

TO KNOW AND TO CARE: HOW AWARENESS AND VALUATION OF THE FUTURE JOINTLY SHAPE CONSUMER SAVING AND SPENDING

Daniel M. Bartels*, Oleg Urminsky*, and Shane Frederick†

**University of Chicago Booth School of Business, †Yale School of Management*

NOTE: THIS IS A DRAFT. COMMENTS ARE WELCOME, BUT PLEASE DO NOT CITE WITHOUT PERMISSION.

ABSTRACT

We find that reduced spending in the present requires the combination of both being motivated to provide for one's future self (valuing the future) and actively considering long-term implications of one's choices (awareness of the future). Feeling more connected to the future self—thinking that the important psychological properties that define your current self are preserved in the person you will be in the future—provides the motivation for consumers to make far-sighted choices by changing the valuation of future outcomes (e.g., discount factors). However, this change only reduces spending when opportunity costs are highlighted. Implications for the efficacy of behavioral interventions and for research on time discounting are discussed.

ACKNOWLEDGEMENTS

We thank Eugene Caruso, Pete McGraw, Stephen Spiller, Rob St. Louis and attendees at the Boulder Summer Conference on Consumer Financial Decision Making, Society for Judgment and Decision Making, Association for Consumer Research, and Society for Consumer Psychology conferences for helpful comments on this research, and we thank Jarrett Fowler for superogatory research assistance.

“If you're wasting \$5 a day on little things like a latte at Starbucks or a muffin, you can become very rich if you can cut back on that, and actually took that money and put it in a savings account at work, like a 401(k) plan or an IRA account... [I]n your 20s, you can actually be a multimillionaire by the time you reach retirement by simply finding your latte factor and paying yourself back.” (Bach 2002)

The advice above—offered by financial self-help guru David Bach—describes a savings strategy that is not easily followed. Continuous restraint is difficult to achieve: one must take into account the future opportunities that current indulgences displace and must value those future outcomes, even though the benefits enjoyed by future selves come at the cost of current forbearance. Individual differences in these two dispositions—considering and valuing future outcomes— may help explain why people in similar economic circumstances sometimes save at very different rates (Venti and Wise 2001). Contemporary work has investigated constructs underlying each of these factors individually, but has not integrated the two into a comprehensive framework that would address how they interact in shaping choices with intertemporal consequences.

In the current studies, we study how both factors *jointly* shape spending decisions. To examine the role of awareness of future consequences of one's choices on spending, we examine the degree to which people consider the opportunity costs of their choices. To examine the influence of valuing future outcomes on spending decisions, we do two things: (i) we measure and manipulate one antecedent of caring about future outcomes—psychological connectedness to the future self (which has been shown to impact time discounting, Bartels and Urminsky 2011), and (ii) we measure the valuation of future outcomes directly (via discount factors). We think that studying either factor in isolation yields an incomplete account, missing how these considerations interact to

shape intertemporal choices and therefore failing to predict when people exercise restraint in spending.

To develop the theoretical rationale for this argument, we first explore the motivational factors that influence how much people value their own future outcomes, and then discuss how the awareness of opportunity costs affects what people choose. We then contrast our novel account, where both factors are mutually reinforcing, with prior theories that assume awareness and valuation of future outcomes are either redundant or operated independently. Five studies find evidence for our novel idea that these factors are *mutually reinforcing*—valuing future outcomes reduces spending primarily when opportunity costs are considered. These results help account for the dearth of evidence showing a relation between time preference (as measured by elicited discount factors) and saving or restraint in spending. We conclude by discussing the potential limitations of well-intentioned interventions designed to improve consumer decisions.

THEORETICAL BACKGROUND

Valuation of future outcomes.

Time preferences (i.e., the strength of people's preference to receive outcomes sooner and thereby forego larger out-comes that occur later) have been interpreted as the degree to which the future is valued, and therefore have long been viewed as one of the primary determinants of savings and spending decisions (see Frederick, Loewenstein, and O'Donoghue 2002; Urminsky and Zauberman 2013 for reviews). While the degree of discounting, the functional form of discount rates, and correlates of discounting have been widely studied, less work examines the motivational reasons why people discount the value of future outcomes so steeply, and why some people are less patient than others. Prior work has instead primarily focused on either economic considerations (e.g,

liquidity constraints; Meyer, 1976) or perceptual accounts (e.g., subjective time, Zauberman et al. 2009; comparison of delay relative to outcome, Scholten and Read 2010).

One starting point for understanding the underlying motivation is the idea that a person can be construed as a temporal sequence of overlapping, but partly distinct selves (Parfit 1984), rather than a single identical entity over time. The motivation to sacrifice consumption on behalf of future selves could then depend on how “connected” the current self feels toward those future selves—how much overlap the person perceives with respect to beliefs, values, goals, and other defining features of personal identity. The more one anticipates change in these aspects, the less motivated the person may be to save for the future self who will benefit. Recent work implicates psychological connectedness as a determinant of intertemporal choices. High felt connectedness relates to impatience in intertemporal choice tasks (Bartels, Kvaran, & Nichols, 2013; Bartels & Rips, 2010; Ersner-Hershfield, Wimmer, & Knutson, 2009).

However, those studies—like most laboratory-based research on time discounting—measured intertemporal preferences using tradeoffs between explicitly specified smaller rewards available sooner and larger rewards available later (e.g., would you rather have \$500 in a week or \$1000 in a year?). Spending decisions, by contrast, are rarely explicitly framed as an intertemporal tradeoff (Rick and Loewenstein 2008). For example, a person might spend \$4 on a latte at Starbucks without thinking about opportunity costs at all (Frederick et al. 2009), and people may make such decisions without considering the future opportunity costs of the expenditure. This observation may help explain why attempts to use estimates of discounting derived from laboratory tasks to predict “far-sighted” decision making in the field have yielded mixed results (Barsky et al. 1997; Chabris et al. 2008; Chapman and Coups 1996; Fuchs 1982; Meier and Sprenger forthcoming; Melanko and Larkin 2013; Reimers et al. 2009; see Urminsky and Zauberman 2013 for a review).

Awareness of future outcomes.

A growing body of literature has shown that increasing the salience of opportunity costs or tradeoffs (we will use the two terms interchangeably) restrains spending. In particular, Frederick et al. (2009) find that merely reminding people that unspent money could be used for other purposes reduced intended spending. While some of the opportunity costs considered may be in the present (e.g., other items in the same store), the opportunity cost of a current purchase could often also be construed as reduced consumption in the future. Also, manipulations that explicitly direct attention to future consequences have been shown to increase preferences for delayed rewards (Hershfield et al., 2011), and a greater focus on long-term consequences predicts higher (reported) intent to save more money for retirement (Nenkov, Inman, & Hulland, 2008) and higher (reported) incidence of healthy behaviors (Strathman et al., 1994). Individual differences in the propensity for financial planning (e.g., explicit consideration of future spending) predict accumulated wealth, coupon use, and credit score (Lynch et al., 2010).

To date, there has been minimal overlap between research investigating the consideration of future outcomes and research investigating the valuation of future outcomes. Neither the distinction, nor possible interactions are typically discussed. For example, in empirical research using the widely studied tradeoff tasks (choices between explicitly specified outcomes differing in their delay and magnitude), the consideration of those future outcomes is taken for granted (Ainslie 1975; Chabris et al. 2008; Loewenstein and Prelec 1992, Mazur 1987; Samuelson 1937). Accounts of decision-making based on this discounting literature then often assume that people vary in their patience, without distinguishing between consideration and valuation of future consequences as determinants of patience.

In contrast, we argue that the consideration of future out-comes and the valuation of those outcomes are not only conceptually distinct, but the nature of the interaction between the two is important for understanding how people make everyday intertemporal choices. To illustrate the distinction, consider two people, Jan and Fran, who both spend all their discretionary income every month on current consumption instead of saving for the future, but for different reasons. Jan spends all her money because, even though she cares about her future welfare, she fails to consider her future financial needs when making purchases now. In contrast, Fran spends all her money because, despite being aware of the consequences, she doesn't care about what happens to her when she's old.

In this paper, we investigate the unaddressed question of whether and how these two factors interact in shaping people' spending decisions. The current studies offer insights into why financial outcomes have not been consistently predicted by measures of discounting in the prior literature by finding that awareness of and valuation of the future interact to predict people's choices.

Next, we discuss three distinct possibilities—our account and the two competing accounts implied by the prior literature—for how the combination of considering future consequences and valuation of future consequences might jointly influence choices with intertemporal implications. As illustrated in Figure 1, these accounts make different predictions about how purchase likelihood will be affected by manipulations that target the consideration of future outcomes (e.g., emphasizing opportunity costs vs. not) and valuation of future outcomes (e.g., affirming connectedness vs. not).

Are awareness and valuation of future outcomes the same construct?

One possibility is that the two factors are very closely linked in people's experience. Thinking more about future consequences may induce people to place a higher value on future outcomes than they would otherwise. Correspondingly, people who have a higher valuation for future outcomes in general may invest more effort in considering the future consequences of a specific choice.

H1—Inseparability: Restrained spending depends on a single construct reflecting the awareness of and valuation of future outcomes—greater awareness of future outcomes co-occurs with higher valuation of those outcomes. So, each factor induces the other.

Some research on intertemporal choice has taken a position consistent with this view. The degree of consideration of future outcomes has been interpreted as a determinant of discounting (Logue 1988, Radu et al. 2011). Conversely, impatience—steep discounting—has been proposed as underlying inattention to future outcomes (Ainslie 1992). More generally, some researchers have argued that those with more concern for the welfare of future selves (e.g., people who discount the future less) will be motivated to more assiduously investigate the future consequences of a present action (Hershfield, Cohen and Thompson 2013; Strathman et al. 1994).

If H1 holds, manipulating one factor would also affect the other: A manipulation that increased valuation of future outcomes would also increase consideration of future outcomes, such as opportunity costs and a manipulation that increased consideration of future outcomes would also increase valuation of those outcomes. So, prompting consideration of future consequences, prompting valuation of future consequences, or doing both would produce similar outcomes, as each is sufficient to promote far-sighted behavior (see first panel of Figure 1). In other words

purchases would be most likely when people are not thinking about opportunity costs *and* not valuing future outcomes.

H2—Independence: Awareness of future outcomes and valuing those outcomes contribute independently to restrained spending.

An alternative possibility is that each factor could independently influence choices. In line with this assumption, Adams and Nettle (2009) correlate measures of smoking outcomes with a survey-based measure of discounting and, separately, with the propensity to consider future consequences, without considering potential interactions. Similarly, quantitative models of dynamic discrete choice often either assume a fixed discount rate consistent with market interest and estimate aspects of the planning horizon (e.g., probability of taking future discounts into account, Hartmann 2006) or fix the planning horizon and estimate the discount rate (Yao et al. 2012).

Empirically, if H2 holds, manipulating either factor would not affect the efficacy of the other factor—the likelihood of purchase would reveal two simple effects with *no* interaction (see middle panel of Figure 1).

H3—Mutual reinforcement: Restrained spending requires both being aware of future outcomes and valuing those outcomes.

Lastly, we propose a novel third view, distinct from both H1 and H2 and unexplored in the prior literature. We argue that consideration of and concern for future outcomes may be neither equivalent nor independent, but may instead be mutually reinforcing. The specific interaction we predict is the following: Consideration of future consequences will promote restrained spending

more when that the person cares about the welfare of her future self, and this concern will motivate thrift more when she sees her current consumption as reducing future welfare.

