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REVIEW

WILEY CONSUMER PSYCHOLOGY REVIEW

Psychological analysis of consumer intertemporal decisions

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Abstract

Many consumer decisions involve trade-offs of benefits and costs distributed over time. Such decisions are often referred to as intertemporal decisions. The current review examines how the underlying psychological drivers of intertemporal preferences inform consumer decision-making. To this end, we identify four important consumer decision domains—financial decision-making, hedonic purchases, time management, and health decision-making—and use the extensive work in intertemporal choice to inform these decisions and identify routes to understanding and improving consumer decision-making.

1 | INTRODUCTION

Intertemporal decisions involve trade-offs of benefits and costs distributed over time and are highly prevalent across many consumer decisions. Consumers make intertemporal trade-offs when deciding whether to eat a luscious dessert that is harmful for long-term health or a healthy dessert that is less enjoyable in the present, whether to order the new iPhone XS Max or wait a year or so for the prices to drop, whether to study an additional hour or go out for drinks with friends, or whether to spend the time now to refinance a mortgage to a lower future interest rate or defer the mortgage paperwork in favor of more leisurely activities.

Many articles and chapters have been written across disciplines as diverse as psychology, economics, marketing, and public policy to better understand how people make intertemporal decisions. The beginnings of this literature can be traced (at least in large part) to the seminal paper by Ainslie (1975), who theorized about a variety of temporal phenomena using animal behavior as the empirical foundation. The work that followed focused mainly on identifying anomalies in how people make intertemporal trade-offs, comparing observed behavior with the predictions of the classical discounted utility model (Samuelson, 1937). Having established multiple anomalies, the past two decades have seen a renewed interest in understanding the psychological underpinnings of intertemporal decisions, with studies identifying a multitude of psychological processes. Several excellent reviews summarized this extensive literature, focusing on intertemporal anomalies (Frederick, Loewenstein, & O'Donoghue, 2002), mathematical formulations of discounting functions (Killeen, 2009; Read, 2004), psychological determinants (Urminsky & Zauberman, 2016; Zauberman & Urminsky, 2016), and the neurological underpinnings of intertemporal decision (Kable, 2013).

Rather than updating these past (some fairly recent) reviews, the emphasis in this article is on discussing how intertemporal preferences and the underlying psychological drivers can inform consumer decision-making. To this end, we identify four important consumer decision domains—financial decision-making, hedonic purchases, time management, and health decision-making—and use the extensive work in intertemporal choice to inform these decisions and the relevant research. The remainder of this review is structured as follows. First, we briefly review the early work that identified a multitude of behavioral anomalies as well as the newer work that offered psychological accounts for these anomalies. Next, we discuss how these findings can inform each of the four decision domains and how these mechanisms can be used as tools of behavioral analysis. Finally, we conclude by identifying future directions.

2 | INTERTEMPORAL CHOICE ANOMALIES

Intertemporal choice literature is grounded in discounted utility theory (Samuelson, 1937). Although discounted utility theory was never intended to be descriptive (for a detailed discussion, see Frederick et al., 2002), it nonetheless became the de facto straw man, just like standard utility theory in the judgment and decision-making literature. Most of the early work focused on comparing observed human behavior to the normative standards of the

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discounted utility theory and identifying violations. While many such violations have been documented, we focus on those most directly relevant for consumer behavior: high discount rates, temporally inconsistent discounting, magnitude and sign differences in discounting, resource-specific discounting, and framing differences in discounting.

2.1 | High discount rates

The most notable finding in the intertemporal choice literature is the high discount rates inferred from the experimental work. When given the choice, consumers often behave impatiently and forgo much larger rewards in the future in order to receive relatively smaller rewards now. The discount rates implied in these decisions are well above market interest rates (Frederick et al., 2002). Although the exact discount rates vary across studies, the general finding does not appear to be an artifact of hypothetical laboratory studies. Studies examining actual spending (Hausman, 1979) and saving (Laibson, 1997) also find high levels of discounting. In one study, rural villagers in Vietnam made a series of intertemporal choices, knowing that one of their choices would be randomly selected to be realized (Tanaka, Camerer, & Nguyen, 2010). The revealed annualized discount rates were extremely high (>1,600%). While this is an extreme example, it nonetheless suggests that high discount rates are not limited to the laboratory setting.

2.2 | Temporally inconsistent discounting

One of the most commonly cited and the most frequently examined anomaly is the inconsistent discount rates consumers exhibit for different lengths of time. This effect, interchangeably referred to as hyperbolic discounting, present bias, or declining impatience, is observed when discount rates implied in decisions decline as the time horizon gets longer (Benzion, Rapoport, & Yagil, 1989; Thaler, 1981). For example, in one study, consumers required a higher daily premium to avoid a 3-day delay in delivery (about $5, or $1.80 per day) than a 10-day delay (about $10, or only $1 per day; Malkoc & Zauberman, 2006). This pattern of discounting can lead to preference reversals, in which choices made in the near future are inconsistent with choices made in the more distant future. For instance, participants who preferred to receive a $100 certified check available immediately over a $200 certified check that could not be cashed for 2 years, also preferred a $200 certified check available in 8 years, over a $100 one available in 6 years (Ainslie & Haslam, 1992). Note, however, that most of the evidence for present bias comes from matching or willingness to accept tasks and less so from choice reversals. Indeed, some evidence suggests actual reversals within person and over time might be unlikely (Read, Frederick, Scholten, 2012), possibly due to the psychological changes during the wait period (Dai & Fishbach, 2013; Sayman & Öncüler, 2009). Further, these elicitation methods may also be associated with distinct psychological process (Lee, Malkoc, & Rucker, 2018), cautioning against the interchangeable use and interpretation of the results from matching and choice paradigms.

2.3 | Magnitude and sign differences in discounting

In his seminal paper, Thaler (1981) identified two additional discounting anomalies: the magnitude effect and the sign effect. The magnitude effect demonstrates that consumers discount smaller amounts more than larger amounts, with a non-monotonic decrease. In his studies, Thaler found that when participants considered delaying $15 for a year, the resultant annual discount rate was 139%, whereas $250 and $3,000 were discounted by 34% and 29%, respectively. Even more starkly and demonstrating the sign effect, when delaying a $15 fine for 1 year, the annualized discount rate was 29% (vs. 139% for gains).

Both the magnitude and sign effects have been replicated across domains. For instance, magnitude effect was studied with real outcomes in Denmark (Andersen, Harrison, Lau, & Rutström, 2013), with non-intertemporal outcomes such as tipping (Chapman & Winquist, 1998) and with nonhumans such as pigeons (Grace, Sargisson, & White, 2012). Similarly, sign effect was studied with smokers (Baker, Johnson, & Bickel, 2003) and with environmental and health outcomes (Hardisty & Weber, 2009). Still, compared to temporal inconsistencies, we know relatively little about the psychological processes that drive magnitude and sign effects. Recently, neuroscientific research started to identify neural correlates of magnitude (Ballard, Aydogan, Kim, & McClure, 2018; Ballard et al., 2017) and sign (Tanaka, Yamada, Yoneda, & Ohtake, 2014; Xu, Liang, Wang, Li, & Jiang, 2009) effects, with no clear consensus.

2.4 | Resource-specific discounting

Although most of the work in intertemporal choice has used monetary outcomes, some systematic examinations of resource-specific discounting have been conducted. Probably the largest accumulation of evidence centers around comparing how people discount money and health outcomes (e.g., trading of a partial reduction in pain sooner with a full reduction in pain later; Chapman, Nelson, & Hier, 1999). These studies show that when people trade off health outcomes over time, their choices display high levels of discounting, hyperbolic discounting (Bleichrodt & Johannesson, 2001; Cairns & Van Der Pol, 1997; Chapman & Elstein, 1995), and magnitude effects (Chapman, 1996)—just like monetary outcomes. Nonetheless, studies directly comparing levels and patterns of discounting for money outcomes with healthcare outcomes have found mixed evidence (Chapman, 1996; Urminsky, 2018). Thus, whether consistent differences exist between how consumers discount monetary and health outcomes is unclear.

