example, McGraw & Tetlock (2005) found that after the "Lincoln bedroom scandal" of the Clinton presidency—when the media discovered that large campaign donors had been rewarded with overnight stays in the White House—liberals (i.e., Clinton supporters) were more likely to excuse the transgression than were conservatives. As such, liberals threaded a needle through multiple considerations, partially acknowledging a potential violation of the sanctity of the White House (a sacred value) and partially excusing the exchange as favors for friends (a secular value). Lower commitment to the violated norm can have the same effect. When a church, for example, raffled a new Hummer (an ostentatious sports utility vehicle) to recruit new members, both churchgoers and nonchurchgoers were disgusted. Secular promotions violate the sanctity of the church. However, nonchurchgoers were also amused, exhibiting a willingness to consider the promotion a "benign violation"—a humorous mixed solution comprising some immorality and some amusement (McGraw & Warren 2010; Warren & McGraw 2016). Consider the parallel here to the dynamics described above: In the course of goal pursuit, less commitment increases balancing, which also reflects a mixed solution.

Scope Insensitivity Versus Scope Sensitivity

Scope insensitivity reflects an extreme solution for resolving tradeoffs between magnitudes. It occurs when the evaluation of a problem is sensitive to the severity of a single case, but insensitive to how many cases are involved (Kahneman, Ritov, Schkade, Sherman, & Varian 1999; Schley & Peters 2014). For example, when asked to donate money, people tend not

to offer a larger amount when thinking about saving 200,000 birds versus 20,000 birds (Desvousges, Johnson, Dunford, Wilson, & Boyle 1993). This reflects an extreme solution because valuation is based on a single consideration. People weigh only their affective response to the severity of a single case (e.g., the heart-wrenching mental image of a dying bird), basing valuation on feeling (Chang & Hung 2018; Hsee & Rottenstreich 2004).

Scope sensitivity, meanwhile, reflects a mixed solution because valuation depends on multiple considerations. In addition to their affective response to the severity of a single case, people also consider how many cases are involved and weigh the potential impact of their actions to find the right balance (e.g., how many dying birds will be saved). They thus base valuation partially on feeling and partially on calculation (Hsee, Zhang, Lu, & Xu 2013), so the prospect of saving more birds increases the amount people are willing to donate.

Scope (in)sensitivity can depend on evaluability, which refers to the ease with which something can be evaluated in isolation (Hsee 1996). For example, the appropriate temperature for an office is relatively evaluable. Even in isolation, people inherently know whether it is too hot or too cold. The appropriate price for a glass of French wine at a nice restaurant, however, is relatively inevaluable. Only by comparing it to the price of a glass of Californian wine can a diner infer whether it is relatively expensive or cheap. Scope insensitivity thus tends to arise when people are unfamiliar with the relevant stimuli (Morewedge, Kassam, Hsee, & Caruso 2009). In other words, it is equally unclear to donors whether 200,000 birds versus 20,000 birds is a meaningful number to save. People do not know how to evaluate this metric in isolation. When people are familiar with the relevant stimuli, however, they can calibrate valuation, resulting in scope sensitivity—a mixed solution.

Semantic Similarities

Further underscoring the link between these decision phenomena are the numerous semantic similarities that emerge across disconnected literatures (Fishbach & Shaddy 2016). In many cases, one choice effect can just as easily be described as another. For example, Fishbach et al. (2011) tested for consistency seeking by examining candy choices. Participants first chose between two milk chocolate Hershey's kisses and two dark chocolate Dove minis. After an intervening task, they made a second choice between the same two options. Choosing the same type of candy for the second choice reflected consistency seeking. Viewed together, however, these decisions resemble a test of the compromise effect. Participants effectively faced three options: (a) four Hershey's kisses, (b) two Hershey's kisses and two Dove minis, and (c) four Dove minis. Here, options (a) and (c) also suggest compromise avoidance, fully satisfying a desire for milk or dark chocolate at the complete expense of the other flavor. While Fishbach et al. (2011) called this consistency seeking, it just as compellingly demonstrates compromise avoidance.

Or consider people's unwillingness to make taboo tradeoffs. As noted above, people generally refuse to make tradeoffs between sacred and secular values. To offer a classic example: Suppose a $200 million government program saved 200 lives last year. This year, the same program can save 200 lives for only half the amount ($100 million). Should the government spend the same amount as last year ($200 million) and save 400 lives? Or should it spend half the amount as last year ($100 million), save the same number of lives (200), and use the savings to reduce the deficit? Tetlock et al. (2000) found that most people objected to the latter. Saving lives is a sacred value that should not be violated in the interest of a secular value like saving

money. As a result, people are effectively scope insensitive here, as well—they do not respond to the magnitude of the potential cost savings when resisting the moral violation.

SECTION II: WHEN TO EXPECT MIXED VERSUS EXTREME SOLUTIONS

The choice effects described above are not only semantically related, but also conceptually linked. Thus, if a particular variable promotes either a mixed or extreme solution, it will influence all of the aforementioned choice effects. Here, we summarize 14 variables that have been shown to influence at least one of the choice effects described in Section I. While most of these variables were explored with respect to a specific phenomenon, we demonstrate they are in fact broadly applicable to other choice effects that reflect the same tradeoff-resolution principle (Table 2).

The first class describes variables that affect how people relate to the available options. For example, when people view their decisions as expressions of their identity, they prefer extreme solutions that unambiguously express that identity. The second class describes variables that affect how the options in the choice set relate to each other. For example, substitutability among options promotes switching, yielding mixed solutions; complementarity promotes repetition, yielding extreme solutions. The third class describes variables that affect tradeoff ease. For example, it is easier to resolve tradeoffs when attribute levels are described quantitatively (e.g., a 90-calorie snack for $4 vs. a 200-calorie snack for $2) than qualitatively (e.g., an expensive, low-calorie snack vs. a cheap, high-calorie snack). And so mixed solutions are more likely in the former case.