To flesh out some of the contrasts, let's return to our earlier example: Jan spends all her money because she although she cares about her future needs, she doesn't think about them when making purchases, whereas Fran understands the consequences of her current spending but doesn't care about what happens to her when she's old. The distinction between Jan and Fran is inconsistent with H1, which suggests that (i) interventions that increase valuation their future consequences or (ii) simple reminders to consider tradeoffs would help both reduce their spending (because they collapse to one construct). But in this example, the former wouldn't help Jan, and the latter wouldn't help Fran. H3, on the other hand, implies that making Jan care more about her future self won't reduce spending nor will reminding Fran of the tradeoff she's making. But doing the reverse—reminding Jan and inducing caring in Fran—would, as would combing these interventions.

While H3 is reflected conceptually in some quantitative models of dynamic decision making (e.g., Winer 1997), the two factors have not been jointly estimated due to the difficulty in separately identifying both factors from choices observed in panel data. However, we can test H3—and distinguish its predictions from those of H1 and H2—using direct measurement and experimental methods. Under H3, manipulations that prompt consideration of future outcomes will be most effective at reducing purchases when people value (or are prompted to value) those future outcomes, as shown in the last panel of Figure 1. As a result, reduced spending will occur primarily when both conditions hold: opportunity costs are recognized and valuation of future outcomes is high.

In this paper, we test the mutual reinforcement account (H3) against the two alternative possibilities suggested by the prior literature (H1 and H2) across five studies. As noted earlier, to address the first construct—valuation of future outcomes, we do two things: (i) we measure and

manipulate one antecedent of caring about future outcomes—psychological connectedness to the future self and (ii) measure the valuation of future outcomes directly (via discount factors). To address the second construct, we both measure people’s tendency to consider future outcomes (via their propensity to plan) and manipulate it (by providing opportunity cost reminders and prompting relative comparisons). We discuss the novel implications of our findings for the design of policy interventions.

STUDY 1A: CONNECTEDNESS AND OPPORTUNITY COST SALIENCE JOINTLY DETERMINE WILLINGNESS TO PURCHASE

Studies 1a and 1b examine how the recognition of tradeoffs inherent in choices and how valuation of the future (which increases with greater connectedness to the future self—Study 1a, and that is reflected in measures of discounting—Study 1b) jointly determine financial decisions. Any single contemplated expenditure, by itself, rarely jeopardizes any other specific spending or savings goals and, thus, may often be made without considering opportunity costs. However, the notion of opportunity cost can be readily cued, and we predict that doing so will potentiate the relation between connectedness and thrift.

Method

Eighty-eight adults were approached on a college campus and nearby museum to complete a short survey in return for a candy bar. They rated psychological connectedness to the future self—the degree to which they felt that the important psychological properties that define their current selves would be preserved in their future selves—on a 100 point scale, and on a corresponding visual analog scale utilizing Euler circles, also scored to range from 0 to 100 (see Appendix A for materials). These two measures were substantially correlated ($r = .40, p < .001$), and we used the

average as our measure of connectedness. Then, following Frederick et al. (2009), respondents chose whether to spend \$14.99 on a hypothetical DVD, and we manipulated the salience of the expenditure's opportunity cost by including or excluding the reminder in brackets below:

Imagine that you have been saving some extra money on the side to make some purchases, and on your most recent visit to the video store, you come across a special sale on a new DVD. This DVD is one with your favorite actor or actress, and your favorite type of movie (e.g., comedy, drama, thriller, etc.). This particular DVD that you are considering is one that you have been thinking about buying for a long time. It is available at a special sale price of \$14.99.

What would you do in this situation? (please circle A or B)

(A) Buy this entertaining DVD

(B) Not buy this entertaining DVD [keeping the \$14.99 for other purposes]

Results and Discussion

Replicating prior work, we found that providing an information-neutral opportunity cost cue marginally reduced purchase intentions (from 71% to 51%; $\chi^2(1) = 3.69$; $p = .055$). More importantly, as predicted by H3, the relation between psychological connectedness and purchase intent was much stronger when opportunity costs were highlighted (biserial correlation $r(43) = -.41$, $p < .01$), than when they were left implicit (biserial correlation $r(45) = .04$, *n.s.*; difference between correlations $z = 2.14$, $p < .05$). A spotlight analysis based on a fitted logistic regression model (Figure 2; Appendix B, Table 1) found that the opportunity cost cue was especially effective for consumers with connectedness scores one-standard deviation above the mean (for whom the opportunity cost reminder decreased purchase rates from 73% to 30%). Conversely, among those whose connectedness scores were one standard deviation below the mean, the manipulation had little effect (the reminder slightly increased purchase intent from 69% to 74%).

These results are inconsistent with the alternative possibilities (H1 and H2). Under H1 (Inseparability), we would not expect to see an effect of manipulating opportunity cost salience

among those who were high in connectedness to the future self, because H1 predicts that people high in connectedness would spontaneously consider opportunity costs. Under H2, we would expect to see an equally strong effect of manipulating opportunity costs for those who are high or low in connectedness. So, these results suggest—consistent with H3—that restraint in spending arises from the *combination* of opportunity cost salience (that facilitates the recognition that money saved now can be spent later) and connectedness to the future self (that motivates caring about the future selves for whom the money is being saved).

STUDY 1B: OPPORTUNITY COST SALIENCE AND ESTIMATES OF DISCOUNTING JOINTLY DETERMINE WILLINGNESS TO PURCHASE

As noted earlier, while prior work has theorized that estimates of discounting elicited via explicit tradeoffs would predict a wide range of behaviors, relatively modest correlations between estimates of discounting and behaviors in the field have been found (see Urminsky and Zauberan 2013 for a review). In particular, to our knowledge, there is no research linking level of spending (such as purchase probabilities or amount spent) and separately measured discounting measures. The results of Study 1a suggest one reason: in contrast with the stylized choices involving explicit tradeoffs that have been studied in discounting tasks, many real world choices lack explicit tradeoff cues. So, we predict that measures of discounting will correlate more strongly with purchase choices when tradeoffs between the choice options are highlighted.

Method

Two hundred thirty three online participants completed a titration task where participants chose between \$900 in a year and various smaller amounts available immediately. We used these choices to compute the *discount factor* (the proportion of present value retained when the amount of

money is delayed, often represented by δ) for each participant. Some researchers instead report discount rates (often represented by r). These estimates of discounting are simple nonlinear transformations of each other: $\delta = 1/(1+r)$, and $r = (1/\delta)-1$. We use the discount factor because the distribution of elicited discount rates is often highly skewed. A high discount factor represents a high degree of patience, or valuation of the future, while a low discount factor signals impatience, or steep discounting (i.e., a high discount *rate*). After responding to the discounting task, participants decided whether to purchase the DVD, with opportunity cost salience manipulated as in Study 1a.

Results and Discussion

As predicted by H3, and inconsistent with both H1 and H2, the relation between discount factor and purchase intent was stronger when opportunity costs were highlighted ($r(121) = -.20, p < .05$), than when they were left implicit ($r(112) = .09, p > .10$; difference between correlations $z = 2.21, p < .05$). A spotlight analysis based on a fitted logistic regression model (Figure 2; Appendix B, Table 2) found that for patient respondents (those with discount factors one standard deviation above the mean) the opportunity cost reminder was effective – its presence decreased purchase rates from 56% to 34%. For impatient respondents, the manipulation had little effect – purchase rates went from 46% without a reminder to 53% with the reminder.

These results support the contention that how people trade off the present against the future (as represented by their measured discount factor) predicts their purchase decision specifically when tradeoffs in the purchase context are made salient. This result is (directionally) weaker than in Study 1a, consistent with the view that elicited discount factors are multiply determined while connectedness represents a motivational determinant of discount factors that may be particularly relevant to reducing spending. We will revisit the role of discounting in Study 4, where we both

manipulate connectedness to the future self and measure the resulting differences in discount factors.

More broadly, the findings suggest a solution to the puzzle of why estimates of discounting do *not* consistently predict consumer behavior in previous studies, despite representing a stable individual difference (as evidenced by test-retest reliability per Simpson and Vuchinich 2000; see Urminsky and Zauberman 2013 for a review). When behaviors are not spontaneously construed as a tradeoff between present costs and future benefits at the time of choice (e.g., flossing, making credit card payments on time), we anticipate that measured discount factors will be a relatively weak predictor. However, when behaviors are spontaneously construed as intertemporal tradeoffs (e.g., trading off time and inconvenience now to avoid periodontal disease or interest charges later), discount factors, as elicited via explicit intertemporal tradeoffs, should be an effective predictor. Conversely, many behavioral interventions (or “nudges”), such as providing information about future consequences (Koehler, White, and John 2011) or reminders of one’s long-term plans (Karlan et al. 2012) may be ineffective for precisely those people whose behavior appears the most shortsighted—those who heavily discount the future.

STUDY 2: THE ROLE OF SPONTANEOUS AND PROMPTED OPPORTUNITY COST CONSIDERATION IN DISCRETIONARY SPENDING

In Study 1, we manipulated the salience of opportunity costs, but some people may not require such prompts. Spiller (2011) found that people with greater propensity to plan for the future (a scale introduced by Lynch et al., 2010) are more likely to spontaneously recognize opportunity costs. We predict that connectedness to the future self should be a stronger predictor of discretionary

purchasing among those with greater propensity to plan, much as we predict it to be when opportunity costs are experimentally cued.

Method

One hundred ninety-nine adult consumers completed an online survey involving the DVD scenario and connectedness measures used in Study 1, the “Consideration of Future Consequences” scale (Strathman et al. 1994), and the “Propensity to Plan for Money” scale (Lynch et al. 2010) adapted to a one-year time frame. We also measured the Elaboration of Potential Outcomes scale (Nenkov et al, 2008), but only weak non-significant relationships were found and we do not discuss further.

Results and Discussion

The opportunity cost manipulation reduced intended purchase rates from 63% to 49% ($\chi^2(1) = 4.1; p < .05$). As in Study 1a, the manipulation did not affect the subsequent connectedness measure ($r(199) = -.02, p = .82$), confirming that awareness of future implications and concern for them (as measured by connectedness) are empirically distinct, contrary to H1. (Also, because the manipulation of opportunity costs affected choices but not the later connectedness measure, this pattern is not consistent with a self-generated validity interpretation of connectedness—i.e., that participants inferred their connectedness from their choice; Feldman and Lynch 1988).

A spotlight analysis based on a fitted logistic regression model (Figure 2; Appendix B, Table 3) found that the opportunity cost cue was especially effective for people with connectedness scores one-standard deviation above the mean (for whom the opportunity cost reminder decreased purchase rates from 58% to 28%). Conversely, among those whose connectedness scores were one standard deviation below the mean, the manipulation had no effect (68% vs. 72%).

In this study, we analyzed two measures of spontaneous consideration of opportunity costs. The consideration of future consequences scale and the propensity to plan scale correlated strongly with each other ($r = .53$). Both measures also correlated significantly— though not especially strongly—with connectedness to the future self ($r_s = .18$ and $.22$, $ps < .01$).