Other work has compared money and consumer products, finding a weak preference for money over both consumable (e.g., food and cigarettes) and non-consumable products (books, laptops, TV; Urminsky, 2018). By contrast, a comparison of various consumables revealed no differences in discounting between beer, candy, and soda, but all consumables led to higher discounting than money (Estle, Green, Myerson, & Holt, 2007). Consumers also show differences in discounting when delaying material purchases (e.g., a book)

and experiential purchases (e.g., a movie), such that they discount experiences more heavily (Goodman, Malkoc, & Rosenboim, forthcoming). Finally, consumers show higher discount rates when making trade-offs of time (Zauberman & Lynch, 2005) and affect-rich outcomes (Vallacher, 1993) than money trade-offs.

2.5 | Framing differences in discounting

When making intertemporal trade-offs, consumers are sensitive not only to what and how long, but also to how a temporal trade-off is framed. Two consistent framing effects emerge: delay/expedite asymmetry and date/delay effect. Delay/expedite asymmetry (Loewenstein, 1988) refers to steeper discounting when a present outcome is delayed into the future (e.g., delay shipping to save $10) than when a future outcome is expedited into the present (e.g., expedite shipping and pay $10). This asymmetry holds for simple discounting, as well as hyperbolic discounting (Malkoc & Zauberman, 2006) and losses (Benzion et al., 1989; Shelley, 1993).

Merely altering how a time horizon is represented also changes the valuation of outcomes over that duration. When describing a choice between a sooner and a later outcome, the timing of the future option can be described in one of two ways: with a date (December 31, 2019) or with the amount of time until that date (e.g., 1 year). The date/delay effect (LeBoeuf, 2006; Read, Frederick, Orsel, & Rahman, 2005) refers to systematic difference between these descriptions, consistently finding that consumers discount outcomes less steeply when the future time is described with a date than when it is described as a delay.

3 | PSYCHOLOGICAL THEORIES OF INTERTEMPORAL CHOICE

With multiple intertemporal choice anomalies established and then replicated, the last two decades have seen a shift in focus from identifying anomalies to better understanding the psychological drivers behind these effects. Not surprisingly, a phenomenon as complex as intertemporal choice is multiply determined, and a diverse set of theories and processes have been proposed to explain it. The first set of explanations focuses on affect and emotion, suggesting visceral factors and irresistible urges drive intertemporal decisions (Ainslie, 1975; Hoch & Loewenstein, 1991; Loewenstein, 1996; Rook & Hoch, 1985). The second set of explanations is more cognitive and centers around the representation of the ultimate outcomes, demonstrating that how concretely the outcome is represented (Malkoc & Zauberman, 2006), how similar the outcomes appear (Rubenstein, 2003; Scholten & Read, 2010), and how they are distributed over time (Goodman et al., forthcoming) systematically influence intertemporal decisions.

The third set of explanations pertains to time itself, showing that how long consumers subjectively perceive a delay (Zauberman, Kim, Malkoc, & Bettman, 2009) and how much time consumers feel they have in the future (Zauberman & Lynch, 2005) contribute to intertemporal preferences. A fourth set of explanations examines how consumers' focus (or failure to focus) on different aspects of the intertemporal trade-off can explain their preferences. For instance, whether consumers focus on the opportunity cost of their choices (Bartels & Urminsky, 2015; Zauberman, 2003), whether they appropriately consider the future consequences (Magen, Dweck, & Gross, 2008), or whether they focus on costs or benefits of each option (Shu & Gneezy, 2010; Soman, 1998), all help explain intertemporal decisions. Finally, a fifth set of explanations focuses on consumers' mindsets (Malkoc, Zauberman, & Bettman, 2010) and their perceived connectedness to future selves (Bartels & Rips, 2010), finding that they both influence intertemporal choices. In the sections that follow, we use this diverse set of intertemporal theories and processes to analyze consumer behavior in four important domains.

4 | CONSUMER INTERTEMPORAL DECISIONS

Many consequential decisions consumers make as they manage their wealth, health, and time have intertemporal components. Literature on intertemporal choice can provide an important set of tools to better understand the challenges consumers face when making these decisions. As noted previously, the basic human tendency is to heavily value immediate and short-term costs and benefits. But this observation in and of itself is not very useful in understanding the hurdles consumers face or developing ways to help consumers make decisions that are aligned with their long-term well-being. Emerging work on the psychological underpinning of intertemporal choice can provide insights about how to influence and improve these consequential decisions.

These complex decisions have many layers. First, people can fail to consider future consequences of their actions. Second, even when they consider these consequences, they can underweight them or lack the motivation to carry out actions whose benefits feel distant. Similarly, if consumers see the future as particularly distant, think of the future in abstract terms, or see their future self as disconnected from their present self, maintaining the necessary motivation to persevere with such efforts may be difficult. Given these dynamics, in the sections that follow, we address each of these decision domains, highlighting the findings and theories most relevant to each, in four important domains: financial decision-making, hedonic purchases, time management, and health decision-making.

4.1 | Financial decisions and intertemporal choice

Many of the key financial decisions consumers face involve trade-offs between costs and benefits in the present and those that are in the future. Virtually every purchase decision a consumer makes requires a consideration of such trade-offs, often in the form of opportunity costs (Frederick, Novemsky, Wang, Dhar, & Nowlis, 2009). For instance, when a consumer opts to buy a new TV today for $1,800, as opposed to a cheaper one for $1,400, she effectively chooses

to save less toward her kids' education down the road. While financial decisions have many facets (for a review, see Greenberg & Hershfiled, 2019), in this section we focus on two types of financial decisions that will highlight different issues: saving for retirement and refinancing a mortgage.

4.1.1 | Retirement savings

The decision of whether and how much to save for retirement, rather than consume now, is an important intertemporal decision individuals face. The standard pension, referred to as a defined benefit plan, guarantees a portion of one's salary as income after retirement. Increasingly, however, a majority of retirement savings comes in the form of defined *contribution* plans (e.g., in the US 401 (k) accounts) in which retirement income depends on how much a consumer saves today (and his employer matches). This change shifts the burden of how much to save to the individual, and as a result, many consumers tend to undersave (Choi, Laibson, Madrian, & Metrick, 2002).

The low levels of saving are not simply caused by consumers not valuing retirement savings as an important goal. In fact, 68% of employees believe their own savings rate is too low, and 24% report they plan to increase their retirement contributions over the next few months. In reality however, only 3% do (Choi et al., 2002). Thus, the inability to save is not driven by a lack of interest or knowledge. Instead, the dynamics between the difficulty of forgoing current consumption and underestimation of the cost and benefits of future income determine the extent of savings. Such a complex decision is unlikely to have a single cause, with multiple mechanisms contributing to it. Next, we review key psychological processes of intertemporal decisions that likely influence retirement decisions.

Representation of present and future benefits

A key contributor to retirement decisions is the inherent difference in how consumers represent outcomes and events in the present and in the future (Trope & Liberman, 2003, 2010). For instance, the above-mentioned consumer who is considering a TV purchase would represent the consequences of owning the superior TV concretely, vividly imagining what it would be like to take it home and watch a game. In contrast, the saving benefits of choosing the inferior but cheaper TV lie in the future and are represented abstractly and are void of contextual details. This mismatch between the concreteness of the immediate benefits of making a purchase and the abstractness of the delayed benefits of forgoing it makes saving for retirement difficult.