Table 2. Three classes of variables that yield mixed versus extreme solutions

	1. How the decision maker relates to the options	
	Factors yielding mixed solutions	*Factors yielding extreme solutions*
1.1	Ignoring identity in choice	Invoking identity in choice
1.2	Preference uncertainty	Preference certainty
1.3	Novice in the choice domain	Expert in the choice domain
1.4	Consequentialist ethics	Deontological ethics

	2. How the options relate to each other	
	Factors yielding mixed solutions	*Factors yielding extreme solutions*
2.1	Available options are substitutes	Available options are complements
2.2	Decreasing marginal utility	Increasing marginal utility
2.3	Options are independent of each other	Options form a gestalt (a "whole")
2.4	Options compete for resources	Options undermine each other (conflict)
2.5	Positive-to-negative order	Negative-to-positive order

	3. Tradeoff ease	
	Factors yielding mixed solutions	*Factors yielding extreme solutions*
3.1	Quantitative framing of considerations	Qualitative framing of considerations
3.2	Available mental resources	Limited mental resources
3.3	Thinking (cognition)	Feeling (emotion)
3.4	Concrete construal	Abstract construal
3.5	Simultaneous choice	Sequential choice

1. How the Decision Maker Relates to the Options

Variables that change how people relate to the options will change how people choose to resolve tradeoffs.

1.1 Identity

Invoking identity in choice yields extreme solutions. People constantly compare their current and future selves to desired identities and act consistently (Cohn, Fehr, & Maréchal 2014; Goenka & Thomas 2020; Reed, Kay, Aquino, & Levy 2016). Thus, when people make choices based on identity (i.e., who someone was, is, or will become), they aim to fully satisfy a single consideration, rather than partially satisfy multiple considerations. This is because when

communicating their identities, people do not want to send mixed signals (White, Simpson, & Argo 2014).

Mover, people satiate less quickly and experience slower hedonic adaptation when stimuli are identity-relevant (Chugani, Irwin, & Redden 2015; Yang & Galak 2015), and satiation is a cause of variety seeking (Galak et al. 2013). As such, recent work shows that invoking identity indeed attenuates variety seeking (Rifkin & Etkin 2019; Yang & Urminsky 2015)—a mixed solution.

1.2 Preference (Un)certainty

Preference uncertainty yields mixed solutions. This is because fully satisfying only a single consideration increases the risk of "doubling down" on the wrong one—a prospect that uncertain individuals especially want to avoid. For example, many craft breweries offer "beer flights" (i.e., small pours of several different types of beer) because first-time visitors with uncertain preferences do not want to risk ordering a full glass they end up disliking. Partially satisfying multiple considerations diversifies risk (Baumgartner & Steenkamp 1996; Ching, Erdem, & Keane 2013; Ratner & Kahn 2002).

How might preference (un)certainty affect phenomena that reflect either mixed or extreme solutions? Consider, for example, someone adopting a New Year's Resolution to exercise more frequently (Dai, Milkman, & Riis 2014). He might be unsure about or unfamiliar with which kinds of exercise are most effective for weight loss. Someone training for a long-distance bike race, however, might know exactly what kinds of exercise are most effective for endurance cycling. Because the former gymgoer faces more preference uncertainty, he might enroll in a gym with different types of classes (e.g., spinning, yoga, strength training) and equipment (e.g., exercise bikes, yoga studios, weights). This reflects variety seeking—a mixed

solution. The latter gymgoer, meanwhile, faces less preference uncertainty, so he might enroll in a gym with only a single type of class (e.g., spinning) and equipment (e.g., exercise bikes). This reflects consistency seeking—an extreme solution.

1.3 Expertise

Related to preference certainty is expertise (Chernev, Böckenholt, & Goodman 2015), which yields extreme solutions. Experts have established well-formed criteria for evaluating options (Brucks 1985). They are more willing to seek an extreme solution that fully satisfies only a single consideration because they know which is most important. For example, experts believe variety seeking, which reflects a mixed solution, betrays a lack of discernment, so they are less likely to diversify choices themselves (Sela, Hader, Morgan, & Maimaran 2019). Non-experts, on the other hand, prefer larger choice sets precisely *because* they allow for greater variety seeking (Hadar & Sood 2014).

Other mixed solutions should similarly be attenuated among experts. For example, part of the reason why experts tend to increase effort in response to negative feedback during the course of goal pursuit is that they are more certain about the value of the goal they are pursuing. This is not true of novices, so they are demotivated by negative feedback. Experts, meanwhile, interpret it as a lack of progress, so they balance by increasing effort (Finkelstein & Fishbach 2011).

1.4 Ethics

Following deontological rules—evaluating actions based on ethical principles rather than practical consequences—yields extreme solutions, while consequentialism yields mixed solutions. For example, many moral dilemmas implicate a tradeoff between sacrificing a single innocent life and saving multiple people (e.g., the trolley problem, the footbridge dilemma). Deontologists argue that sacrificing an innocent life is universally wrong, irrespective of its

consequences (Holyoak & Powell 2016). Consequentialists, on the other hand, follow utilitarian rules to maximize total welfare. So sacrificing an innocent life may sometimes be acceptable—for example, when it results in saving more lives overall. And indeed, past research has linked deontology to highlighting—an extreme solution—and consequentialism to balancing—a mixed solution (Cornelissen, Bashshur, Rode, & LeMenestrel 2013; Mullen & Monin 2016).