Overall, purchase intent was negatively correlated with connectedness, propensity to plan, and consideration of future consequences (biserial correlations of $r = -.26$, $p < .01$; $r = -.19$, $p < .01$ and $r = -.17$, $p < .05$). However, as predicted by H3, higher connectedness related to lower purchase intent when opportunity costs were highlighted ($r(97) = -.42$, $p < .01$), but not in the control condition ($r(102) = -.09$, $p > .10$). The difference between correlations is statistically significant ($z = -2.48$, $p < .01$).

When opportunity costs were experimentally highlighted, the spontaneous propensity to plan became a directionally weaker predictor of purchase intent ($r = -.31$ vs. $-.09$, $p = .10$), as did consideration of future consequences ($r = -.24$ vs. $-.12$, $n.s.$). These results suggest three insights: (i) psychological connectedness to the future self has a greater effect on purchase decisions when tradeoffs are highlighted, (ii) highlighting tradeoffs reduced spending more for participants low in propensity to plan—Spiller 2011 reports a similar result, where consumers who score low on propensity to plan are more context-sensitive in their consideration of opportunity costs, and (iii) highlighting tradeoffs reduces the significance of individual differences in the spontaneous tendency to do so.

To model the combined effects of these factors, we jointly regressed respondents' purchase decision on opportunity cost cue, connectedness, propensity to plan and the interactions between these variables. All of the predictor variables except for connectedness and all pairwise interactions were significant. More importantly, the three-way interaction was significant (all $ps < .01$),

indicating that measured propensity to plan moderated the interaction of connectedness and opportunity cue reminder. The full details of the logistic regression are given in Table 4 of Appendix B. We find similar results in a second analysis where we replaced propensity to plan with consideration of future consequences (see Table 5 in Appendix B).

Figure 3 presents a spotlight analysis that suggests that connectedness depressed purchase intent when opportunity costs were chronically salient (for people with a high propensity to plan) or situationally salient (an opportunity cost cue was provided). Unexpectedly, among those with low propensity to plan who were not cued to consider tradeoffs, connectedness significantly elevated purchase intent. However, there is no significant overall positive effect of connectedness on purchase probability when the opportunity cost cue is not present. We also do not find a significant effect in the other studies (although we see corresponding positive non-significant effects in Studies 3 and 4), and we therefore do not speculate about what might have caused the significant effect here.

These findings have implications for understanding the efficacy of behavioral interventions that remind people of the future consequences of their actions (e.g., that buying a latte means spending down one's retirement account). Such interventions are likely to be less effective for those who don't identify strongly with their future selves (and may therefore steeply discount the value of future outcomes) and are likely to be redundant for people who already spontaneously construe the opportunity costs of their choices.

STUDY 3: HIGH CONNECTEDNESS AND SALIENT OPPORTUNITY COST DECREASE PREFERENCE FOR AN EXPENSIVE OPTION

The prior results support our contention that financial restraint arises from the combination of connectedness to the future self (which motivates savings) and recognition of tradeoffs (whether

spontaneous or experimentally induced). In the following study, we extend these findings by manipulating (rather than merely measuring) connectedness.

Method

We collected 137 complete surveys from adult online participants who were considering buying an iPad. Using a 2 x 2 between-subjects design, we crossed an opportunity cost manipulation used by Frederick et al. (2009) with a psychological connectedness manipulation used by Bartels and Urminsky (2011), which induces the belief that one's identity will (or will not) substantially change. Specifically, participants in the high connectedness condition ($N = 69$) began by reading a short description of recent research suggesting that adulthood is characterized by stability in identity (e.g., "*the important characteristics that make you the person you are right now... are established early in life and fixed by the end of adolescence*"). Participants in the low-connectedness condition ($N = 68$) read about instability (e.g., "*the important characteristics that make you the person you are right now... are likely to change radically, even over the course of a few months....*"). To ensure comprehension, participants wrote a one-sentence summary of the passage they read. They then rated their connectedness to the future self as described in Study 1a. The manipulation influenced rated connectedness as intended ($M = 77.1$, $SD = 16.3$ in the high condition vs. $M = 62.8$, $SD = 19.5$ in the low condition; $t(135) = 4.68$, $p < .01$).

Participants were then presented with the choice below. The \$100 price difference between the two products was left implicit in the control condition ($N = 67$), but stated explicitly for participants in the "salient opportunity cost" condition ($N = 70$). These prices were accurate when the study was run:

Imagine that you have been saving some extra money on the side to make some purchases, and that you are faced with the following choice. Select the option you would prefer.

(A) Buy a 64 Gigabyte Apple iPad for \$735

(B) Buy a 32 Gigabyte Apple iPad for \$635 [leaving you \$100 for other purposes]

(C) Not buy either iPad

Results and Discussion

In the high connectedness condition, adding the opportunity cost reminder decreased the choice share of the premium iPad, from 35% to 6% ($\chi^2 = 9.3, p < .05$) but had no such effect in the low connectedness condition (27% vs. 23%, *n.s.*). The difference in connectedness only reduced choices of the premium product when opportunity costs were cued (23% vs. 6%, $\chi^2 = 4.2, p < .05$), but not when the cue was absent (27% vs. 35%, *n.s.*).

We also coded the spending level of the chosen option (\$0, \$635, or \$735) and regressed this measure on connectedness, opportunity cost cue, and their interaction. Here, we find the predicted interaction ($\beta = -59.97, t = -2.10, p < .05$) and no main effects ($\beta_s = -12.10$ and $-22.32, t_s < 1$ for Connectedness and Opportunity Cost Cue; See Table 8 of Appendix B), suggesting that exercising financial restraint requires both high degrees of connectedness to one's future self and a reminder to consider opportunity costs of current expenditures. Similarly, we found no significant main effects in an ordinal regression analysis, but did observe the predicted interaction ($\beta = -.377, \text{Wald} = 4.4, p < .05$; see Figure 4 and Table 7 of Appendix B), suggesting that exercising financial restraint requires both high degrees of connectedness to one's future self and a reminder to consider opportunity costs of current expenditures.

STUDY 4: CONNECTEDNESS TO THE FUTURE SELF AFFECTS CHOICES BY DECREASING TEMPORAL DISCOUNTING

Previous work had shown that connectedness to the future self affects time discounting, as measured by explicit tradeoffs between receiving lump sums of money at discrete times. Time discounting, in turn, is often theorized to underlie consumer decisions about spending and saving. In Studies 1a and 1b, we found parallel effects of measured connectedness and discount factors, such that valuing the future corresponded to less purchasing only when opportunity costs were cued. Study 4 explores how connectedness and discount factors jointly relate to consumer choices. To do so, we manipulate both opportunity cost salience and connectedness, and we measure time preference (via discount factor), observing the effect on a discretionary purchase decision similar to that used in Study 3. Doing so allows us to test whether and when specifically *connectedness-induced changes in time preference* affect people's discretionary purchase choices.

Study 4 will help address the puzzle of why estimates of discounting often weakly predict consumer behavior, as Study 1b did. Replicating our earlier result, we will again find that discount factors predict discretionary purchase behavior only when tradeoffs are highlighted. Study 4 also examines the process by which connectedness affects consumer financial decision making. We find that (i) manipulating connectedness to the future self changes how people value the future (as reflected by discount factors), and (ii) it is primarily when opportunity costs are made explicit that these changes in discount factors explain changes in people's spending vs. saving decisions.

Method

We collected 146 complete surveys from adult online participants who indicated that they were considering buying an iPad 2. Connectedness was manipulated as in Study 3, and opportunity cost salience was manipulated by leaving the \$230 price difference between two iPad 2 models

implicit in the control conditions ($N = 79$) or highlighting the difference for participants in the “high opportunity cost salience” conditions ($N = 67$). These prices were accurate when the study was run:

Imagine that you have been saving some extra money on the side to make some purchases, and that you are faced with the following choice. Select the option you would prefer:

(A) Buy a 64 Gigabyte iPad 2 with Wi-Fi and 3G for \$829

(B) Buy a 32 Gigabyte iPad 2 with Wi-Fi for \$599 [leaving you \$230 for other purposes]

(C) Not buy either iPad 2

Following the iPad choice, an average annual discount factor was computed for each participant by averaging responses to four discounting tasks involving choices between smaller-sooner and larger-later monetary shown in Appendix C ($\alpha = .86$, although estimates of reliability can be inflated by common method variance; Kardes, Allen, and Pontes 1993).

Results and Discussion

Time preference. Making people feel more psychologically connected to their future selves increased the value respondents placed on future outcomes, as assessed by the traditional discounting tasks (average discount factor $\delta = 0.51$, $SD = .21$ vs. average $\delta = 0.58$, $SD = .17$; $t(144) = 2.16$, $p < .05$; see also Table 9 in Appendix B).

Spending on discretionary purchase. Increasing connectedness eliminated choices of the premium product when opportunity costs were cued (9% vs. 0%), but had no effect when the cue was absent (8% vs. 7%). Given the low rate of selecting the premium product and the zero cell (no purchases of the expensive iPad in the opportunity cost salient, high connectedness condition), we coded the spending level of the chosen option (either \$0, \$599, or \$829) for statistical analysis.

Making people feel more connected to their future selves only reduced spending when opportunity costs were cued ($M = \$311$, $SD = 332$ vs. $M = \$159$, $SD = 268$; $t(65) = 2.08$, $p < .05$),

but not when the cue was absent ($M = \$213$, $SD = 317$ vs. $M = \$273$, $SD = 324$, *n.s.*). Neither of the manipulations had significant main effects in a linear regression predicting intended spend, but we again found the predicted interaction between opportunity cost and connectedness ($\beta = -53.25$, $t = 2.05$, $p < .05$; Table 10 of Appendix B). Note that an ordinal regression yields the same results, but the linear regression is reported because the observed zero cell violates the assumptions of the significance tests used in ordinal regression. Figure 5 shows that the experimental induction of greater connectedness reduced spending only when opportunity costs were explicit.

The reduction in spending caused by high connectedness when opportunity costs were cued was driven by a marginally significant increase in not purchasing (52% vs. 74%, $\chi^2 = 3.47$, $p = .06$). When opportunity costs were not cued, there was no increase in refraining from purchasing between the low vs. high connectedness conditions (68% vs. 57%, $\chi^2 = .91$, $p > .3$). A logistic regression predicting non-purchase reveals a significant interaction between opportunity cost salience and connectedness ($\beta = .704$, Wald = 4.0, $p < .05$) and no significant main effects.

Role of time preference.

When opportunity costs are explicit, choosing whether to buy an expensive iPad or save the money for something else more closely resemble the choices used to impute the discount factor—both are decisions explicitly framed as a tradeoff. Consistent with this view, the more patient participants with higher discount factors (imputed from intertemporal choices, see Appendix C) chose to spend less in the scenario only when opportunity costs were explicit, ($r = -.31$, $p < .05$), and discount factor did not predict iPad choice otherwise ($r = .08$, *n.s.*). These results help explain why discount factors imputed from choices involving *explicit* tradeoffs may have limited predictive validity for a large variety of real-world choices—those where the tradeoffs are not spontaneously considered.

Our data suggest that the effect of connectedness on spending is both moderated by the opportunity cost cue and partially mediated by the discount factor (see Figure 6). Specifically, when opportunity costs are cued, the connectedness-induced change in spending is mediated by connectedness-induced changes in time preference. In contrast, connectedness-induced changes in time preference do not affect spending when opportunity costs are not cued.