Conceptualizing retirement decisions as an inherent mismatch in how present and future benefits are represented provides several tools to boost retirement savings. As a general principle, these tools either make present benefits more abstract or make future benefits more concrete. For instance, reframing an intertemporal decision as expediting a future outcome (vs. delaying a present one) allows consumers to represent the immediate purchase more abstractly, which decreases their level of discounting (Malkoc & Zauberman, 2006). Thus, simply anchoring consumers in the future, as opposed to present, appears to be sufficient to decrease the disproportional impact of the immediate benefits.

Just like making the immediate benefits more abstract can decrease discounting and increase savings, elaborating on these benefits can increase it. In one study, participants imagined purchasing a DVD online. Before they were asked to indicate their willingness-to-accept amount for delaying or willingness-to-pay amount for expediting it (depending on the condition), half of the participants thought and wrote about how, when, and with whom they would watch the DVD upon receipt. The exercise of imagining the immediate benefits of the purchase led to concrete representations and increased impatience, even for those who were expediting a future delivery and thus initially had abstract representations (Malkoc & Zauberman, 2006).

Just like altering the representations of the immediate benefits can diminish or intensify the mismatching levels of representation, so can altering the representation of future benefits. In one study, participants considered two software options for a class they were currently taking: a lower-quality software that required very little initial learning investment and a higher-quality software that required a larger investment. Half of the participants directly proceeded to making a choice, while the other half first imagined the future benefits of the options. In the baseline control condition, participants preferred the easy-to-learn but low-quality software, thus demonstrating the underestimation of future benefits. If, however, participants were asked to imagine the future benefits of the options before making a choice, their preferences significantly shifted toward the hard-to-learn but high-quality software (Zhao, Hoeffler, & Zauberman, 2007). Furthermore, instructing participants to think about the process of using a product (a longer-term consequence) was more successful in decreasing the purchase intent for a relatively hedonic item (i.e., Apple iPad) than was asking them to think about specific benefits—an aspect they presumably had already focused on (Zhao, Hoeffler, & Zauberman, 2011).

Taken together, these studies highlight the importance of understanding how consumers' natural level of construal for present and future outcomes can impact their decisions to save. To the extent that saving behavior hinges on consumers' willingness to forgo purchases, making either the immediate benefits of a purchase more abstract or the future benefits of saving more concrete helps curb purchases and increase savings. These interventions can vary from subtle nudges (e.g., changing the initial focus of thinking from present to future) to more heavy-handed instructions (e.g., asking consumers to simulate future outcomes or usage processes). For example, encouraging consumers to think about how they would spend their retirement money should increase savings by allowing consumers to more concretely represent future outcomes. Supporting this notion, in one study, participants who were instructed to consider the outcomes of investing in a 401(k) account indicated that they would be willing to invest 70% more than those who did not explicitly consider the future outcomes (Nenkov, Inman, & Hullnad, 2008).

Representation of future selves

A related point is how consumers represent their future selves. The notion is simple: If consumers perceive their future selves as an extension of their current selves, they will be more likely to engage in behaviors that are beneficial in the future (Parfit, 1984). Put differently, the motivation to sacrifice consumption now for the benefit of future selves may depend on how psychologically "connected" consumers feel to their future selves (Bartels & Rips, 2010). In this view, consumers place more value on outcomes that benefit their future selves (and thus are more likely to save) if they perceive the defining aspects of their personal identity to be more or less constant over time.

Although the first exploration of this effect did not find a correlation between measured connectedness and discount rates (Frederick, 2002), more recent experimental work has provided evidence that discount rates are lower when people are made to feel more connected to their future selves (Bartels & Urminsky, 2011) and that discount rates correlate with neural-activation approximations of connectedness (Ersner-Hershfield, Wimmer, & Knutson, 2009). In one study, college seniors were told either that an individual's identity is established early in life and is unlikely to change after graduation, or that major events such as graduation alter identity traits. Participants who believed their college-graduate selves would be very similar to their college-student selves were more willing to wait for a later cash amount over a smaller-sooner one (Bartels & Urminsky, 2011).

These findings point to possible interventions to encourage healthy financial decisions by increasing consumers' connectedness to their future selves. For instance, Hershfield et al. (2011) utilized age-adjusted photographs of participants and found that those who visualized and interacted with their future self through such photographs increased their saving behaviors. However, connectedness may not be sufficient to increase savings. To be able to forego a desired purchase in the present, a consumer needs to both value the future outcomes and be aware of the future consequences of their actions (Bartels & Urminsky, 2015). For instance, participants who felt more connected to their future selves preferred the cheaper iPad with smaller memory, but only when they were explicitly told to consider the opportunity cost of buying the more expensive iPad (i.e., buying the cheaper option would leave money to be spent for other things). Thus, while increasing consumers' connectedness to their future self could be an effective way to motivate saving, such interventions also need to incorporate a course of action to actually increase saving.

Perceived money slack

People generally feel monetarily constrained in the present and perceive that they will have more money slack (and less constraint) in the future (Zauberman & Lynch, 2005). This dynamic perception of slack has two independent effects on retirement planning. First, as consumers feel more monetarily constrained in the present, they prioritize their current spending over savings in the future. Simultaneously, as they feel they will have money slack in the future, they believe saving will be easier in the future, decreasing the motivation to save in the present. Because people perpetually believe they will have more slack in the future than in the present (Berman, Bhattacharjee, Small, & Zauberman, 2018; Berman, Tran, Lynch, & Zauberman, 2016; Zauberman & Lynch, 2005), the dynamics of slack have detrimental effects on the ultimate income available for retirement through both of these routes. However, it is also possible to utilize these perceptions to design interventions.

When people believe they will have money slack in the future, they think saving will be easier in the future and thus are more likely to precommit to save. A behavioral intervention that exploits this effect is the Save More Tomorrow (SMarT) plan (Thaler & Benartzi, 2004). The basic tenet of the SMarT plan is getting people to commit in advance to allocate a portion of their future salary increases toward retirement savings. In the original study, the SMarT plan led employees to increase their annual saving rate for retirement from 3.5% to 13.6% over 40 months of the test. Over the last decade, this plan has gained popularity, and many firms that are offering 401(k) plans to employees also provide some version of this plan.

Note that increased savings are not simply due to having more money to save. Ordinarily, consumers adjust to a raise fairly quickly, starting to feel the lack of slack soon thereafter. However, a raise in the future is different. When people think about a future raise, they believe that it will give them more financial slack than a present raise would have. This optimistic estimation is driven predominantly by underweighting of future expenses—a phenomenon also known as "expense neglect" (Berman et al., 2016). Indeed, in estimating future money slack, consumers place approximately three times more weight on income change than expense change. Examining a diverse population of students, unemployed, employed, and executives, one study found that when asked directly, participants expected both their income and expenses to go up in the future. However, when estimating how much money slack they would have in the future, participants only focused on their income growth and mostly ignored the expense growth. Therefore, asking people to increase their saving once they receive a raise is not as effective.

The SMarT plan is only one of many possible ways to leverage the natural temporal dynamic of perceived slack. Other interventions can more directly build on the psychology of slack. An obvious route is to de-bias the exuberance of slack growth, possibly by mentally simulating the reality that future slack will not be as different from the present as one expects.

Time perception

Another factor contributing to reduced motivation to save is how far into the future consumers think retirement is. The further an event seems to be, the less weight consumers place on its consequences. Indeed, consumers' discounting and impatience track with their perceptions of how temporally far away they perceive a given event to be (Kim & Zauberman, 2009; Zauberman et al., 2009). Thus, when they perceive retirement as being a very distant event, they give it little weight; consequently, it triggers little willingness to sacrifice in the present (see Zauberman & Kim, 2012, for a detailed discussion of time perception and retirement decisions).