Moreover, common tradeoffs in everyday choice need not invoke such dramatic life-or-death scenarios to arouse a sense of ethics. For example, two cars might differ according to price and safety. Suppose the expensive option carries a higher safety rating, while the affordable option carries a lower safety rating. Weighing this price-safety tradeoff is aversive because people detest quantifying the value of human life (Luce 1998). Deontologists who endorse this view would therefore always choose the option with the higher safety rating, even if it were more expensive (subject to budget constraints, of course). Consequentialists, on the other hand, calculate whether the higher safety rating is worth the extra money. This implies that if a third option were added to the choice set—an even more expensive option that carries the highest possible safety rating—deontologists would choose it without hesitation (Bonnefon, Shariff, & Rahwan 2016; Shallow, Iliev, & Medin 2011), thereby exhibiting compromise avoidance—an extreme solution. The consequentialist would be more likely to exhibit the compromise effect—a mixed solution.

2. How the Options Relate to Each Other

Variables that change the perceived or actual relationships between available options will determine which type of solution is adopted. These variables depend on the nature of the choice set.

2.1 Substitutes and Complements

Complementarity yields extreme solutions, while substitutability yields mixed solutions. For example, peanut butter and jelly are complements; peanut butter and almond butter are substitutes. Complements represent actions or items that are better together (Leszczyc & Häubl 2010; Rahinel & Redden 2013), and this incentivizes people to fully satisfy a single consideration with an extreme solution. Substitutes serve as replacements for each other (Huh, Vosgerau, & Morewedge 2016), and this incentivizes people to partially satisfy multiple considerations with a mixed solution. For example, when two news articles are substitutes, people only need to read one before switching to a different topic (i.e., seek variety). When two news articles are complements (e.g., the first helps readers understand the second), people will read both (i.e., seek consistency; Shaddy & Fishbach 2018).

Moreover, the same set of actions or items can potentially be framed as either complements or substitutes. Consequently, the resulting solution people adopt should differ. For example, toothbrush/toothpaste, mouthwash, and mint chewing gum can be presented as either different ways to achieve fresh breath (i.e., substitutes) or three elements of a complete dental hygiene program (i.e., complements). Presenting these items as substitutes might lead to balancing. After brushing their teeth, people will feel licensed to switch to a different goal (e.g., putting on makeup). Presenting these items as complements, meanwhile, might lead to highlighting. After brushing their teeth, people will continue pursuing the same goal (e.g., next using mouthwash). They may even pay more for these items when presented as complements, rather than substitutes (Sarantopoulos, Theotokis, Pramatari, & Roggeveen 2019).

2.2 Marginal Utility

Actions or items that exhibit decreasing marginal utility yield mixed solutions. For example, most people would derive a lot of utility from a morning workout. A second workout, perhaps at lunch, might still be useful, but less so than the first. Working out for yet a third time, after work, would be overkill. The instrumental value of this third workout would be miniscule, relative to the previous two. The utility function for these actions is thus said to be concave (Greene & Baron 2001). Put differently, because these are substitutable means for achieving the same goal (Orehek, Mauro, Kruglanski, & van der Bles 2012), each successive workout yields less instrumental value than the last. As a result, people prefer mixed solutions when marginal utility decreases. So exercising in the morning would be more likely to yield balancing at lunch (e.g., an unhealthy meal).

Actions or items that exhibit increasing marginal utility, on the other hand, yield extreme solutions. For example, the frequent flyer miles accrued by a business traveler striving to earn status on an airline are increasingly valuable. Each additional flight on that particular airline gets her closer to priority boarding and complimentary upgrades. The utility function is now said to be convex (Festjens & Janiszewski 2015). So, even when loyalty requires layovers—because her chosen airline does not offer nonstop flights to a particular destination, for example—she tolerates it. Consistency seeking is more valuable when marginal utility is increasing.

2.3 Gestalt Perceptions

Perceiving a "whole" as greater than the sum of its parts (Koffka 1935) yields extreme solutions. For example, people perceive product bundles (e.g., three suitcases packaged together and sold for a single price) as a distinct, inseparable gestalt unit (Shaddy & Fishbach 2017). This occurs when items are all the same with respect to salient attributes (e.g., similar colors, shapes,

brands, etc.; Evers, Inbar, & Zeelenberg 2013). And when people perceive a cohesive entity that is greater than the sum of the parts (Weaver, Garcia, & Schwarz 2012), this sense of a "whole" reduces the substitutability of each element, resulting in extreme solutions.

Take, for example, the difference between ordering multiple restaurant dishes a la carte and a prix fixe tasting menu where multiple courses are arranged by the chef. The latter format conveys a greater sense of a cohesive "whole" (Thaler 1999). The meal is an integrated experience, and variety should be less appealing. People, for example, would prefer the same type of cuisine throughout the meal, reflecting consistency—an extreme solution. When ordering a la carte, however, this same perception of an integrated experience is diminished, and diners could find different cuisines more appealing, reflecting variety—a mixed solution.

2.4 Competition and Conflict

Goals often compete for resources and attention, and this yields mixed solutions. Other times, goals are in direct conflict, and this yields extreme solutions. For example, a snacking decision can invoke competition for calories within a daily budget (e.g., this cookie contains 200 calories, while this apple contains 90 calories). So perhaps a snacker chooses to eat an apple in the morning and a cookie in the afternoon, thereby exhibiting balancing. The same options can also be framed as directly undermining each other (e.g., this cookie is unhealthy, while this apple is healthy). Now, the snacker might be more likely to highlight a health goal by choosing to eat an apple in the morning and another fruit in the afternoon.