In support of this interpretation, we found a significant main effect of manipulating connectedness on the discount factor ($p < .05$, Table 9 in Appendix B), and a significant interaction between the connectedness and opportunity cost cue manipulations on spending ($p < .05$, Table 10 in Appendix B). Also, we find a significant interaction between discount factor and opportunity cost cue ($p < .05$, Table 11 in Appendix B) on spend. The interaction between connectedness and opportunity cost is reduced when the model includes an interaction between discount factor and opportunity cost (Table 12 in Appendix B).

Based on the framework of Muller, Judd and Yzerbyt (2005), this suggests that opportunity cost salience moderates the effect of connectedness on spending through its effect on the discount factor. Consistent with this interpretation, we find a significant moderation by opportunity cost cue of the indirect effect of connectedness on spending (via discount factor) ($\beta = -335.8$, $t = -2.39$, $p < .05$), in a moderated mediation model (Figure 6, based on Model 3 in Preacher, Rucker and Hayes, 2007).

Study 4 addresses both (i) when it is that connectedness to the future self will *not* affect people's spending (specifically, when opportunity costs are neglected) and (ii) the process by which connectedness *does* affect spending. Our results suggest that making a person feel more connected to the future self reduces their spending precisely because of changes in how they value the future. The effect of the connectedness manipulation on choices involving stylized monetary rewards

parallels the effect on discretionary purchase decisions, provided that the opportunity costs are salient. By making the opportunity costs of buying an iPad explicit, participants are invited to think through the tradeoffs in this purchase decision, and the purchase choice is therefore predicted by the discount factor imputed from choices involving explicit tradeoffs. In contrast, the same discount factor may have limited validity for predicting those choices that are not viewed by the decision maker as tradeoffs.

STUDY 5: CHANGES IN CONNECTEDNESS CAUSE CHANGES IN PRICE SENSITIVITY WHEN TRADEOFFS ARE CUED

So far, our results suggest that people who think of choices as affecting future selves they care for will make more far-sighted choices—foregoing the impulse to purchase goods they covet but can sensibly forego. One interpretation of these results is that the combination of connectedness to the future self and opportunity cost salience merely makes people less willing to spend in the present and therefore more likely to reject any purchase.

Alternatively, those more connected people who are aware of opportunity costs may be more likely to trade off the consumption value of the product on offer against the long-term utility of not spending (e.g., the value of money in the bank), resulting in spending that is more focused on what the person values most highly. If this happens, a greater reduction in spending will be concentrated among products that provide low value to the person. To test this, in the following study we examine which purchases are most affected by our connectedness and opportunity cost manipulations. We also extend our results by using a common task (considering the relative desirability of multiple product categories before shopping) to manipulate the salience of tradeoffs.

Method

We collected 130 complete surveys from online participants. We crossed a connectedness manipulation with a tradeoff salience manipulation. The procedure consisted of three stages: First, we manipulated connectedness by randomly assigning respondents to estimate the difficulty of generating 10 [2] reasons why their own identity would re-main very stable over the next year, after reading that most participants in a previous study could do so (see Bartels & Urminsky, 2011). We expected that participants considering two reasons would find the task easy, and therefore have no reason to doubt the stability of their identity. In contrast, those considering ten reasons would anticipate difficulty generating the reasons, and would therefore interpret this experience as evidence of lower connectedness to their future selves.

In the final two stages, participants completed two tasks: (i) ranking the desirability of six product categories (pocket video cameras, blenders, bed sheets, pocket watches, laser printers, and nonstick frying pans) from 1 = “Most desirable; the kind of product I want the most” to 6 = “Least desirable; the kind of product I want the least”, and (ii) choosing between a more and less expensive product from each of those categories.

In the high tradeoff salience condition, the ranking task preceded the decision of which product to purchase. The ranking task was intended to make tradeoffs between different priorities more salient, encouraging recognition that satisfying one purchase goal subordinates others. At a minimum, the task makes participants contemplate at least five other uses of their money before their first decision of whether to splurge or save. In the low tradeoff salience condition, the same ranking task was completed after making the choices.

We expected the connectedness manipulation to have the strongest effect when tradeoffs were highlighted by the ranking task. Our analyses focused on how often, and under which conditions, participants "splurged" by buying the more expensive product in each of the six

categories. This design also allows us to examine how closely that choice relates to the ranked desirability of the product category, testing whether the combination of high connectedness and high tradeoff salience motivate thrift across the board, or whether knowing and caring about future outcomes causes people to reduce spending for less-valued categories.

Results and Discussion

Number of Expensive Purchases. As predicted, people forced to consider tradeoffs (by initially ranking the categories) chose fewer premium products when made to feel more connected (1.45 vs. 2.36, $t = 3.08$, $p < .01$), but connectedness had no effect when the ranking task came second (2.19 vs. 2.03, *n.s.*). A linear regression confirmed that the predicted interaction was significant ($\beta = -.27$, $t = -2.38$, $p < .05$; see Table 13 in Appendix B), but found no effect of tradeoff salience and a marginal main effect of connectedness. Analyzing the amount spent yields a similar result: when tradeoffs are cued, higher connectedness yields lower spending (\$489 vs. \$503, $t = 2.99$, $p < .01$) but otherwise has no effect (\$500 vs. \$498). A linear regression predicting total intended spend confirms the significant interaction ($\beta = -3.78$, $t = -2.16$, $p < .05$; see Table 14 in Appendix B) and finds a marginal main effect of connectedness and no effect of opportunity cost.

Price Sensitivity. Participants ranked the six categories, from most to least preferred. For each participant, we computed the correlation between the rank assigned to that category of product (1 through 6) and their decision to purchase the more expensive item within the category. Across all conditions, the average within-subjects correlation was significantly less than zero (average $r = -.12$, $t = -3.64$, $p < .001$)—respondents were less likely to splurge for categories they cared less about. Further probing reveals that higher (vs. lower) connectedness yields fewer choices of the premium option in the less preferred categories (average $r = -.25$ vs. $.06$, $t(64) = 3.40$, $p = .001$) when

tradeoffs are highlighted, but not when they are not highlighted (average $r = -.15$ vs. $.09$, *n.s.*). A mixed within-between ANOVA confirmed the three way interaction between category ranking, connectedness and opportunity cost salience (see Table 15 in Appendix B).

These results suggest that among participants who were made to feel more connected to the future self, the tendency to splurge was not only reduced, but spending was more concentrated in the most personally important product categories, which was especially pronounced in the high tradeoff salience conditions (i.e. when people ranked categories before choosing). To illustrate, Figure 7 presents the fraction of times respondents chose to splurge in the higher ranked (top 3) vs. lower ranked (bottom 3) product categories. As predicted, only those in the high connectedness, high tradeoff salience condition had fewer choices of the premium product for the lower-ranked (vs. higher ranked) categories ($M = .14$, $SD = .21$ vs. $M = .34$, $SD = .29$, $t(37) = 3.73$, $p < .001$). No such difference was observed in the other conditions (all $ps > .10$). So, it is specifically when opportunity cost is highlighted and connectedness is heightened that people reduce spending, specifically on less desirable products (relative to all other conditions).

This study generalizes our findings to a more typical purchase situation. A task that people often do before shopping—prioritizing categories of spending—can highlight tradeoffs, and this facilitates the effect of connectedness on fiscal restraint. Also, the restrained spending occurs for purchases of product categories that are less personally desirable. As a result, higher-connectedness respondents' tastes for spending are both reduced and more focused after completing the ranking task.

GENERAL DISCUSSION

Seemingly myopic behavior is often attributed to consumers' failure to anticipate future consequences and to consider them at the moment of decision. This assumption motivates

requirements for restaurants to post detailed calorie information and for credit card companies to specify the long-term costs of debt. Such informational interventions sometimes do affect consumer behavior. However, an alternative view is that seeming shortsightedness is not due to lack of information about future outcomes, but instead arises from undervaluing those outcomes, which suggests different interventions. Little is known about how the efficacy of interventions might vary across different types of consumers, nor about how multiple interventions would work in concert. Our findings suggest a potential resolution of this problem.

The general framework of consumer financial decision making that we advance in this paper recognizes two key factors that jointly determine choices: (i) valuation of one's future interests (which is partially determined by connectedness) and (ii) awareness of the intertemporal tradeoffs entailed by current choices. These key factors have been studied before, but largely in isolation, and examining them together yields insights that are distinct from prior theories and not apparent when either is studied alone.

We find that the mere awareness of opportunity costs, by itself, is insufficient to motivate fiscal restraint among people low in connectedness, who place lower value on the additional future consumption made possible by current thrift, and therefore may be least prone to save. We also find that the motivation to provide for future selves is insufficient to motivate far-sighted behavior, absent explicit reminders of the future consequences of current expenditures. These findings are inconsistent with Hypotheses 1 and 2. Also, making opportunity costs salient only modestly increased discount factors (Study 4), and had no effect on measured connectedness (Study 2), inconsistent with H1.

Consistent with Hypothesis 3, however, time preferences matter most when opportunity costs are salient – whether salience arises through overt reminders to consider opportunity costs,

through individual differences in how spending is construed (as assessed by the Propensity to Plan scale), or by having consumers rank the importance of different categories of goods before making purchase decisions. We find this relationship with both discount factors as a measure of general time preference, and connectedness to the future self, which captures the motivation to preserve resources for the future. Alternative interpretations of connectedness are assessed in the pretest reported in Appendix D of this paper, as well as in Bartels and Urminsky (2011).

We believe that these findings shed light on when spending and saving decisions will be influenced by consumers' attitudes toward their future selves. In an unpublished field survey with 304 adult bank customers, we find a correlation between connectedness and savings (even controlling for income and demographics) among participants who reported that they enjoyed managing their finances and looked forward to it. In contrast, we find no such correlation among participants who report that they dislike managing their finances, presumably because their lack of engagement reduces the spontaneous consideration of financial tradeoffs.

We note, however, that the efficacy of making tradeoffs salient may depend on the *specific* opportunity costs that are highlighted. We would expect discounting and connectedness (via its influence on discounting) to matter more if the opportunity costs were explicitly characterized as *future consumption* (as in a commercial by *Sun America* that characterizes the cost of a \$70,000 luxury car as the removal of \$326,000 from one's retirement account). Since our opportunity cost reminders were generic and not tailored to specifically prompt thoughts of the *future* opportunities displaced by current indulgences, our tests may be a conservative test of the interaction we posit.

Lastly, we note that our findings relate to issues that arise in the empirical modeling literature on dynamic decision making, where the distinct effects of time discounting and planning horizon are often not identifiable in the available data. One common approach is to set the discount

factor to some level (e.g., one set by aggregate asset returns or cost of capital, or sometimes just by picking a seemingly reasonable number, such as $\delta = .995$ in Erdem and Keane 1996) and to assume that consumers are fully forward-looking, in that they accurately take into account all future outcomes (Erdem and Keane 1996; Sun, Neslin, and Srinivasan 2003; Nair 2007). More recently, research that tries to estimate discount factors from dynamic behavior has treated consumers as fully forward-looking either by assumption (Yao et al 2012) or by experimentally providing full information (Dube, Hitsch, and Jindal 2013). Our findings imply that time preference and planning horizon are not equivalent, and highlight the importance of qualifying the interpretation of models that make strong assumptions about either factor.