4.1.2 | Mortgage refinancing decisions

Buying a house is often the biggest financial decision a consumer will make. For all but the wealthiest individuals who can make all-cash offers, this process means selecting a mortgage, and in the United States, the mortgage often has a 30-year term. This duration term and the interest rate introduce intertemporal trade-offs to what is already a difficult decision. The first trade-off is whether to take a fixed- or variable-rate loan. A fixed-rate loan sets a constant interest rate, which allows the consumer to pay the exact amount every month, hence decreasing uncertainty. An adjustable rate loan often provides a lower initial interest rate (and monthly payment) that may increase after a number of years, usually between three and ten years depending on the exact contract.

Once a mortgage is in place, a secondary decision is whether or when to refinance the loan. Refinancing allows consumers to close the old loan in exchange for a new loan with more favorable terms. However, many consumers do not refinance when they normatively should and forego large savings. A recent study found that an estimated 20% of households for whom refinancing was clearly advantageous had not done so. As an outcome, the median household forwent $160 monthly saving over the remaining time on the loan. The total net present value of those forgone savings for the median household added up to $11,500 (Keys, Pope, & Pope, 2016).

Clearly, homeowners can fail to take advantage of a refinance option for many reasons, such as a simple lack of knowledge, the inability to trust the system, or transaction costs. However, these factors cannot fully explain the observed pattern of behavior. In a large-scale field study, a nonprofit organization sent letters to encourage consumers to refinance. All the recipients were eligible to refinance and all would have substantial savings with no up-front costs (Keys et al., 2016); nonetheless, only 16% of consumers who received letters took the opportunity to refinance. Importantly, all the families were low-income but eligible for refinancing, and all had prior relationships with the nonprofit. Thus, lack of need, lack of knowledge, or lack of trust in the system is unlikely reasons for this short-sighted behavior.

Given the intertemporal and financial nature of refinancing decisions, all of the psychological accounts described in the retirement-decision section would apply here. Instead of reiterating these accounts here, we focus on the temporal aspect of slack theory to provide a nuanced and less direct perspective.

As discussed earlier, refinancing decisions are complex and mentally taxing. Furthermore, these decisions require an investment of time. Thus, refinancing can be conceptualized as a discounting of time rather than money. Consumers treat time as a resource to be maximized and, as with money, experience more slack in the future than in the present. However, perceptions of slack are much more pronounced for time than for money (Zauberman & Lynch, 2005). When people believe they will have more free time in the future than they have in the present, they tend to delay tasks, especially those involving a great deal of uncertainty and anxiety, such as a mortgage refinancing decision. That is, despite realizing this action is beneficial, consumers put it off because they believe they will have a better time to do it in the future. This behavior is analogous to the intertemporal lock-in, in which consumers expect to engage in online search more than they actually do, and end up shopping from the previously visited website (Zauberman, 2003). Like the consumer who unintentionally gets locked into an online retailer, homeowners also underestimate the impact of future time investments required and leave a great deal of future savings unclaimed. Thus, it is not sufficient to understand how consumers discount money. It is also important to understand how they discount time.

In sum, conceptualizing financial decisions as a special case of intertemporal choices can help policy makers and marketers understand why consumers' financial decisions often contradict their self-stated goals and help design appropriate interventions. In this section, we focused on retirement and mortgage refinance decisions. However, this analysis could be extended to other financial decisions, such as investment choices, consumer borrowing, or credit card payments.

4.2 | Hedonic purchases and intertemporal choice

Seeking pleasure is a major motivator for most consumers, and hedonic products or experiences are prime candidates for providing pleasure (Alba & Williams, 2013). Luscious dinners, luxurious clothes, sporty cars, and wine festivals are all hedonic in nature, and their primary function is to provide pleasure. Such pursuits are in contrast to more functional and utilitarian purchases, which have a focal instrumental goal. Researchers have used several dichotomies to describe this distinction: luxury versus necessity (Berry, 1994), hedonic versus utilitarian (Dhar & Wertenbroch, 2000; Hirschman & Holbrook, 1982; Strahilevitz & Myers, 1998), affect-rich versus affect-poor (Rottenstreich & Hsee, 2001), should versus want (Bazerman, Tenbrunsel, & Wade-Benzoni, 1998; Milkman, Rogers, & Bazerman, 2008), and vice versus virtue (Wertenbroch, 1998). Common to all these dichotomies is a short-term pleasure pitted against a delayed instrumentality (Khan, Dhar, & Wertenbroch, 2005). This line of work has recognized the inherent intertemporal trade-off and used it in theory development, predominantly focusing on the role of guilt (Kivetz & Simonson, 2002; Strahilevitz & Myers, 1998) and urges (Loewenstein, 1996; Shiv & Fedorikhin, 1999) imposed with the hedonic choice. In this section, we review key effects and theories from the intertemporal choice literature that can provide a deeper understanding of hedonic consumption.

4.2.1 | Affect

Hedonically appealing options evoke an urge that fulfills an immediate pleasure. Affective processes and visceral factors play a significant role in such decisions, both because of their strong influence and because people often have difficulty anticipating them. Formalizing the effect of visceral factors on behavior, Loewenstein (1996) argued that when consumers are faced with hedonic temptations, their visceral urges put them in a "hot" state, which does

not allow for "cold" cognitions to surface. When the urges take over, consumers make short-sighted decisions that favor what is most rewarding in the present. Importantly, when consumers are in a cold state, where cognitions in line with long-term goals are active, they have little appreciation for how they would behave when they are affectively aroused, creating what Loewenstein terms a hot–cold empathy gap. For example, a teenager might underestimate the likelihood of using illicit drugs in advance, not realizing the power of the situation. Analysis of data from a federally sponsored survey about teenage marijuana consumption demonstrated that teenagers underestimate future marijuana use, and this underestimation is most severe for those who rarely interact with marijuana (Sainam, Putsis, & Zauberman, 2018). This presumably happens because the lack of experience makes it difficult for the teenagers to anticipate the hot state they will be in at the point of actual decision.

Illustrating the role of affect and cognition more broadly, in one study, participants were asked to memorize either a 2-digit or a 7-digit number as they were choosing between an affect-rich dessert and a healthier but affect-poor fruit salad. Participants who memorized a 7-digit number, and thus lacked cognitive resources, were more likely to rely on their affect and choose an affect-rich dessert (Shiv & Fedorikhin, 1999). Further attesting to the role of affect, consumers show little sensitivity to changes in nonaffective features. One study analyzing retailing data found that hedonic products in a grocery store (e.g., frozen novelties and candies) are less responsive to a 15% price cut than are utilitarian items (e.g., laundry detergent and pest control products; Wakefield & Inman, 2003).

This conceptualization motivates a series of predictions about when consumers will give in to hedonic temptations and when they will resist them. Because urges are mostly directed toward desirable external stimuli, a simple yet impactful intervention is to physically separate from temptations. In a series of studies, Mischel and colleagues demonstrated that children were more willing to wait to receive a larger quantity of marshmallows if their view of the marshmallows was blocked with a barrier (Mischel & Baker, 1975) or if they only saw the pictures rather than the actual marshmallows (Moore, Mischel, & Zeiss, 1976). In addition, transforming rewards into nonrewards (e.g., thinking about pretzels as thin long logs; Mischel & Baker, 1975) also increases the delay of gratification. Furthermore, consumers employ distancing as a self-control strategy, suggesting that they have the ability to intuit the importance of physical separation. For instance, in a series of in-depth interviews, consumers described physically distancing themselves from a tempting situation (e.g., "I try to distract myself by moving to another display" and "I steer clear of record stores when I can't afford it") as strategies they regularly employ (Rook & Hoch, 1985).