Critically, perceptions about whether goals are in competition or conflict describe many self-control dilemmas. For example, Fishbach & Zhang (2008) found that when a food menu separated healthy and unhealthy items, diners inferred conflict and selected only healthy or only unhealthy items (e.g., highlighting). However, when alternatives were presented together, diners

inferred competition and selected a mixed of healthy and unhealthy items (e.g., balancing; Liu, Haws, Lamberton, Campbell, & Fitzsimons 2015; Milkman, Minson, & Volpp 2014).

2.5 Order Effects

Tradeoffs often follow a specific order. And in general, moving from negative to positive (i.e., bad-to-good) is a desirable mixed solution. This is because people generally want to balance out negative considerations with positive ones (Kahneman, Fredrickson, Schreiber, & Redelmeier 1993). For example, people prefer event sequences that improve over time (Klein & O'Brien 2017; Loewenstein & Prelec 1993). So, a person who prefers French to Greek restaurants will schedule dinner at the Greek restaurant this week and dinner at the French restaurant next week. Sequences that get worse over time should produce the opposite effect, increasing endorsement of extreme solutions. People do not want to undermine positive considerations with negative ones. In general, people resist "tainting" the positive with something negative (Savary, Li, & Newman 2020), thus encouraging the complete satisfaction of a single consideration.

As a result, the same actions presented in different orders might elicit different strategies for resolving tradeoffs. For example, it might be more acceptable to add something healthy to something unhealthy, but less acceptable to add something unhealthy to something healthy. In other words, adding fruit to ice cream might seem more sensible than adding ice cream to fruit. This is because ice cream is generally perceived as unhealthy, while fruit is perceived as healthy. Adding fruit to ice cream, therefore (i.e., negative-to-positive order) mirrors balancing between goals—a mixed solution. Adding ice cream to fruit, on the other hand (i.e., positive-to-negative order), would be less appealing because people would prefer highlighting—an extreme solution.

3. Tradeoff Ease

Variables that affect tradeoff ease serve as cues for which type of solution should be adopted. For example, when it is easier to identify a mixed solution, then a mixed solution seems more appropriate.

3.1 Quantitative Versus Qualitative Framing

Quantitative information yields mixed solutions. This is because quantitative information—such as number of calories, specific prices, or quality ratings—increases evaluability (Hsee 1996). When attribute levels are defined quantitatively, people can "calculate" the exchange rate between relevant considerations (Nowlis & Simonson 1997). This implies that a mixed solution is the correct way to resolve the tradeoff.

For example, someone selecting a snack from a display case offering an apple, a cookie, and pretzels might simplify the decision by choosing the option she believes is the tastiest or healthiest, thereby fully satisfying a single consideration—an extreme solution. However, if each item included a calorie label, she would feel compelled to find the right balance. She now has to consider whether the tastiness of the cookie is worth the extra calories, relative to the next-tastiest option, with fewer calories. She thus switches to partially satisfying multiple considerations (Parker & Lehmann 2014; Salisbury & Feinberg 2012)—a mixed solution.

3.2 Availability of Mental Resources

Limited mental resources yields extreme solutions. This is because people tend to follow simple heuristics when cognition is impaired. Partially satisfying multiple considerations with mixed solutions often requires greater mental effort than fully satisfying a single consideration with extreme solutions. For example, committing to a simple savings rule, such as setting aside

$5 a day, is relatively straightforward (Hershfield, Shu, & Bernartzi 2020). Constantly tracking and calibrating savings and discretionary spending, however, is not.

As such, time pressure causes people to shift from compensatory strategies—where higher levels of one attribute can compensate for lower levels of another attribute—to non-compensatory strategies—where people follow decision rules (Bernartzi et al. 2017; Payne, Bettman, & Johnson 1988). Accordingly, Dhar, Nowlis, & Sherman (2000) found that cognitive load attenuates the compromise effect because people are less able to give proportional weight to attributes in the choice set. Lichters et al. (2016) provide additional neurobiological evidence: Pharmacologically reducing serotonin levels in the brain, thereby limiting mental resources, also attenuates the compromise effect.

Note, however, that this reasoning assumes that the relevant heuristic or decision rule to which people default is itself an extreme solution. In many situations, it is. However, in other cases, when the relevant heuristic or decision rule reflects a mixed solution, lacking mental resources will increase endorsement of extreme solutions. For example, someone in a rush at a coffee shop might default to the medium size, thereby exhibiting the compromise effect. This is because the default strategy in this situation is satisficing, rather than maximizing (Schwartz et al. 2002).

3.3 Thinking Versus Feeling (Cognition Versus Emotion)

Basing decisions on thinking and cognition yields mixed solutions, relative to basing decisions on feeling and emotion. For example, scope insensitivity and consistency, which

reflect extreme solutions, are greater when the affective system is engaged (Chang & Pham 2018; Lee, Amir, & Ariely 2009).

The distinction between thinking and cognition versus feeling and emotion parallels other models of dual-system processing. Take, for example, the distinction between type I and type II processes (Kahneman & Frederick 2002; Schley, de Langhe, & Long 2020). Type I is intuitive. It is automatic and effortless, sensitive to affect and prototypes. Type II is reflective. Type I processes should yield extreme solutions, because mixed solutions usually require additional effort and reflection (Dhar & Gorlin 2013).

Again, however, whenever the mixed solution is automatic and effortless, this association should reverse. For example, Benartzi & Thaler (2001) found that investors sometimes follow a "naïve diversification" strategy, dividing their retirement contributions evenly across all available funds in a retirement plan. So if 10 funds are available, investors will designate 10% to each. This is a mixed solution, but it is a simplifying heuristic that most economists would caution needs to be overridden by additional thinking and cognition (lest investors end up with sub-optimal asset allocations).