Implications for Interventions in Financial Decision Making.

The large literature on financial decision making has explored various interventions aimed at promoting far-sighted behavior. Many interventions target people's presumed lack of information to optimize such decisions. For example, credit card companies are required to disclose the monthly payment needed to pay off one's accumulated debt in three years, cigarette packaging requirements mandate explicit warnings of the long-term health consequences of smoking, and New York requires chain restaurants to post calorie information.

Related interventions assume that people may fail to fully process information or fail to summon it at the right time. For example, studies have found increased savings or reduced debt from interventions like reminding people of the consequences of failing to save (e.g., Koehler et al., 2011) or to stick to a debt repayment schedule (Zinman and Karlan 2012). Presumably these manipulations affect behavior by bolstering the accessibility of intertemporal tradeoffs in the face of competing cognitive demands. Other interventions, such as surveys about banking and savings

(Dholakia & Morwitz, 2002), or collecting deposits in person (Ashraf, Karlan, & Yin, 2006) may provide inadvertent reminders, with similar effects.

However, informational interventions have not always been found to be effective (e.g., Karlan, Morten and Zinman 2012). The current studies suggest that these kinds of interventions can fail to have an impact either because such tradeoffs are spontaneously taken into account (a person may have a high propensity to plan) or because people have low connectedness with the future selves their current forbearance would benefit. So, efficacy of interventions will vary markedly across people, for reasons unrelated to the intervention's potential benefit. Our analysis suggests that connectedness-increasing interventions may therefore increase the efficacy of informational manipulations. However, not all informational interventions will necessarily have such positive synergies: for example, an ad that emphasizes the costliness of medicating our frail older selves could well undermine the feelings of connectedness that provides our motivation to save for those older selves in the first place.

If intertemporal preferences are stable, our results are consistent with the characterization of informational interventions as “nudges” (Sunstein and Thaler 2008) that affect the choices of those who want to make far-sighted choices but not those of people who have a preference for current consumption. However, recent research on connectedness suggests that intertemporal choices may not represent stable preferences, and therefore bolstering people’s sense of connectedness with their future self could also be seen as an alternative type of intervention (Bartels & Urminsky, 2011) that acts on underlying preferences. Interventions that involve imagining one’s future self (e.g. “motivational interviewing” used in smoking and alcohol reduction: Colby et al., 2005), or more literally, viewing one’s aged self (Hershfield et al. 2011) may be operating through a similar mechanism. However, these types of interventions, as well as attempts to impact time preference

(e.g., Urminsky & Kivetz, 2011), will primarily affect decisions for which the tradeoffs are explicit or spontaneously considered. When a non-planner passes by Starbucks, merely shifting her relative valuation of present versus future consumption is unlikely to impact her coffee purchasing, unless she happens to view that purchase as a tradeoff—unless she finds her “latte factor,” as David Bach describes it.

The current studies suggest that greater attention should be placed on the interaction between the factors underlying intertemporal cognition and behavior. Interventions that succeed in both facilitating the recognition of tradeoffs and fostering feelings of connectedness will best promote the interests of people’ future selves. Prudence may require the convergence of specific thoughts and specific feelings at the moment of decision: an explicit consideration of the costs of an indulgence, and empathy for those future selves who bear those costs. Once we recognize and identify with the future beneficiaries of our sacrifices, fiscal restraint may feel more like buying ourselves a future gift and less like self-deprivation.

REFERENCES

- Adams, Jean and Daniel Nettle (2009), “Time perspective, personality and smoking, body mass, and physical activity: An empirical study,” *British Journal of Health Psychology*, 14(1), 83-105
- Ainslie, George (1975), “Specious Reward: A Behavioral Theory of Impulsiveness and Impulse Control,” *Psychological Bulletin*, 82 (4), 463–96.
- Ameriks, John, Andrew Caplin and John Leahy (2003), “Wealth Accumulation and the Propensity to Plan,” *The Quarterly Journal of Economics*, 118 (3), 1007-1047
- Ashraf, Nava, Dean Karlan, and Wesley Yin (2006). "Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines." *Quarterly Journal of Economics*, 121 (2), 635-72.
- Bach, David (2002) [Interview with Fredericka Whitfield, Anchor of CNN Sunday Morning], CNN, Aired December 29, 2002 - 11:23 ET
- Bartels, Daniel M. and Lance J. Rips (2010), "Psychological Connectedness and Intertemporal Choice," *Journal of Experimental Psychology: General*, 139, 49-69.
- Bartels, Daniel M. and Oleg Urminsky (2011), " On Intertemporal Selfishness: The Perceived Instability of Identity Underlies Impatient Consumption," *Journal of Consumer Research*, 38, no. 1 (2011): 182-198.
- Barsky, Robert B. , F. Thomas Juster, Miles S. Kimball and Matthew D. Shapiro (1997), “Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study,” *The Quarterly Journal of Economics*, 112(2), 537-579
- Bryan, C.J. & Hershfield, H.E. (2012), “You owe it to yourself: Boosting retirement saving with a responsibility-based appeal,” *Journal of Experimental Psychology: General*, 141(3), 429-432.
- Chabris, Christopher F., David Laibson, Carrie L. Morris, Jonathon P. Schuldt, Dmitry Taubinsky (2008), “Individual Laboratory-Measured Discount Rates Predict Field Behavior,” *Journal of Risk and Uncertainty*, 37(2-3), 234-69.
- Chapman, Gretchen B and Elliot J. Coups (1996) “Time Preferences and Preventive Health Behavior: Acceptance of the Influenza Vaccine,” *Medical Decision Making*, 19(3), 307–14.
- Colby, Suzanne M., Peter M. Monti, Tracy O'Leary Tevyaw, Nancy P. Barnett, Anthony Spirito, Damaris J. Rohsenow, Suzanne Riggs, and William Lewander (2005), “Brief motivational intervention for adolescent smokers in medical settings,” *Addictive Behaviors*, 30 (5), 865–74

- Dancy, Jonathan (1997), *Reading Parfit*. Oxford: Blackwell
- Dasgupta, P, & Masken, E. (2005), "Uncertainty and Hyperbolic Discounting," *The American Economic Review*, 95(4), 1290-1299.
- Dholakia, Utpal M. and Vicki G. Morwitz (2002), "The scope and persistence of mere-measurement effects: Evidence from a field study of customer satisfaction measurement," *Journal of Consumer Research*, 29 (2), 159-167.
- Dube, Jean-Pierre H., Gunter Hitsch, and Pranav Jindal (2013), "Measuring subjective consumer beliefs and heterogeneous discount factors for durable goods adoption," Working paper, University of Chicago Booth School of Business.
- Dupas, Pascaline and Jonathan Robinson (2011), "Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya," Working paper, National Bureau of Economic Research.
- Erdem, Tülin and Michael P. Keane (1996), "Decision-Making under Uncertainty: Capturing Dynamic Choice Processes in Turbulent Consumer Goods Markets," *Marketing Science*, 15 (1), 1-20
- Ersner-Hershfield, Hal, G. Elliot Wimmer, and Brian Knutson (2009), "Saving for the Future Self: Neural Measures of Future Self-Continuity Predict Temporal Discounting," *Social Cognitive and Affective Neuroscience*, 4(1), 85-92.
- Feldman, Jack M. and John G. Lynch, Jr. (1988), Self-Generated Validity and Other Effects of Measurement on Belief, Attitude, Intention, and Behavior," *Journal of Applied Psychology*, 73, 421-435.
- Fisher, Irving (1930), *The Theory of Interest*. NY: Macmillan.
- Frederick, Shane (2002), "Time Preference and Personal Identity," in *Time and Decision: Economic and Psychological Perspectives on Intertemporal Choice*, George Loewenstein, Daniel Read, and Roy Baumeister, eds. NY: Russell Sage.
- Frederick, Shane, George Loewenstein and Ted O'Donoghue (2002) "Time Discounting and Time Preference: A Critical Review," *Journal of Economic Literature*, 40(2), 351-401
- Frederick, Shane, Nathan Novemsky, Jing Wang, Ravi Dhar, and Stephen Nowlis (2009), "Opportunity Cost Neglect," *Journal of Consumer Research*, 36, 553-61.
- Fuchs, Victor (1982), "Time Preferences and Health: An Exploratory Study," In V. Fuchs (Ed.) *Economic Aspects of Health*. Chicago: University of Chicago Press, pp. 93–120.

- Hartmann, Wes R. (2006), "Intertemporal Effects of Consumption and Their Implications for Demand Elasticity Estimates," *Quantitative Marketing and Economics*, 4(4), 325-49.
- Hausman, J. A. (1979), "Individual discount rates and the purchase and utilization of energy-using durables: Comment," *Bell Journal of Economics* 10, 33-54.
- Hershfield, Hal E., Taya Cohen, and Leigh Thompson, L. (2013), "Short horizons and shady situations: When lack of continuity to our future selves leads to unethical behavior," forthcoming, *Organizational Behavior and Human Decision Processes*
- Hershfield, Hal E., Daniel G. Goldstein, William F. Sharpe, Jesse Fox, Leo Yeykelis, Laura L. Carstensen, and Jeremy N. Bailenson (2011), "Increasing saving behavior through age-progressed renderings of the future self," *Journal of Marketing Research* 48, no. SPL: S23-S37.
- Kardes, Frank R., Chris T. Allen, and Manuel J. Pontes (1993), "Effects of Multiple Measurement Operations on Consumer Judgment: Measurement Reliability or Reactivity?" *Advances in Consumer Research*, 20, 280-283.
- Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman (2012), "Getting to the Top of Mind: How Reminders Increase Saving," working paper, Yale University.
- Karlan, Dean, Melanie Morten and Jonathan Zinman (2012), "A Personal Touch: Text Messaging for Loan Repayment," working paper, Yale University
- Kassam, Karim S., Daniel T. Gilbert, Andrew Boston, and Timothy D. Wilson (2008), "Future Anhedonia and Time Discounting," *Journal of Experimental Social Psychology*, 44 (6), 533-37.
- Kim, B. Kyu and Gal Zauberman (2012), "Can Victoria's Secret Change the Future? A Subjective Time Perception Account of Sexual Cue Effects on Impatience," *Journal of Experimental Psychology: General* 142, no. 2 (2013): 328.
- Koehler, Derek, Rebecca White and Leslie John (2011), "The Price of Good Intentions," *Social Psychological and Personality Science*, 2(1), 90-96.
- Loewenstein, George, and Drazen Prelec, "Anomalies in intertemporal choice: Evidence and an interpretation," *The Quarterly Journal of Economics* 107, no. 2 (1992): 573-597.
- Logue, A.W. (1988), "Research on self-control: An integrating framework," *Behavioral and Brain Sciences*, 11, 665-709.