A stimulus-driven affective account also poses other interesting questions. For instance, if pictures help decrease the lure of hedonic items (Moore et al., 1976; Shiv & Fedorikhin, 1999), would consumers be less tempted in online contexts? The answer appears to be yes, but only in non-touch interfaces. When consumers are able to touch pictures and interact with them (vs. nontouch interfaces), they are more likely to choose affect-laden products, such as cheesecake or a hot chocolate, over their utilitarian counterparts, such as fruit salad or a cup of tea (Shen, Zhang, & Krishna, 2016). In one study, participants chose a bowl of ice cream over a USB drive (both priced at $10) 80% of the time when using a touch screen iPad, but only 62% of the time when using a desktop, and 58% of the time when using a stylus on an iPad. These findings support the role of physical distance from the stimulus object as an important factor diminishing impatience toward hedonic products.

Just like physical distance, temporal distance can also help consumers psychologically remove themselves from an affect-laden state. That is, increasing temporal distance from the consumption decision diminishes hedonic choices in favor of affect-poor, but more utilitarian, items. For instance, consumers are more likely to choose unhealthy snacks if the consumption immediately follows choice, but prefer healthier snacks if the consumption follows a delay (Read & van Leeuwen, 1998). Similarly, consumers ordering online groceries are more likely to choose "should" items, such as vegetables, as opposed to "want" items, such as ice cream, if the delivery is scheduled for a later date (Milkman, Rogers, & Bazerman, 2010).

Further, when consumers expect options to actualize in the distant future, they regularly opt for options that align better with what they think they *should* do (Rogers & Bazerman, 2008). Marketers know and take advantage of this tendency. For instance, low-brow magazines that accrue benefits primarily at the moment of reading are more likely to be sold at the newsstands (vs. via subscription) than high-brow magazines (e.g., investment magazines; Oster & Scott Morton, 2005). Consumers are also aware of the influence of immediate surroundings ("often five minutes cools me down") and strategically use postponement ("never buy without checking other stores") as a self-control strategy (Rook, 1987; Rook & Hoch, 1985).

This awareness also allows consumers to pre-commit to utilitarian options, making deviations toward hedonic options costly. For example, many regular smokers buy their cigarettes by the pack, despite considerable savings that come with buying 10-pack cartons. Such purchase quantity rationing discourages excessive vice consumption by making marginal consumption more difficult and costlier (Wertenbroch, 1998). Some companies also employ pricing strategies that make precommitment attractive. Discounts for monthly subscriptions (vs. pay per visit) for gyms are a good example, because consumers believe that committing to incurring future costs will increase their likelihood of attending the gym. The success of this strategy, however, is not clear. A study analyzing data from three US health clubs found that users with monthly contracts on average predicted they would visit the gym nine times a month, but in fact only visited about four times. This translates into $17 per visit when paying monthly, compared to the $10 pay-per-visit cost (Della Vigna & Malmendier, 2006). These findings suggest that consumers' use of pre-commitment tools might not always be effective in inducing the intended behavior and can result in monetary losses.

Making decisions from a temporal distance also means that consumers are often not sensitive to further differences in delay. For instance, most consumers prefer receiving a small box of chocolates

in 5 days to receiving a large box in 35 days, but prefer the large box in 45 days to the small one in 15 days. To isolate the effect of future delays, Dai and Fishbach (2013) added a third condition, whereby participants were exposed to distant future options a priori (small box in 15 days vs. large box in 45 days) but made a choice after a delay. Participants were contacted 10 days later, when the receipt of small box and large box was 5 and 35 days, respectively, essentially making the scenario equivalent to the near-distant condition. Interestingly, waiting to make the decision led to the most amount of patience. In other studies, even the illusion of waiting led to similar results. These findings suggest that when participants felt like they had already waited, any further delay felt easier to handle.

Taken together, these findings provide important ways to design interventions based on affect-based accounts. The basic premise is simple: If the immediate presence of hedonic outcomes makes resisting them difficult, distancing consumers should increase their patience and their likelihood to choose more utilitarian alternatives. In this section, we discussed physical and temporal distance as two ways to help consumers resist over consumption of hedonic products, with interventions ranging from actual physical distance to utilization of non-touch environments and from actual temporal distance to mere illusions of delay. Nonetheless, creating many variations of these interventions is possible using the distancing principle.

4.2.2 | Time perception

Although the most direct effect of emotion and arousal is an increase in the attractiveness of hedonic products, it can have a secondary effect through time perception. Arousal, which often follows exposure to desired objects, lengthens duration judgments. In a study, heterosexual males judged the same amount of time to be longer after flipping through Victoria's Secret catalog pictures (vs. neutral pictures; Kim & Zauberman, 2013). This finding is consistent with other work that has shown a direct relationship between arousal levels and perceived length of objective durations (Matell, King, & Meck, 2004; Stetson, Fiesta, & Eagleman, 2007).

The consequence of future time feeling longer for hedonic decisions is fairly straightforward. The more distant the future seems, the more likely individuals are to discount future consequences and to succumb to temptations. Indeed, changes in perceived temporal distance can account for consumers' impatience, whereby the greater that distance seems, the more impatient consumers become (Kim & Zauberman, 2013; Zauberman et al., 2009). Note that although the differences in time perception might operate through affect, time perception nonetheless is a distinct driver with different moderators.

Importantly, a process driven by an expanded time perception introduces a different set of interventions compared to a process driven by increased affective reactions. For instance, describing a time period with a date (e.g., November 22) as opposed to a delay length (e.g., two months later) contract consumers' perception of time (LeBoeuf, 2006), which then decreases their willingness to delay outcomes (LeBoeuf, 2006; Read et al., 2005). Therefore, one would expect decisions made for a specific future date (vs. a general delay period) to favor virtues, "shoulds," and necessities. Similarly, having a scheduled future task makes the time leading to it feel subjectively shorter (Tonietto, Malkoc, & Nowlis, forthcoming), potentially nudging consumers away from temptations.

4.2.3 | Failing to appropriately consider future consequences

One reason consumers discount future outcomes heavily is that they do not pay appropriate attention to future consequences. Thus, when the reason behind overindulgent choices is lack of attention to the future outcomes, the easiest intervention is to make the future salient.

One effect that embodies this phenomenon is the hidden-zero effect (Magen et al., 2008), which suggests that consumers often ignore the absence of rewards implied in their choices. In one study, participants choosing between $5 now and $6.20 in 26 days favored the sooner outcome. However, when the same choice made the absent rewards salient by asking participants to choose between $5 now and $0 in 26 days or $0 today and $6.20 in 26 days, participants were more likely to choose the delayed reward (Magen et al., 2008). This pattern of behavior suggests that when choosing $5 now, consumers do not naturally realize their choice dictates they will receive no money in the future. Later studies established that the effect is indeed driven by temporal attention and not by perceptions of improving sequences (Radu, Yi, Bickel, Gross, & McClure, 2011). Indeed, when not specifically prompted, consumers tend to ignore future opportunity costs, but not those in the present (Read, Olivola, & Hardisty, 2017).

In a similar vein, thinking about one's future state can motivate people to pursue these goals by rendering the delayed reward more important (Fishbach, Friedman, & Kruglanski, 2003). Merely paying attention to the end state can increase motivation by helping people focus on the discrepancy between the current and the ideal state (Higgins, 1987; Kivetz, Urminsky, & Zheng, 2006). Thus, not paying attention to future consequences can drive consumers' hedonic consumption. Consequently, shifting consumers' attention toward the future can, at least in part, provide a remedy for overindulgent choices (Myrseth, Fishbach, & Trope, 2009; Trope & Fishbach, 2000).

If consumers are overweighting the present and underweighting the future, another effective intervention is to design virtue options with added immediate benefits. In one study, participants completed surveys in exchange for truffles. If the participants chose and received their chocolate truffles before the survey, they felt more motivated than those who chose but did not receive the truffles until after the survey (Woolley & Fishbach, 2018). Similarly, creating short-term rewards for virtuous behavior is more effective than downplaying the vice or bolstering the future benefits. For instance, participants who chose the most enjoyable (short-term reward) rather than most useful (long-term reward) exercise persisted longer when performing it. In another study, participants who chose the

tastier rather than the healthier bag of carrots consumed more of it (Woolley & Fishbach, 2016).