3.4 Construal Level

Low-level construal yields mixed solutions. This is because thinking concretely facilitates comparison across multiple considerations. High-level construal, on the other hand, yields extreme solutions. When thinking abstractly, people are more likely to prioritize and emphasize a single consideration. For example, balancing, which reflects a mixed solution, is more likely when people focus on the concrete meaning of their actions. And because actions scheduled for the distant (vs. near) future are construed more abstractly, highlighting is more likely the less proximal an action is (Conway & Peetz 2012; Park & Hedgcock 2016). So

thinking about working out in the near future (e.g., next week) caused participants to infer progress and plan to work out less than thinking about working out in the distant future (Fishbach et al. 2006).

Moreover, Malkoc, Zauberman, & Ulu (2005) found that thinking about the near future (i.e., low-level construal) caused participants to attend more to alignable differences among options. These are common attributes with different levels across alternatives (e.g., one type of potato chip has six grams of fat, while another has nine grams of fat). Alignable differences are similar to quantitative information in that they are more evaluable and are thus associated with mixed solutions. However, they also found that thinking about the distant future (i.e., high-level construal) caused participants to attend more to nonalignable differences. These are aspects of an option that do not correspond to any other attributes of alternatives (e.g., one type of potato chip has an oily appearance, while another has a strong taste). Nonalignable differences are similar to qualitative information in that they are less evaluable and are thus associated with extreme solutions. And indeed, Khan, Zhu, & Kalra (2011) demonstrated that thinking about the future, which the foregoing analysis suggests should increase endorsement of extreme solutions, attenuates the compromise effect—a mixed solution.

3.5 Simultaneous Versus Sequential Choice

Making choices simultaneously yields mixed solutions, while making choices sequentially yields extreme solutions (Simonson 1990). For example, a shopper might visit a grocery store on a Sunday and make simultaneous choices about what to cook for each of the following five days. Or the same shopper might visit the grocery store each day during the week and make sequential decisions on five consecutive days. In the former case, the shopper resolves more tradeoffs. She has to predict her preferences for meals each day, resulting in greater variety

seeking. In the latter case, she resolves fewer tradeoffs. She simply decides what she is in the mood for each night. This results in less variety seeking (Simonson & Winer 1992).

Simultaneous choice has been associated with greater variety seeking, licensing, and the compromise effect (Jang & Yoon 2016)—all mixed solutions. For example, Khan & Dhar (2007) asked participants to choose movies to rent and manipulated whether participants considered these decisions in isolation or alongside future decisions. Options included highbrow movies, such as *Schindler's List*, and lowbrow movies, such as *Ocean's Eleven*. Participants who considered their decisions simultaneously alongside future decisions were more likely to balance by choosing a lowbrow movie this week and a highbrow movie next week.

SECTION III: REINTERPRETING "MISTAKES"

The distinction between mixed and extreme solutions for resolving tradeoffs sorts the choice literature according to a single theoretical criterion. And the variables that promote one solution versus the other suggest people are sensitive to how they themselves relate to the available options, how the available options relate to each other, and how easy it is to interpret those relationships. Given that the motivation and decision-making literatures abound with examples of "mistakes" people purport to make when resolving tradeoffs, might this framework similarly contribute a novel perspective?

Consider, for example, that it has been argued people generally fail at self-control (Hofmann, Vohs, & Baumeister 2012; Mischel, Shoda, & Rodriguez 1989), mistakenly choose material over experiential purchases (Van Boven & Gilovich 2003; Gilovich & Gallo 2020), and spend on the self when they should spend on others (Aknin, Dunn, Proulx, Lok, & Norton 2020;

Dunn, Aknin, & Norton 2008). But do decision makers themselves believe these to be mistakes, or could they simply reflect mixed solutions?

For example, when a dieter eats a doughnut, it is possible that this indeed reflects a self-control failure, resulting from a momentary lapse of willpower. However, it is equally possible that it instead reflects balancing between goals, in which case it would not. Perhaps she just completed a strenuous workout, which yielded a significant sense of progress toward a weight-loss goal. She now feels licensed to reward herself. In this latter case, it is unlikely even a dieter would admit failure. She is simply balancing—resolving a tradeoff with a mixed solution.

How, then, to distinguish mistakes from mixed solutions?

In this section, we explain how our organization of the choice literature around two general tradeoff-resolution principles can cast in new light several such "mistakes." That is, they might be better characterized as mixed solution. And while we do not wish to define mistakes normatively, we submit that researchers are often quick to describe any action incongruent with previous behaviors or stated goals as mistakes, leaving little room for the possibility that they simply reflect mixed solutions. We therefore conclude with guidance for distinguishing mistakes from mixed solutions.

Self-Control Failure

People often make decisions that are inconsistent with long-term goals (Baumeister, Vohs, & Tice 2007; Fishbach, Friedman, & Kruglanski 2003; Hofmann et al. 2009). And when judged in light of a single consideration—whether a specific action is consistent with the long-term goal to lose weight, for example—these decisions are typically characterized as mistakes. So of course, a dieter sometimes eats a doughnut because she is depleted (Dai, Milkman,

Hofmann, & Staats 2015; Jia, Hurt, & Fishbach 2019) or lacks the requisite willpower to resist (Mischel et al. 1989; Roberts, Shaddy, & Fishbach 2020).