- Lynch, John G., Jr., Richard G. Netemeyer, Stephen A. Spiller, and Alessandra Zammit (2010), "A Generalizable Scale of Propensity to Plan: The Long and the Short of Planning for Time and for Money," *Journal of Consumer Research*, 37(1), 108-28.
- Magen, Eran, Carol Dweck and James Gross (2008) "The Hidden-Zero Effect," *Psychological Science*, 19 (7), 648-649
- Mazur JE (1987), "An adjusting procedure for studying delayed re-inforcement," In: Commons ML, Mazur JE, Nevin JA, Rachlin H (eds) Quantitative analysis of behavior: vol 5. The effect of delay and intervening events on reinforcement value. Erlbaum, Hillsdale, N.J., pp 55–73
- Meier, Stephan, and Charles D. Sprenger (2012), "Time discounting predicts creditworthiness." *Psychological Science* 23, no. 1: 56-58.
- Meyer, Richard F. (1976), "Preferences Over Time," in *Decisions with Multiple Objectives*. Ralph Keeney and Howard Raiffa, eds. NY: Wiley, p. 473-89.
- Melanko, Shane and Kevin T. Larkin (2013) "Preference for Immediate Reinforcement over Delayed Reinforcement: Relation Between Delay Discounting and Health Behavior," *Journal of Behavioral Medicine* 36, p. 34-43
- Monti, P. M., Colby, S. M., Barnett, N. P., Spirito, A., Rohsenow, D. J., Myers, M., et al. (1999), "Brief intervention for harm reduction with alcohol positive older adolescents in a hospital emergency department," *Journal of Consulting and Clinical Psychology*, 67, 989–94.
- Muller, Dominique, Charles M. Judd, and Vincent Y. Yzerbyt (2005), "When Moderation is Mediated and Mediation is Moderated," *Journal of Personality and Social Psychology*, 89 (6), 852-63.
- Nair, Harikesh (2007) "Intertemporal price discrimination with forward-looking consumers: Application to the US market for console video-games" *Quantitative Marketing and Economics*, 5 (3), 239-292.
- Nenkov, Gergana Y., J. Jeffrey Inman, and John Hulland (2008), "Considering the Future: The Conceptualization and Measurement of Elaboration on Potential Outcomes," *Journal of Consumer Research*, 35(1), 126
- Novemsky, Nathan, Ravi Dhar, Norbert Schwarz, and Itamar Simonson (2007), "Preference Fluency in Choice," *Journal of Marketing Research*, 44 (3), 347–56.
- Parfit, Derek (1984), *Reasons and Persons*, Oxford, UK: Oxford University Press.

- Preacher, Kristopher J., Derek D. Rucker, and Andrew F. Hayes (2007), "Addressing Moderated Mediation Hypotheses: Theory, Methods, and Prescriptions," *Multivariate Behavioral Research*, 42(1), 185-227.
- Radu, P.T., Yi, R., Bickel, W.K., Gross, J.J., McClure, S.M. (2011), "A Mechanism For Reducing Delay Discounting By Altering Temporal Attention," *Journal of the Experimental Analysis of Behavior*, 96, 363-385.
- Reimers, Stian, Elizabeth A. Maylor, Neil Stewart, and Nick Chater (2009), "Associations between a one-shot delay discounting measure and age, income, education and real-world impulsive behavior," *Personality and Individual Differences*, 47, 973-978.
- Rick, Scott and George Loewenstein (2008), "Intangibility in intertemporal choice," *Philosophical Transactions of the Royal Society B*, 363, 3813-3824.
- Samuelson, Paul A. (1937), "A Note on Measurement of Utility," *Review of Economic Studies*, 40(2), 155-61.
- Scholten, Marc and Daniel Read (2010). "The psychology of intertemporal tradeoffs" *Psychological Review*, 117(3), Jul 2010, 925-944.
- Shell, Jenefer and Duane F. Husman (2001), "The Multivariate Dimensionality of Personal Control and Future Time Perspective in Achievement and Studying," *Contemporary Educational Psychology*, 26(4), pp. 481-506.
- Simpson, Cathy A. and Rudy E. Vuchinich (2000), "Reliability of a measure of temporal discounting," *The Psychological Record*, 50, 3-16.
- Smith, Adam (1759/1981), "*The theory of moral sentiments*," (Eds D. D. Raphael & A.L. Macfie), Indianapolis, IN: Liberty Fund.
- Spiller, Stephen A. (2011), "Opportunity cost consideration," *Journal of Consumer Research* 38, no. 4: 595-610.
- Stango, Victor and Jonathan Zinman (2011), "Limited and Varying Consumer Attention: Evidence from Shocks to the Salience of Penalty Fees," Working paper, Graduate School of Management, University of California, Davis.
- Steel, P. (2007), "The nature of procrastination: a meta-analytic and theoretical review of quintessential self-regulatory failure," *Psychological bulletin*, 133(1), 65.

- Strathman, Alan, Faith Gleicher, David S. Boninger, and C. Scott Edwards (1994), "The Consideration of Future Consequences: Weighing Immediate and Distant Outcomes of Behavior," *Journal of Personality and Social Psychology*, 66(4),742-52
- Sun, B., & Neslin, S.A. (2003), "Measuring the Impact of Promotions on Brand Switching When Consumers Are Forward Looking," *Journal of Marketing Research*, 40 (4), 389-405.
- Sunstein, C. R., & Thaler, R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven: Yale University Press.
- Urminsky, Oleg and Ran Kivetz (2011), " Scope Insensitivity and the "Mere Token" Effect," *Journal of Marketing Research*, Vol. 48, No. 2: 282–295.
- Urminsky, Oleg and Gal Zauberman (2013), "The Psychology of Intertemporal Preferences," Working paper
- Venti, Steven F. and David Wise (2001), "Choice, Chance, and Wealth Dispersion at Retirement," in S. Ogura, T. Tachibanaki and D. Wise (eds.) *Aging Issues in the United States and Japan*. University of Chicago Press
- Wanke, Michaela, Gerd Bohner, and Andreas Jurkowitsch (1997), "There Are Many Reasons to Drive a BMW: Does Imagined Ease of Argument Generation Influence Attitudes?" *Journal of Consumer Research*, 24 (2), 170–77.
- Weber, Elke U., Johnson, Eric J., Kerry F. Milch, H. Chang, J. C. Brodscholl, and Daniel G. Goldstein (2007), "Asymmetric Discounting in Intertemporal Choice: A Query Theory Account," *Psychological Science*, 18(6), 516-23.
- Winer, Russell S. (1997):, "Discounting and its impact on durables buying decisions," *Marketing Letters* 8, no. 1:109-118.
- Yao, S., Mela, C., Chiang, J., & Chen, Y. (2012), "Determining consumers' discount rates with field studies," *Journal of Marketing Research*, Vol. 49, 822-841
- Zauberman, Gal, B. Kyu Kim, Selin Malkoc, and James R. Bettman (2009), "Discounting Time and Time Discounting: Subjective Time Perception and Intertemporal Preferences," *Journal of Marketing Research*, 46 (4), 543–56.
- Zimbardo, Philip G. and John N. Boyd (1999) "Putting Time in Perspective: A Valid, Reliable Individual-Difference Metric," *Journal of Personality and Social Psychology*, 77 (6), 1271-1288

Zinman, Jonathan and Dean Karlan (2012), “Borrow Less Tomorrow: Behavioral Approaches to Debt Reduction,” Working paper, Dartmouth College.

Zwane, Alix, Jonathan Zinman, Eric Van Dusen, William Pariente, Clair Null, Edward Miguel, Michael Kremer, Dean Karlan, Richard Hornbeck, Xavier Giné, Esther Duflo, Florencia Devoto, Bruno Crepon and Abhijit Banerjee (2011), “Being surveyed can change later behavior and related parameter estimates,” *Proceedings of the National Academy of Sciences*, 10 (1073), 1-6.

FIGURES

Figure 1: Stylized Illustration of the Alternative Hypotheses: Potential Effects on Purchase Probability of Jointly Manipulating Consideration of Opportunity Costs and Valuation of the Future (via Affirming Connectedness)

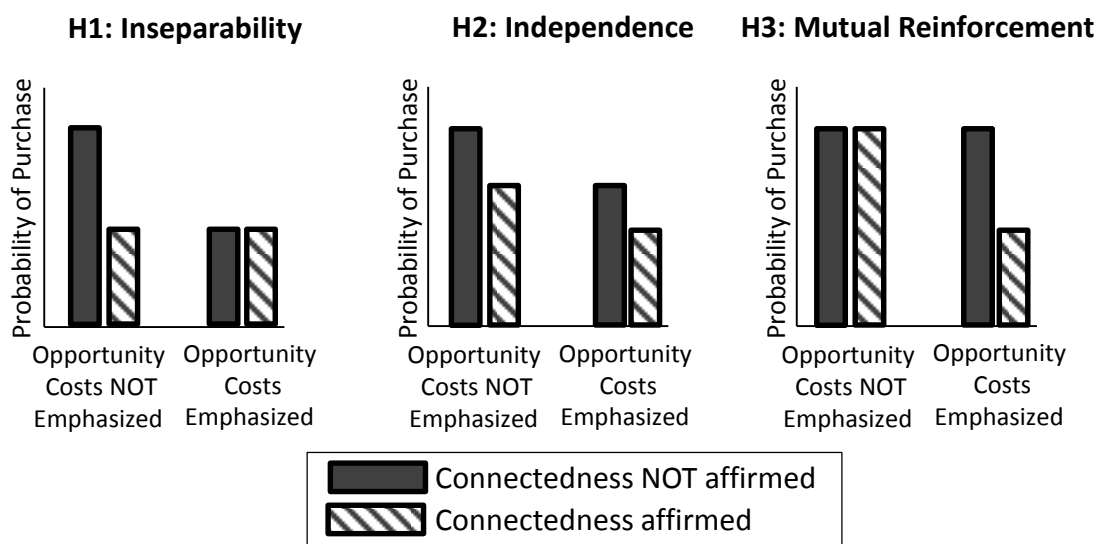


Figure 2: Effects of Manipulated Reminders to Consider Opportunity Costs and Measured Valuation of the Future (Connectedness and Discounting) on Purchase Probability