Note, however, that for such interventions to work, consumers need to find some reward in the immediate virtuous behavior. For example, if consumers find eating spinach utterly undesirable, asking them to choose the tastier one would not result in more spinach consumption. Importantly, when trying to predict long-term success, the presence of immediate rewards (i.e., enjoyment) fares better than the presence of delayed rewards (i.e., an important goal). In a study examining New Year's resolutions, participants who rated the virtuous behavior more enjoyable were more likely to persist two months later than were those who rated the virtuous behavior more important (Woolley & Fishbach, 2017).

In sum, several of the effects and theories used in the intertemporal choice literature can help explain when and why consumers give into their hedonic desires. In this section, we discussed three of such processes: affect, time perception, and failing to appropriately consider future consequences. While these processes are not entirely independent of each other, they nonetheless are distinct and have different moderators. Consequently, these different processes suggest distinct interventions that would increase preference toward more utilitarian or virtuous choices.

4.3 | Time management and intertemporal choice

Time is the scarcest resource for many consumers. According to a recent Gallup survey, 44% of Americans feel they have too much to do and not enough time to do it—a term dubbed "time famine" (Devoe & Pfeffer, 2011). Consumers spend their time on a wide range of activities (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2005). These activities can roughly be grouped into two categories: work and leisure. Work activities are instrumental and extrinsically motivated (Babin, Darden, & Griffin, 1994) and are performed out of obligation (Southerton & Tomlinson, 2005). They can include one's actual work (i.e., paid work), where effort is exerted in exchange for money, or one's chores (i.e., unpaid work), which are instrumental in achieving other personal goals. Leisure activities, on the other hand, are intrinsically motivated tasks that are marked by the pursuit of pleasure and fun (Laran & Janiszewski, 2011). Because one's time is limited, work and leisure compete for consumers' time, making its allocation a prevalent and important decision. Such decisions are endless: stream a movie or clean the house; go out with friends or study for a final; spend time on social media or answer emails; and go to a dinner or to a movie. The list goes on and on. A unique characteristic of time allocation decisions is the nonmonetary nature of both the benefits and costs. Whether leisure or work, almost all activity has a time cost attached to it. Because consumers trade off time and money differentially over time (Zauberman & Lynch, 2005), such time allocation decisions are distinct from intertemporal decisions that involve monetary costs and benefits.

When allocating their time to activities, consumers can behave both myopically, putting off their responsibilities in favor of more enjoyable endeavors (Milgram, Sroloff, & Rosenbaum, 1988), and hyperopically, depriving themselves of leisure activities that feel indulgent or wasteful (Keinan & Kivetz, 2008, 2011; Kivetz & Keinan, 2006; Kivetz & Simonson, 2002). Both myopic and hyperopic behaviors can be understood using theories of intertemporal choice.

Importantly, consumers make two distinct kinds of decisions when allocating their time: (a) choosing between activities and (b) deciding whether to engage in a given activity or postpone it. We organize our discussion around these two types of decisions.

4.3.1 | Choosing between a work and a leisure activity

The trade-offs of how to use one's time often arise when consumers need to choose between productive and leisure activities, which vary in their distribution of costs and benefits. For most work activities, the costs are incurred in the present (e.g., time and mental effort to study) to obtain a benefit in the future (e.g., higher grades or a better job). For leisure activities, the benefits are experiences in the present (e.g., enjoyment), with potential costs incurred in the future (e.g., lower grades, a worse job). As such, any theory that intends to explain a choice of this nature needs to incorporate perceived differences in costs and benefits for the activities under consideration.

Distribution of utility over time

As discussed previously, consumers tend to discount resources (e.g., time and money) differently. One such difference is observed when comparing consumers' impatience toward experiences and material items (Goodman et al., forthcoming). Although material and experiential purchases vary on many dimensions, a critical difference for impatience is the utility duration: Experiences are often consumed over a single intense period, and material items are often less intense but consumed over many episodes. Given such distribution of utility, the hyperbolic nature of intertemporal preferences dictates that consumers show more impatience toward experiences. In one study, participants more heavily discounted a 1-hr massage therapy session compared to an equally valued handheld massager, requiring higher delay premiums for the experience. Importantly however, when an experience was broken into smaller episodes that took place over a longer time span (e.g., a series of 15-min hydro-massages), participants discounted the massage experience less and not differently from the material purchase. These results indicate consumers are more impatient toward purchases that have immediate utility over a short period.

These findings can help explain why consumers myopically choose to engage in leisure at the expense of more work-like activities. Leisure activities not only provide utility in the immediate future, but are also experienced in a single episode. However, the benefits of choosing to study, for instance, are realized in the future as well as over an extended period of time. Thus, how leisure and work outcomes are distributed over time can help explain why consumers prefer leisure to work. Using this conceptualization, one would expect consumers to behave less myopically when the work

task has immediate and compact benefits, such as a student taking an examination the following day or a salesperson who is about to meet his or her quota for a bonus.

Perceived similarity

A recent trade-off model of intertemporal choice argues that consumers make intertemporal decisions by comparing the differential reward with the differential delay (Scholten & Read, 2010). According to this account, intertemporal choice reversals happen because the salient dimension varies from each temporal perspective. For a consumer choosing between five apples today and six apples tomorrow, the difference in a single apple appears relatively small and the deviation from today to tomorrow rather large. If the decision is between five apples in 90 days and six apples in 91 days, however, the difference in the number of apples is more salient than the difference in the delay. Because consumers weight the salient attribute more heavily, they tend to choose the sooner-smaller outcome now, but the later-larger outcome in the future (Rubenstein, 2003).

Such a model can also account for consumers' preferences for leisure over more productive work tasks. Consider a consumer trying to decide between watching a 30-min sitcom and a 30-min documentary. The consumption utility most people get from each seems quite different: Whereas watching a show provides down time and mental rest, watching a documentary is mentally more effortful and not very relaxing. The long-term impact of choosing either option, however, does not seem substantially different: Whether one chooses a low-brow or high-brow activity today has little consequence for future goals. Because the salient difference in the present favors a leisurely activity, this process would predict a preference for the leisure activity. This model would also predict that highlighting future benefits of a present high-brow choice can nudge consumers toward more productive uses of time.

More importantly, this framework would also predict reversals if the future predicted utility of the options is more divergent. For instance, if consumers expect special and/or long-lasting memories from a more work-like task, then the salient difference would take place in the future, not in the present. Thus, a consumer choosing based on the salient difference would prefer the option with a larger value in the future. Thinking back to the previous example, if the documentary offers a memorable experience, such as a special meet and greet with the director or a special screening in a historic locale, this theoretical framework would predict consumers to choose the documentary over the show. Indeed, consumers are known to opt for tasks that are more painful in the present, such as staying in an ice hotel, to collect future memories (Keinan & Kivetz, 2011).

Abstract mindsets

A mindset is a generalization of cognitive processes activated while performing another task (Wyer, 2018; Xu & Wyer, 2007). Although a host of mindsets exist, mindset abstraction is one of the most prominent (Freitas, Gollwitzer, & Trope, 2004; Maglio & Trope, 2012). People in an abstract mindset are more likely to see connections between otherwise noncomparable objects (Johnson, 1984; Malkoc, Zauberman, & Ulu, 2005), perceive options as more similar (Day & Bartels, 2008; Goodman & Malkoc, 2012), see the world in broader categories (Liberman, Sagristano, & Trope, 2002), focus on why they perform an activity (Freitas et al., 2004), and, importantly, become more consistent in their intertemporal preferences (Malkoc et al., 2010). Furthermore, an abstract mindset leads to more patience (Malkoc et al., 2010) and increased self-control (Fujita, Trope, Liberman, & Levin-Sagi, 2006). A simple reading of these findings predicts consumers in abstract mindsets opt for more virtuous activities. However, the relationship appears more complicated, because distancing oneself can also increase indulgence for hyperopic consumers.