However, when viewed in light of multiple considerations—whether a specific action is consistent with either the long-term goal to lose weight or the short-term goal to indulge—these decisions can seem more like mixed solutions. The same dieter could choose to eat a doughnut to balance between other competing and equally valuable goals (Fishbach & Dhar 2005), to avoid exercising too much self-control (Kivetz & Simonson 2002), or because she is simply not motivated at that particular moment (Inzlicht & Schmeichel 2012). In any of these cases, she herself would probably not register a self-control failure.

Similarly, impatience—choosing smaller-sooner rewards over larger-later ones—is often portrayed as a breakdown of will. Yet recent research has identified many factors that are unrelated to self-control and more suggestive of mixed motives (Bartels & Urminsky 2011; Dai & Fishbach 2013; Ersner-Hershfield, Wimmer, & Knutson 2009; McGuire & Kable 2013; Michaelson & Munakata 2016; Shaddy & Lee 2020). Patience can also depend on how much people like what it is they are waiting for. So, for example, college students were more willing to incur an actual weeks-long delay for a higher quality t-shirt when they liked its graphic design more, relative to when they liked it less (Roberts et al. 2020). This does not imply that those who were unwilling to incur the delay and instead opted for the lower quality t-shirt failed at self-control. They simply weighed the cost of waiting against the attractiveness of the reward and decided it was not worth it. That is, they resolved a tradeoff.

Moreover, minor violations in the short-term can even facilitate goal achievement in the long-term. For example, Milkman et al. (2014) propose temptation bundling—combining “want” experiences (e.g., listening to a binge-worthy audiobook) with “should” behaviors (e.g.,

exercising)—as a strategy for improving self-control. By harnessing their motivation to listen to the next chapter of the *Hunger Games*, people are able to drag themselves to the gym. Thus, listening to a relatively lowbrow audiobook should probably not be viewed as self-control failure when it encourages additional exercise.

People sometimes repent "hyperopia," as well—when choosing virtues over vices causes greater retrospective regret than choosing vices over virtues (Kivetz & Keinan 2006; Haws & Poynor 2008). This form of self-control failure arises when people exercise *too much* self-control. For example, college students said they regretted not enjoying themselves, traveling, and spending more when reflecting on their winter breaks 40 years ago. In these cases, indulgence regret is the single consideration by which choosing virtues over vices is judged to be a mistake. However, when reinterpreted as a mixed solution that partially satisfies multiple considerations, these feelings may subside. For example, over winter break, spending time with family might be less enjoyable than spending time with friends; studying for the Law School Admission Test (LSAT) is probably less fun than traveling; earning money as a temporary holiday worker is definitely less fun than spending it. Yet people nevertheless recognize the importance of at least partially satisfying some of these other considerations (e.g., family, career, personal finances), even when it engenders regret with respect to another specific consideration (e.g., indulgence). Indulgence regret, therefore, may simply be a privilege of success.

Finally, Vosgerau, Scopelliti, & Huh (2019) note that while researchers often conceptualize self-control as abstinence from hedonic consumption, people do not necessarily believe that sacrificing immediate pleasure is inconsistent with long-term goals. For example, in one experiment, a majority of participants (62%) anticipated that someone who chose chocolate cake over fruit salad for dessert would not construe this decision as a self-control failure. In fact,

only a small minority (14%) described it as such. These findings further underscore the importance of considering whether people themselves would describe their actions as mistakes.

Material Versus Experiential Purchases

People tend to derive less happiness from material discretionary purchases than from experiential discretionary purchases (Carter & Gilovich 2010; Chan & Mogilner 2017; Van Boven & Gilovich 2003; cf. Goodman, Malkoc, & Rosenboim 2019). This is because experiences are more open to positive reinterpretation, resistant to hedonic adaptation, identity-defining, and interpersonally connecting. Yet, a closer examination reveals that when people regret a material purchase, it is typically because they judge it with respect to just a single consideration—its hedonic benefits. What if they judged it with respect to a mixed solution of hedonic and utilitarian benefits?

For example, consumers tend to choose hedonic goods over utilitarian goods because choice is often driven by an affect heuristic (i.e., do what feels best; Gallo, Sood, Mann, & Gilovich 2017). So they choose two pints of ice cream over a similarly priced box of trash bags when given the option. Yet they express greater willingness to pay (WTP) for the trash bags, relative to the ice cream. This apparent contradiction persists because determining WTP increases deliberation, leading to integration of additional considerations like the perceived value of the product and whether it is a good use of money (O'Donnell & Evers 2018). That WTP increases when people partially satisfy additional considerations implies a mixed solution.

Even for discretionary purchases, people nevertheless likely prefer the best combination of total hedonic and utilitarian value. For example, suppose someone spent $2,000 on a new Tempur-Pedic mattress, as opposed to a Caribbean vacation. This is clearly a mistake if the goal

were to maximize only hedonic benefits like fun, pleasure, and excitement (Dhar & Wertenbroch 2000). No one is fondly recalling their mattress a year later. But the magnitude of the potential utilitarian benefits—more and better sleep—could outweigh any enduring retrospective satisfaction culled from beach memories. That is, the mattress probably maximizes total hedonic and utilitarian value, relative to the vacation. Weingarten & Goodman (2020) thus similarly conclude that the relative advantages conferred by experiential purchases should decrease when either the utilitarian value of a material purchase wanes or its hedonic value waxes.

Finally, material and experiential purchases have been shown to make lower-income individuals equally happy (Lee, Hall, & Wood 2018). While all spenders, irrespective of social class, presumably enjoy hedonic benefits, resource scarcity increases concern for utilitarian benefits, which favor material purchases (Tully, Hershfield, & Meyvis 2015; Weidman & Dunn 2016). Consequently, because lower-income individuals are more attuned to their need to partially satisfy additional considerations like purchase longevity, they are happier with a mixed solution of utilitarian and hedonic benefits.