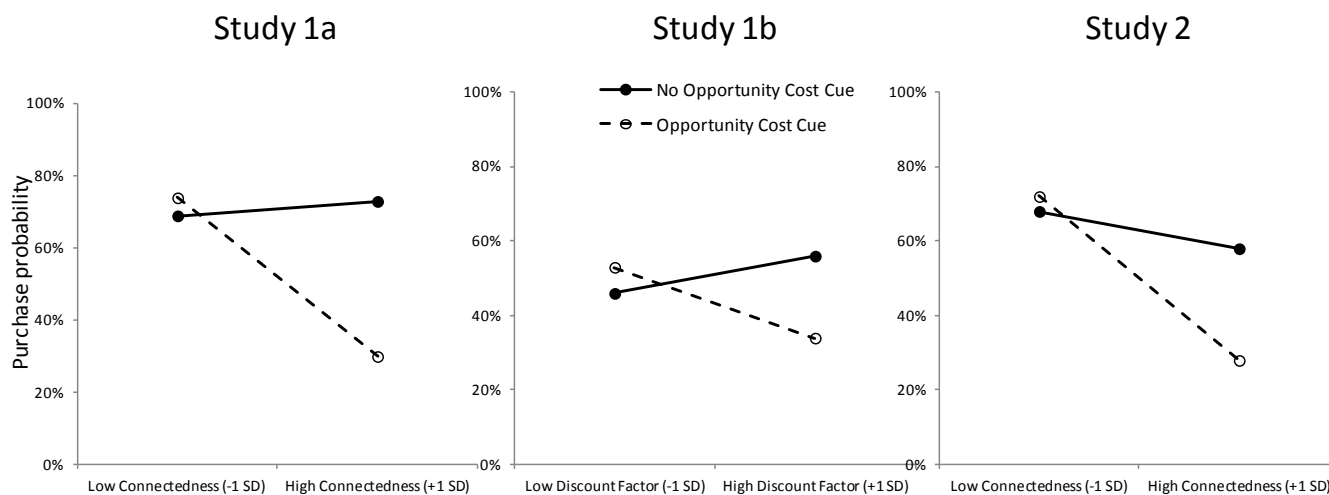


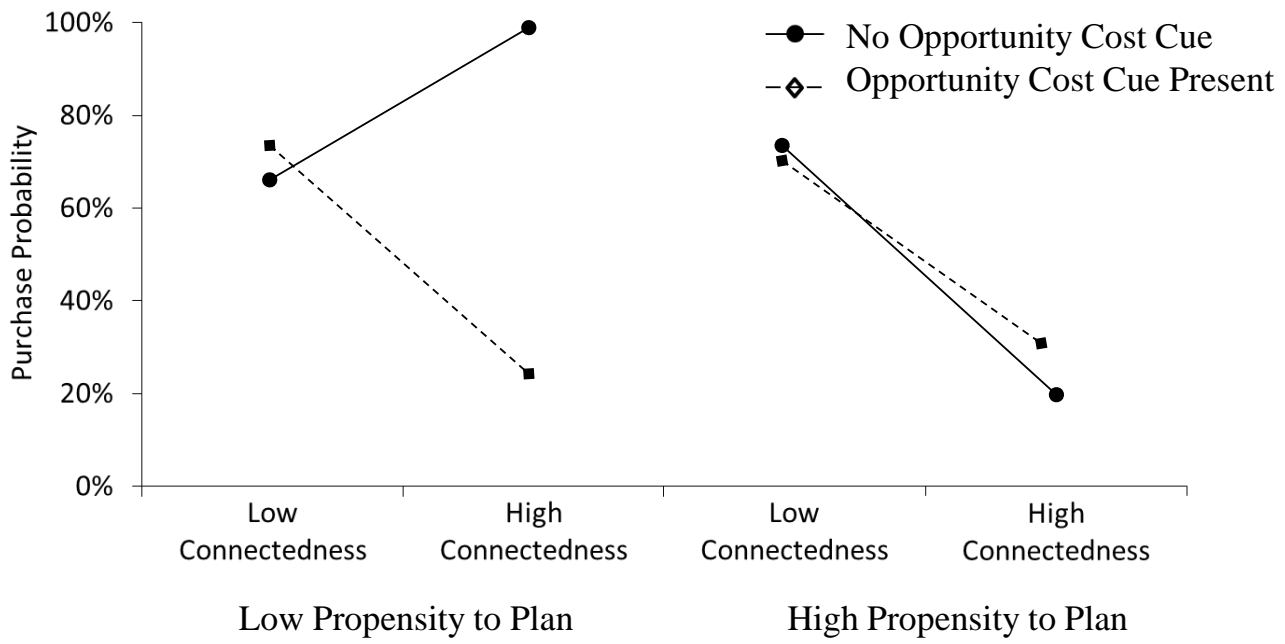
Figure 3: Effect of Opportunity Cost Cue, Connectedness and Planning

Figure 4: Joint Effect of Connectedness and Opportunity Cost Reminders on Proportion Choosing to Purchase the Premium Product, the Inexpensive Product, or to Save their Money in Study 3

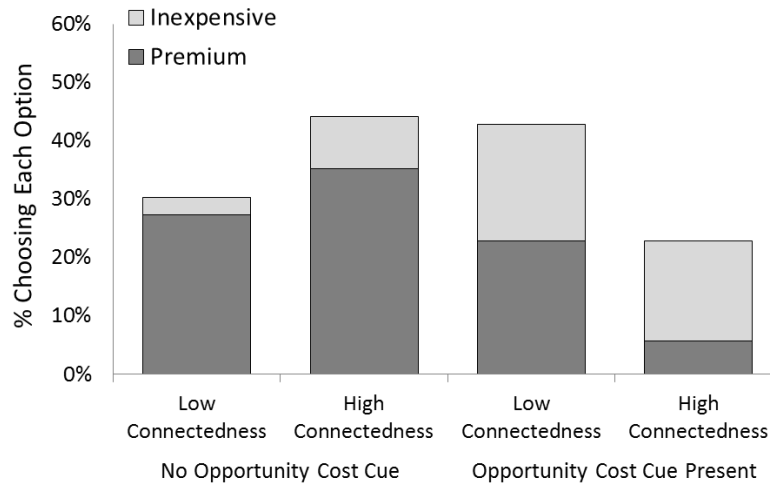


Figure 5: Joint Effect of Connectedness and Opportunity Cost Reminders on Proportion Choosing to Purchase the Premium Product, the Inexpensive Product, or to Save their Money in Study 4

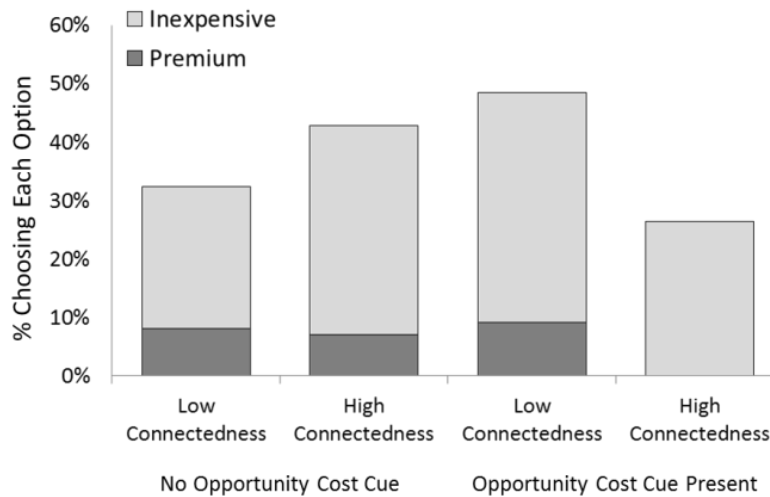


Figure 6: Diagram of Moderated Mediation Model in Study 4

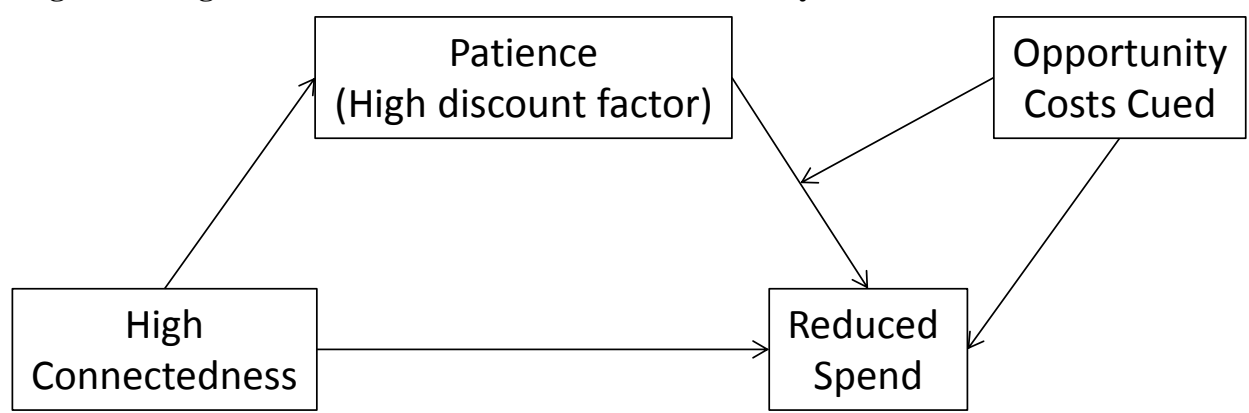
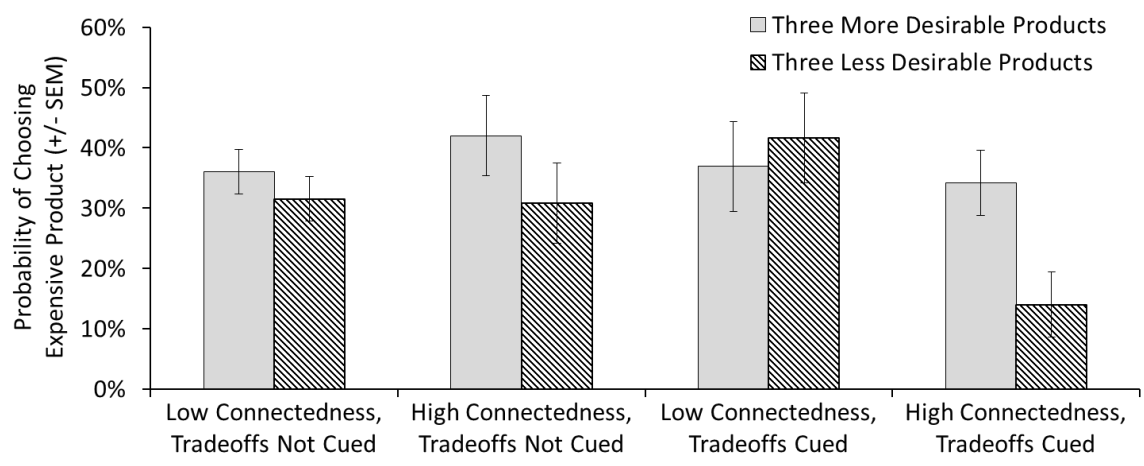


Figure 7: Joint Effect of Connectedness and Opportunity Cost Salience (Rank First = High; Choose First = Low) on Price Sensitivity (Choosing the More Expensive Option). Because of the repeated measures test, error bars represent standard errors of the difference score

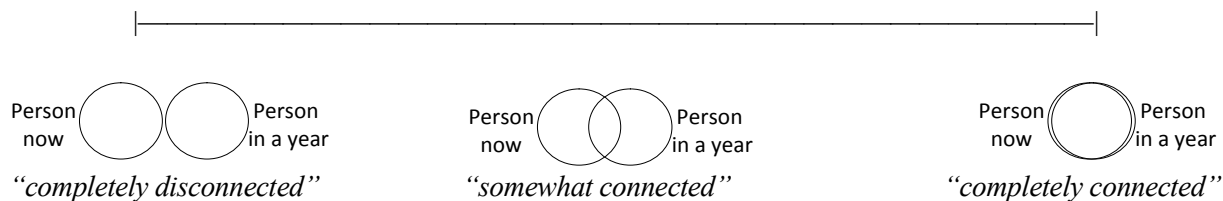


APPENDIX A: CONNECTEDNESS MEASURES

- 1) Please think about the important characteristics that make **you** the person you are now—your personality, temperament, major likes and dislikes, beliefs, values, ambitions, life goals, and ideals—and please rate the degree of connectedness between the person you expect to be in a year compared to the person you are now, where 0 means “I will be completely different in the future” and 100 means “I will be exactly the same in the future.”

My rating is: _____

- 2) Please think again about these important characteristics and indicate your opinion about the degree of connectedness held between the person you are now and the person you will be in a year by drawing a mark on the line below, where no overlap means “completely disconnected” and complete overlap means “completely connected”.