Consumers vary in their level of myopia. Whereas some people are more likely to give into indulgences, others are hyperopic and have difficulty indulging and thus opt for the righteous options (Haws & Poynor, 2008). Hyperopic choices are driven by the guilt consumers experience as they imagine themselves indulging (Kivetz & Keinan, 2006). Importantly, guilt is an emotion that is evoked in a narrow time frame. When consumers are able to take a longer and broader perspective, they are less likely to focus on the guilt felt in the present and more likely to focus on the fear of missing out. This shift in focus then allows consumers in an abstract mindset to indulge and have more fun in the present (Keinan & Kivetz, 2008).

These contradicting findings can be reconciled by understanding what myopic consumers are able to do in the present and what they wish they could do from a temporal distance (Haws & Poynor, 2008). For myopic consumers, whose focus in the present is on enjoyment, an abstract mindset allows them to focus on the big picture and behave more prudently. For hyperopic consumers, who focus on guilt and have a hard time enjoying their time, an abstract mindset allows them to indulge.

In sum, utilizing theories of intertemporal choice can bring new insights into the study of time consumption. The theories we discussed explain not only myopic preferences but also hyperopic ones. Importantly, an intertemporal perspective can also help reconcile myopic and hyperopic tendencies by identifying when consumers may not respond to traditional interventions.

4.3.2 | Deciding when to do an activity

Although most time allocation decisions impose a direct trade-off between two tasks, in many instances, consumers consider a single activity and whether they should take part in it in the present or after a delay. In such circumstances, no alternative option is available and thus no choice of activities. Thus, the decision of when to engage in an activity necessitates a deep understanding of how consumers perceive the temporal costs and benefits in isolation.

Differential discounting of future (non-monetary) costs

When deciding to do an activity in the present or to delay it, consumers compare the predicted net utility for the present and future. Especially when the costs are non-monetary, the actual behavior is driven by the perceived cost, more than perceived benefit (Shu &

Gneezy, 2010; Soman, 1998). In a seminal study, Soman (1998) asked participants to choose between two compensation options: $1 for completing one survey or $4 to come back a second time two weeks later to complete another survey. About 60% of the participants chose to complete a second survey later for additional compensation. However, only about 33% of them actually showed up to do the second survey and receive $4. In other words, close to 70% of the participants received neither the initial $1 nor the later $4. This pattern of behavior implies that from a temporal distance, the effort seemed more trivial, suggesting consumers heavily discount non-monetary costs.

A similar mechanism could drive procrastination. Procrastination is avoidance of a task that needs to be accomplished and thus is about deciding when to engage in an activity. One of the most commonly procrastinated activities is studying, with about 52% of college students stating that they need help dealing with their procrastination (Gallagher, Golin, & Kelleher, 1992). Deciding when to study involves determining whether the net utility (i.e., benefit minus cost) is higher in the present or in the future. Because the future cost is heavily discounted, the net benefit in the future is higher, leading to procrastination.

These findings bring forth the possibility of consumers procrastinating leisure activities if they have immediate (non-monetary) costs. Consider, for instance, a consumer deciding to visit a new exhibit in town. The inherent benefit in the present is accompanied by the immediate time cost of actually undertaking it. But when considering this visit in the future, say, next weekend, the consumer would perceive the time cost to be less substantial, despite seeing no clear differences in its perceived benefits. As an outcome, she would procrastinate doing something she actually wants to do (Shu & Gneezy, 2010). Demonstrating one such instance, a study conducted with pedestrians in London, New York, and Dallas examined the number of landmarks visited in each city. On average, the residents in these cities had visited 30% fewer landmarks than a visitor who spent two weeks in that city. Importantly, an examination of past residents showed that despite having lived in the city a number of years, they visited 40% of the landmarks in their final six months, providing some evidence of procrastinating leisure.

The disproportionate discounting of costs suggests consumers are insensitive to changes in non-monetary costs and sensitive to changes in benefits. Supporting this insensitivity to non-monetary costs, participants' redemption rates for AMC gift certificates did not change with increased cost (i.e., a 10-min walk vs. a 20-min drive). However, increasing the benefits (i.e., one ticket vs. three tickets) decreased procrastination (Shu & Gneezy, 2010).

Connectedness of current and future selves

As discussed before, people who feel more connected to their future selves are more likely to undertake a cost in the present in order to benefit their future selves (Bartels & Rips, 2010). Thus, connectedness is likely a major driver of procrastination. Although consumers procrastinate all sorts of tasks, the tendency is especially acute when they perceive tasks as unpleasant (Milgram et al., 1988), such as studying or exercising. This effect is moderated by motivation level, whereby motivated students are less likely to procrastinate (Bargh & Gollwitzer, 1994). These findings suggest individuals who are more connected to their future selves procrastinate less. Critically, increasing consumers' connectedness to their future selves can also decrease their likelihood of procrastinating and increase their compliance with undesirable but necessary tasks.

Consumers also use costly pre-commitment tools both for work tasks (if they are myopic) and for leisure tasks (if they are hyperopic). For instance, consumers self-impose costly deadlines do avoid procrastination, especially when procrastination impedes performance. In one study, Ariely and Wertenbroch (2002) allowed MIT students to select deadlines for three assignments they needed to complete throughout the semester. They further imposed a 1% penalty for every day students missed their deadline. Thus, the optimal strategy for the students was to set the latest possible date as a deadline for all three papers. However, only 27% of the participants chose this normatively optimal strategy. Instead, students set earlier deadlines—albeit with varying degrees—suggesting they used the deadlines as a pre-commitment tool.

Consumers also use scheduling to commit to desired productive activities, such as exercising and studying, but also for leisure activities, such as social engagements or watching a TV show (for a review, see Malkoc & Tonietto, 2019). Indeed, scheduling the time and place to vote (Nickerson & Rogers, 2010) and to exercise (Milne, Orbell, & Sheeran, 2002) increases the odds of timely completion. Scheduling leisure also increases the completion rate. In one study, students who had a specific redemption time were more likely to show up for a coffee/cookie break during finals than students who had a broad window of time (Tonietto & Malkoc, 2016). We conjecture that both the tendency to impose costly deadlines and to schedule can be intensified for consumers who are more connected to their future selves.

In sum, intertemporal choice theories can help us understand how consumers manage their time. In this section, we discussed time allocation decisions and activity timing decisions, identifying distinct drivers. Better understanding the above-mentioned intertemporal effects and processes is necessary when developing strategies for time management.

4.4 | Health decisions and intertemporal choice

Sugary drinks, fatty foods, alcohol, and smoking are all pleasurable in the present but increase the chances of negative future health consequences. Obesity plagues an estimated 39% of the US population (Hales, Carroll, Fryar, & Ogden, 2017), and one in eight Americans abuses or is dependent on alcohol (Grant et al., 2017), with alcohol dependency causing twice as many deaths as opiate overdoses (Ingraham, 2017). Practices that would help improve long-term health, such as a low-fat diet, clean-water consumption, exercise, regular medical testing, and adherence to medical treatment, are often unpleasant or time consuming, with no immediate benefits. Both internal and external factors influence such decisions

(Schwartz, 2018). In this section, we focus specifically on the critical implications of intertemporal choice research for understanding and improving health decisions (see Urminsky & Zauberman, 2018, for a more detailed review on intertemporal choice and health decisions).