Spending on Others Versus Spending on the Self

Spending money on others promotes greater happiness than does spending money on the self (Aknin et al. 2020; Dunn et al. 2008; O'Brien & Kassirer 2019). It even causes greater activation in the brain's reward centers (Harbaugh, Mayer, & Bughart 2007; cf. Whillans, Aknin, Ross, Chen & Chen 2019). As a result, researchers have called for more prosocial spending, observing "people's daily spending choices may be guided by flawed intuitions" (Dunn, Aknin, & Norton 2014, p. 41).

But spending more on the self and less on others may instead reflect a mixed solution that partially satisfies different types of happiness, immediate and delayed. For example, spending on the self represents a form of saving. Someone who receives an unexpected $20 windfall might pay a bill. The same person who spends the windfall on a gift might indeed experience an immediate "warm glow." But while the latter person is happier at the end of the day, the former might experience delayed happiness at the end of the month (when bills come due).

To that end, and noting that extant research has measured only immediate happiness resulting from spending modest amounts of money, Falk & Graeber (2020) randomly assigned 325 participants to actually receive either 100 euros or actually receive 350 euros, which would then be donated to charity. Participants who donated 350 euros were happier immediately, but participants who received 100 euros were happier four weeks later. This suggests that when people think about satisfying multiple considerations—a mixed solution of immediate and delayed happiness, for example—they might be less likely to perceive spending on the self as a mistake.

Distinguishing Mistakes From Mixed Solutions

Our review of the literature suggests that mixed solutions for resolving tradeoffs have been often portrayed as mistakes, potentially erroneously. How, then, to distinguish mistakes from mixed solutions? We review several criteria (Table 3).

We first note, however, that mistakes and mixed solutions for resolving tradeoffs are not mutually exclusive. For example, when people select less-preferred options to maximize variety (a mixed solution), this could, in fact, represent a genuine mistake. Perhaps a shopper failed to anticipate how temporally segregating consumption attenuates hedonic adaptation. That a

decision is merely inconsistent with one's stated goals or evaluated negatively in light of one's stated interests, however, does not imply a mistake. It could reflect a mixed solution.

Table 3. Four criteria for distinguishing mistakes from mixed solutions

	Criterion	A decision is more likely to be a mistake if—
1.	Deliberation	—additional deliberation changes the decision.
2.	Subjective meaning	—the decision maker considers it a mistake.
3.	Advice to others	—it is incongruent with the decision maker's advice to others.
4.	Future intentions	—the decision maker does not wish to repeat it in the future.

1. Additional Deliberation

Partially satisfying multiple considerations (a mixed solution) is typically more difficult than fully satisfying a single consideration (an extreme solution; Dhar et al. 2000). And whenever that is the case, mixed solutions are less likely to be mistakes, given that they result from increased deliberation. That suggests that extreme—rather than mixed—solutions are often mistakes; hence, people correct them when allowed to elaborate.

More broadly, if additional deliberation causes people to make a different decision or behave differently (Dai et al. 2015; Keysar, Hayakawa, & An 2012; Guo, Trueblood, & Diederich 2017), the original decision was probably a mistake. For example, suppose a dieter is either in a rush or has plenty of time to choose what to eat. That is, she either has the opportunity to deliberate or not. If she were to select a doughnut in the former case and an apple in the latter, this would imply the original choice of a doughnut indeed represented a failure of self-control. Upon reflection, she recruits additional cognitive resources to override her gut-level desire for the unhealthy doughnut and selects the healthy apple. If, however, she were to select the

doughnut in both situations, irrespective of time spent deliberating, this would imply a mixed solution. As noted, there are many reasons why dieters eat doughnuts.

2. Subjective Meaning

How people themselves interpret their own actions matters for distinguishing between mistakes and mixed solutions (Vosgerau et al. 2019). That is, what does the action mean to the person taking it? Would they admit a mistake in retrospect, or even in prospect? For example, would the dieter herself characterize her decision to eat the doughnut a mistake? If it were a reward for finishing a marathon, the answer would likely be no, suggesting a mixed solution. If it were mindless snacking before bed, the answer would likely be yes, suggesting a mistake.

Despite people's ability to articulate these subjective interpretations, researchers often neglect to ask them directly, taking for granted a disconnect between action and intention. It is important to surface these perceptions because someone who experiences a breakdown of will has a very different subjective interpretation of the experience than someone balancing between conflicting, but equally important goals. Capturing these intuitions can illuminate the underlying choice principle.

3. Advice to Others

What would a person advise others to do? People generally try to give good advice (Jonas & Frey 2003) and believe what they advocate (Aronson 1999). Advice thus typically reflects what people believe is normatively correct. So, if a dieter recommended to a dieting friend that she, too, eat a doughnut, this implies a mixed solution. Perhaps they both just spent several hours at the gym. Here, a trip to Krispy Kreme reflects balancing between health, social, and

indulgence goals. However, if she instead recommended abstention, this implies a mistake. She would presumably not wish failure upon a friend.

Importantly, recent work has started to examine the various positive effects of both giving and seeking advice. For example, people who give advice become more confident (Eskreis-Winkler, Fishbach & Duckworth 2018), and people who seek advice are perceived to be more competent (Brooks, Gino, & Schweitzer 2015). This raises the intriguing possibility that eliciting advice from decision makers can not only help distinguish mistakes from mixed solutions, but also may even lead people to make fewer mistakes altogether.

4. Future Intentions

If a person plans to repeat the "mistake" in the future, this would imply a mixed solution. On the other hand, if someone were to anticipate regret from repeating an action, this would signal self-control failure (Magen & Gross 2007; Zeelenberg 1999).

For example, if at the grocery store a dieter always purchased healthy, nutritious food and then added a candy bar to her cart while checking out, this could suggest something like temptation bundling—combining "wants" and "shoulds" to facilitate self-control (Milkman et al., 2014). And as discussed, temptation bundling represents a mixed solution that can facilitate achievement of long-term goals. However, if this same decision were judged in light of only a single consideration—whether she purchased anything unhealthy—it would be incorrectly interpreted as a mistake. People generally do not want to repeat mistakes, so capturing future intentions would be diagnostic.

Concluding Remarks

This Annual Review article provides an up-to-date review of recent empirical research on choice, revealing that the tradeoffs in most choice problems are ultimately resolved with one of just two types of solutions: mixed versus extreme. When people adopt mixed solutions for resolving tradeoffs, they endorse outcomes that partially satisfy multiple considerations; when people adopt extreme solutions, they endorse outcomes that fully satisfy a single consideration. Balancing between goals, variety seeking, the compromise effect, willingness to exchange secular values, and scope sensitivity all reflect mixed solutions. Their opposites—highlighting a single goal, consistency seeking, compromise avoidance, unwillingness to exchange sacred and secular values, and scope insensitivity, respectively—all reflect extreme solutions.

Moreover, we identify several variables that promote one solution or the other. For example, invoking identity (i.e., viewing a decision as an expression of one's self-concept) promotes extreme solutions, which attenuates balancing, variety seeking and the compromise effect (Shaddy et al. 2020). These variables thus not only help reconcile potentially competing predictions for when opposite choice effects will arise (e.g., balancing vs. highlighting), but also help explicate the psychological processes governing tradeoff resolution, more broadly.

Finally, we explain how various "mistakes" people purport to make are often judged according to whether they fully satisfy a single consideration (e.g., a long-term goal). When judged with respect to how they partially satisfy multiple considerations, however (e.g., both a short-term and long-term goal), they may instead reflect mixed solutions. Distinguishing mistakes from mixed solutions is therefore of both practical and theoretical importance. To that end, this review offers a roadmap for future interdisciplinary work examining and reexamining tradeoffs in choice.

Summary Points

- Our review of recent empirical research on choice across multiple literatures reveals that many phenomena can be sorted according to a single theoretical criterion: the underlying tradeoff resolution strategy.
- There are ultimately just two basic strategies for resolving tradeoffs: mixed solutions versus extreme solutions. Thus, for each choice effect reflecting either a mixed or extreme solution, its opposite also exists. For example, variety seeking reflects a mixed solution, while its opposite, consistency seeking, reflects an extreme solution.
- This taxonomy implies that many choice effects—despite having been treated as distinct and independent phenomena, each paired with separate theories and idiosyncratic vocabularies—actually share the same underlying psychology.
- Our survey of the literature reveals three classes of variables that systematically shape tradeoff resolution. The first describes variables that affect how people relate to the available options, the second describes variables that affect how the options in the choice set relate to each other, and the third describes variables that affect tradeoff ease. These variables, in turn, determine which of opposite choice effects will arise.
- Many "mistakes" people purport to make may instead reflect mixed solutions for resolving tradeoffs. Specifically, failures of self-control, the tendency to spend discretionary funds on material purchases rather than experiential purchases, and spending more on the self than on others may not actually represent mistakes when judged with respect to how they partially satisfy multiple considerations.

- A decision is more likely to be a mistake if additional deliberation changes it; the decision maker considers it a mistake; it is incongruent with the decision maker's own advice to others; or if the decision maker does not wish to repeat it in the future.

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Terms and Definitions

Balancing between goals. When people switch between pursuit of different goals over time. For example, when people feel they have made progress toward a weight-loss goal, they are more likely to choose an unhealthy food.

Compromise avoidance. When people choose extreme (vs. intermediate) options. Extreme options have a maximum or minimum level of a particular attribute. For example, when presented with insurance options that varied according to coverage percentage and annual premium, people choose the option with the highest coverage percentage, irrespective of price.

Compromise effect. When options in a choice set gain share when they become intermediate (vs. extreme) options. "Compromise" options have intermediate levels of all attributes. For example, when choosing a beverage many people will switch from the "small" to the "large" cup once an "extra-large" option is introduced.

Consistency seeking. When people repeatedly choose the same option over time or select only a single kind of option within a choice set.

Extreme solutions for resolving tradeoffs. When people endorse outcomes that fully satisfy a single consideration (e.g., a particular goal, taste, or attribute). For example, compromise avoidance and consistency seeking are extreme solutions.

Highlighting a single goal. When people prioritize a focal goal and take actions consistent with that goal. For example, highlighting would occur if, after a workout, someone chose a healthy food, because both exercising and eating healthily serve the same weight-loss goal.

Licensing effect. When past behavior excuses actions that would otherwise generate negative attributions for the self. For example, recalling a past moral action can permit a present immoral action.

Mixed solutions for resolving tradeoffs. When people endorse outcomes that partially satisfy multiple considerations (e.g., goals, tastes, or attributes). For example, the compromise effect and variety seeking are mixed solutions

Scope insensitivity. When the evaluation of a problem is sensitive to the severity of a single case, but insensitive to how many cases are involved.

Variety seeking. When people switch between options over time or select different kinds of options within a choice set.

Unwillingness to make "taboo tradeoffs." When people refuse to make tradeoffs between different types of values, typically between those sacred and secular. For example, the prospect of exchanging something sacred (e.g., a human organ) for something secular (e.g., money) elicits moral outrage, anger, and disgust.