Realizing the potential relationship between time preferences and health decisions, prior research examined how people temporally discount health outcomes A meta-analysis of over 60 published studies (MacKillop et al., 2011) found that higher discount rates are associated with a greater propensity to consume addictive substances, including alcohol (d = 0.50), tobacco (d = 0.57), stimulants (d = 0.87), and opiates (d = 0.76). Researchers similarly exploring the relationship between discounting and obesity found that people with a higher body mass index (BMI = the ratio of weight to height) are more likely to choose sooner-smaller rewards over later-larger rewards (Reimers, Maylor, Stewart, & Chater, 2009; Urminsky & Bayer, 2017). Thus, discounting theories can appropriately apply to health decisions. Next, we review some of the psychological mechanisms relevant to time preferences in general and discuss their implications for health decisions.

4.4.1 | Representation of present and future costs

One key difference between how people think about outcomes in the near versus the distant future is their level of mental representation, often referred to as construal level (Trope & Liberman, 2003, 2010). Under this cognitive process, present health options and their immediate consequences tend to be concrete (e.g., satisfaction from a cigarette or the effort required to exercise) and are thus weighted more heavily than the more abstract long-term benefits (e.g., not getting lung cancer or heart disease). Therefore, interventions such as warning labels are effective in increasing consumers' knowledge and understanding of negative health consequences of an action (Hammond, Fong, McNeill, Borland, & Cummings, 2006) but have little effect on actually changing the behavior (Noar et al., 2016). Alternatively, graphic warning labels that make the future harm more concrete by using evocative pictures are more effective in increasing healthy behavior (Donnelly, Zatz, Svirsky, & John, 2018; Noar et al., 2017; Peters et al., 2007).

A factor further contributing to suboptimal decisions is concreteness of the present costs of engaging in a healthy behavior. When considering an action in the near future, consumers' representations center around feasibility concerns, which results in overweighting the ease with which an action can be executed (Liberman & Trope, 1998). Most healthy behaviors with long-term benefits require more effort in the present (e.g., resisting a cigarette and going to the gym), decreasing the perceived feasibility and the eventual likelihood of engaging in the healthy behavior. Thus, changes in the representation of present and future costs can account for unhealthy behaviors that at first appear unmotivated. Importantly, a feasibility-based explanation hints at why interventions such as taxation (Jha & Peto, 2014) or bylaws (Hammond, McDonald, Fong, Brown, & Cameron, 2004) prove to be effective. Examined from the lens of feasibility, it becomes clear that taxing consumers for smoking or adding a sugar tax makes executing the unhealthy option feel more difficult and more expensive. Similarly, bylaws that ban smoking in certain areas or limit the presence of the unhealthiest options, such as extra-large soft drinks, make engaging in the desired, but unhealthy, behavior difficult. Put differently, taxation and bylaws increase both monetary and effort cost of the unhealthy behavior in the present, which balances out the concreteness of the benefits already inherent in the choice.

4.4.2 | Connectedness of current and future self

How people construe their future selves has important consequences for decisions with intertemporal components, particularly regarding health-related decisions, as the current self bears the costs whereas the future, older self reaps the benefits. Because connectedness has been linked to a range of far-sighted behaviors (see Urminsky, 2017), it is reasonable to expect connectedness to also increase healthy behavior. Preliminary research has found support for this prediction. For instance, manipulations that induce higher connectedness to the future self yield greater willingness to undergo painful medical procedures in the present for future health benefits. Paralleling findings from the discounting literature, people higher in measured connectedness also have somewhat lower BMI (Urminsky & Bartels, 2017).

Along the same lines, when people see their behavior as having long-term health consequences, their motivation to choose in accordance with future health may depend on their discount rate and connectedness to their future self. Indeed, overweight undergraduates who were higher in measured connectedness visited the gym more often over the course of a year compared to those who were less connected to their future selves (Urminsky & Bartels, 2017). Likewise, for overweight visitors to a museum who were prompted to think about health consequences, prompting high (vs. low) connectedness reduced their choices of high-calorie snacks. These findings suggest that how connected people are to their future self will influence their motivation to engage in health-related behaviors. This finding has important implications for how one designs interventions and communications intended to promote a healthy lifestyle.

4.4.3 | Resource slack

Another important reason people often delay engaging in a healthy activity they understand to be beneficial is that they believe they will have more time and more money available in the future. This belief parallels the dynamic whereby consumers fail to save for retirement or refinance their mortgages, as discussed previously. For example, one reason people might delay going to the gym or seeing a specialist for a nagging pain is that they perceive themselves as having very little time or money now, but expect both to be more plentiful in the future. This idea is predicted by Slack Theory (Lynch, Spiller, & Zauberman, 2018; Zauberman & Lynch, 2005), which explains intertemporal preference, including both the overall rate of discounting and the extent of hyperbolic discounting, using the concept of slack.

In general, people perceive more slack in the future than now and therefore tend to devalue the costs and benefits of future outcomes. This tendency to undervalue future costs and benefits tends to be stronger for time use than for money use. These principles show how the time and money costs of attending the gym or seeing a dermatologist loom larger in the present than in the future. Specifically, when perceiving a need to see a dermatologist, people consider how busy they are now and how much more free time they will have in the future. They then tend to delay that (not urgent) appointment to the future. If they do not make a binding commitment, that delay is often extended, because there is always more time in the future than now.

Further, some health-related decisions that require a significant money investment could also be delayed, due to the belief that one will have more money in the future and simultaneously ignoring other future expenses one might have (Berman et al., 2016). Many people might delay expensive, non-insured, dental treatment, because they falsely believe they will have more money slack in the future than they do right now. Given that people are more likely to delay actions that have higher time costs than monetary costs, at least for some populations, making health behaviors easier to engage in (e.g., pop-up clinics that give flu shots) might be more beneficial than reducing costs (e.g., providing free vaccines).

In sum, health decisions provide a particularly relevant and consequential domain to study and apply intertemporal choices. Often, public policy takes an education-based approach to help consumers make more healthy decisions. Viewing health decisions from an intertemporal lens instead suggests a different, more situation-based approach for changing behavior.

5 | GENERAL DISCUSSION

The way that consumers trade off costs and benefits over time is at the core of many consumer decisions. The broad behavioral theories and models that pertain to these decisions fall under time discounting and intertemporal preferences. This area has been well reviewed, in terms of the behavioral anomalies (Frederick et al., 2002) and more recently, the psychological mechanisms (Urminsky & Zauberman, 2016). To provide a unique perspective relevant to consumer psychologists, in this article, we focused on the decisions themselves and presented the relevant psychological mechanisms as tools of analysis for various intertemporal-related decisions. The main message we advanced is that the intertemporal choice effects and theories are relevant to the extent that they allow us to better understand behavior around us. To that end, we selected four, presumably distinct, types of consumer decisions: financial decision-making, hedonic purchases, time management, and health decision-making. Within each decision domain, we demonstrated how the intertemporal choice literature can help analyze the motivations common to these decisions and potential behavioral interventions.

We also use our analysis as a call for future work that will identify key theoretical drivers of a particular behavior and design potential interventions that take advantage of this deeper understanding. Two examples for approaches that come from the financial decision-making domain are the "save more tomorrow" plan (Thaler & Benartzi, 2004) and the use of connecting to future selves via aged photographs (Hershfield et al., 2011). In both cases, with the first one being used on a mass scale, the underlying theory was used to design a tool that is subsequently experimentally tested. Other such tools might leverage mental representation of future versus present outcomes, associated future resource slack, or subjective perception of anticipated time, separate or in combination, to tackle the persistent tendency of many consumers in many situations to focus on the here and now.

Finally, although we believe the four domains we review point to important consumer decisions, other decision domains could benefit from similar analysis, such as environmental or education decisions. We selected these particular four domains primarily because they allow us to show how different types of decisions can be analyzed within these frameworks and theories. Our objective for this review article is to provide a powerful lens to be applied conceptually and tested empirically across a wider set of consumer decisions. Future research can broaden this analysis conceptually and build a foundation for empirical testing of interventions based on the relevant processes we identified.

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