APPENDIX B: SUPPLEMENTAL STATISTICAL RESULTS

Table 1: Logistic Regression Predicting Choosing to Purchase DVD^a (Study 1a)

Source	β	Std Error	Wald	<i>p</i>
Constant	.498	.235	4.479	.034
Connectedness ^b	-.432	.250	2.986	.084
Opportunity Cost Cue ^c	-.406	.235	2.982	.084
Cue x Connectedness	-.525	.250	4.413	.036

Table 2: Logistic Regression Predicting Choosing to Purchase DVD^a (Study 1b)

Source	β	Std Error	Wald	<i>p</i>
Constant	.102	.342	.089	.766
Discount factor ^d	-.344	.506	.461	.497
Opportunity Cost Cue ^c	.517	.342	2.283	.131
Cue x Discount factor	-1.088	.506	4.617	.032

Table 3: Logistic Regression Predicting Choosing to Purchase DVD^a (Study 2)

Source	β	Std Error	Wald	<i>p</i>
Constant	.255	.153	2.763	.096
Connectedness ^b	-.575	.174	10.893	.001
Opportunity Cost Cue ^c	-.274	.153	3.202	.074
Cue x Connectedness	-.368	.174	4.464	.035

Table 4: Logistic Regression Predicting Choosing to Purchase DVD^a (Study 2)

Source	β	Std Error	Wald	<i>p</i>
Constant	.633	.203	9.701	.002
Connectedness ^b	-.232	.226	1.053	.305
Opportunity Cost Cue ^c	-.673	.203	10.996	.001
Propensity to Plan (PTP) ^b	-.741	.242	9.405	.002
Cue x Connectedness	-.795	.248	10.270	.001
Cue x PTP	.750	.242	9.636	.002
Cue x Connectedness x PTP	.917	.248	13.666	.000

Table 5: Logistic Regression Predicting Choosing to Purchase DVD^a (Study 2)

Source	β	Std Error	Wald	<i>p</i>
Constant	.445	.176	6.401	.011
Connectedness ^b	-.527	.210	6.316	.012
Opportunity Cost Cue ^c	-.498	.176	8.030	.005
Consideration of Future Consequences (CFC) ^b	-.298	.203	2.149	.143
Cue x Connectedness	-.385	.210	3.378	.066
Cue x CFC	.211	.203	1.085	.298
Cue x Connectedness x CFC	.954	.273	12.204	.000

Table 6: Logistic Regression Predicting Choosing to Purchase Premium iPad^a (Study 3)

Source	β	Std Error	Wald	<i>p</i>
Constant	-1.402	.247	32.278	.000
Connectedness ^c	-.303	.247	1.509	.219
Opportunity Cost Cue ^c	-.608	.247	6.077	.014
Cue x Connectedness	-.490	.247	3.951	.047

Table 7: Ordinal Regression Predicting iPad Purchasing Choices^f (Study 3)

Source	β	Std Error	Wald	<i>p</i>
Threshold 1 (Not buy)	.633	.184	11.765	.001
Threshold 2 (Buy cheaper)	1.267	.210	36.495	.000
Connectedness ^e	-.091	.180	.257	.612
Opportunity Cost Cue ^c	-.211	.180	1.370	.242
Cue x Connectedness	-.377	.181	4.351	.037

Table 8: Linear Regression Predicting Amount of Intended Spend^g (Study 3)

Source	β	Std Error	t	<i>p</i>
Constant	245.249	28.493	8.607	.000
Connectedness ^e	-12.100	28.493	-.425	.672
Opportunity Cost Cue ^c	-22.320	28.493	-.783	.435
Cue x Connectedness	-59.972	28.493	-2.105	.037

Table 9: Linear Regression Predicting Discount Factor^d (Study 4)

Source	β	Std Error	t	p
Constant	.548	.016	35.363	.000
Connectedness ^e	.034	.016	2.195	.030
Opportunity Cost Cue ^c	.035	.016	2.229	.027
Cue x Connectedness	.00005	.016	.003	.997

Table 10: Linear Regression Predicting Amount of Intended Spend^g based on Cue and Connectedness (Study 4)

Source	β	Std Error	t	p
Constant	238.99	25.937	9.214	.000
Connectedness ^e	-23.138	25.937	-.892	.374
Opportunity Cost Cue ^c	-4.042	25.937	-.013	.876
Cue x Connectedness	-53.250	25.937	-2.053	.042

Table 11: Linear Regression Predicting Amount of Intended Spend^g based on Cue and Discount Factor (Study 4)

Source	β	Std Error	t	p
Constant	366.017	82.373	4.443	.000
Discount Factor ^d	-210.014	140.301	-.128	.137
Opportunity Cost Cue ^c	187.005	82.373	2.270	.025
Cue x Discount Factor	-337.664	140.301	-2.407	.017

Table 12: Linear Regression Predicting Amount of Intended Spend^g based on Cue, Connectedness and Discount Factor (Study 4)

Source	β	Std Error	t	p
Constant	351.469	83.347	4.217	.000
Connectedness ^e	-16.658	26.138	-.637	.525
Discount Factor ^d	-187.047	142.419	-1.313	.191
Opportunity Cost Cue ^c	162.173	83.347	1.946	.054
Cue x Connectedness	-43.164	26.138	-1.651	.101
Cue x Discount Factor	-291.536	142.419	-2.047	.043

Table 13: Linear Regression Predicting Number of Premium Products Chosen^h (Study 5)

Source	β	Std Error	t	p
Constant	2.004	.112	17.88	.000
Connectedness ^e	-.188	.112	-.146	.096
Opportunity Cost Cue ^c	-.102	.112	-.079	.365
Cue x Connectedness	-.267	.112	-2.382	.019

Table 14: Linear Regression Predicting Amount of Intended Spend^g (Study 5)

Source	β	Std Error	t	p
Constant	497.452	1.748	284.618	.000
Connectedness ^e	-3.135	1.748	-1.793	.075
Opportunity Cost Cue ^c	-1.648	1.748	-.943	.348
Cue x Connectedness	-3.775	1.748	-2.160	.033

Table 15: Repeated Measures ANOVA Predicting Choice of Premium Option in Each Categoryⁱ (Study 5)

Source	Sum of Squares	F	p
<i>Between-Subjects Effects:</i>			
Intercept	84.947	319.708	.000
Connectedness ^e	.747	2.810	.096
Opportunity Cost Cue ^c	.220	.827	.365
Cue x Connectedness	1.507	5.673	.019
Error	33.478	--	--
<i>Within-Subjects Contrasts:</i>			
Category Rank ^j	1.742	11.724	.001
Rank x Connectedness	1.090	7.340	.008
Rank x Opportunity Cost Cue	.004	.030	.862
Rank x Cue x Connectedness	.617	4.153	.044
Error	18.720	--	--

Note: Only the linear trend is shown for the within-subjects factor, Rank. No higher order polynomial effects were significant as a main effect or in an interaction.

Coding of Variables:

^a 0 = not purchase, 1 = purchase

^b Z-scored continuous scale measures

^c -1 = no opportunity cost cue, 1 = opportunity cost cue

^d Discount factor, between 0 (no valuation of future) and 1 (no discounting of future)

^e -1 = low connectedness condition, 1 = high connectedness condition

^f 1 = no purchase, 2=cheaper option, 3 = more expensive option

^g Amount in dollars

^h Number of premium items chosen, out of six pairs, ranging from 0 to 6

ⁱ 0 = choose lower cost item, 1 = choose higher cost item

^j Linear contrast for Ranking, 1=most preferred to 6 = least preferred

APPENDIX C: DISCOUNTING MEASURES USED IN STUDY 4

Imagine that you have the option of receiving some money tomorrow or one year from now.

We will show you a series of such options, one in which you would receive money tomorrow and the other in which you would receive money in a year.

In each row below, choose which ONE of the two options you would prefer to receive. Imagine that both payments are guaranteed to occur when promised.

(Note: Each battery of choices was presented on a separate screen. The order of these screens was randomized.)

\$260 tomorrow ---- OR ---- \$260 in one year
 \$260 tomorrow ---- OR ---- \$312 in one year
 \$260 tomorrow ---- OR ---- \$364 in one year
 \$260 tomorrow ---- OR ---- \$416 in one year
 \$260 tomorrow ---- OR ---- \$468 in one year
 \$260 tomorrow ---- OR ---- \$520 in one year
 \$260 tomorrow ---- OR ---- \$572 in one year
 \$260 tomorrow ---- OR ---- \$624 in one year

\$260 tomorrow ---- OR ---- \$429 in one year
 \$260 tomorrow ---- OR ---- \$405 in one year
 \$260 tomorrow ---- OR ---- \$381 in one year
 \$260 tomorrow ---- OR ---- \$357 in one year
 \$260 tomorrow ---- OR ---- \$332 in one year
 \$260 tomorrow ---- OR ---- \$308 in one year
 \$260 tomorrow ---- OR ---- \$284 in one year
 \$260 tomorrow ---- OR ---- \$260 in one year

\$40 tomorrow ---- OR ---- \$40 in one year
 \$40 tomorrow ---- OR ---- \$56 in one year
 \$40 tomorrow ---- OR ---- \$71 in one year
 \$40 tomorrow ---- OR ---- \$87 in one year
 \$40 tomorrow ---- OR ---- \$103 in one year
 \$40 tomorrow ---- OR ---- \$119 in one year
 \$40 tomorrow ---- OR ---- \$134 in one year
 \$40 tomorrow ---- OR ---- \$150 in one year

\$40 tomorrow ---- OR ---- \$158 in one year
 \$40 tomorrow ---- OR ---- \$141 in one year
 \$40 tomorrow ---- OR ---- \$124 in one year
 \$40 tomorrow ---- OR ---- \$107 in one year
 \$40 tomorrow ---- OR ---- \$90 in one year
 \$40 tomorrow ---- OR ---- \$73 in one year
 \$40 tomorrow ---- OR ---- \$57 in one year
 \$40 tomorrow ---- OR ---- \$40 in one year

APPENDIX D:

PRE-TEST OF CONNECTEDNESS MANIPULATION IN STUDY 5

To ensure that the procedure manipulates people's sense of connectedness to their future selves and to assess potential confounds, we ran a pretest of the fluency manipulation's effect on connectedness and other factors. We asked a separate sample of participants ($N = 77$) to estimate the ease of generating 2 or 10 reasons why their identity would remain stable. We then asked them to rate their connectedness to their future selves and to respond to a battery of items that measure other potential influences on intertemporal tradeoff-making—such as their uncertainty about future states or their future preferences, and their anticipated changes to spending money or to their tastes.

Consistent with expectations, participants in the high connectedness (2 reasons) condition rated themselves as more connected to the future self on a normalized two-item measure ($M = 0.17$) than participants in the low connectedness (10 reasons) conditions ($M = .17$ vs. -0.29 , $t = 2.17$, $p < .05$); they also judged that the task would be easier than participants in the low connectedness (10 reasons) condition ($M = 5.45$ vs. 4.14 , $t = 3.40$, $p < .01$). In contrast, there was no significant effect of the manipulation on people's beliefs about upcoming changes in their disposable income or free time, their general uncertainty about the future or their uncertainty specifically about their preferences, nor their subjective perceptions of how long a year is (Zauberman et al. 2009). The manipulation did not affect people's beliefs that their preferences would be different in the future, or that they would derive less enjoyment from future consumption (e.g. future anhedonia, Kassam et al 2008). So, this pretest provides evidence that the fluency manipulation primarily impacts people's sense of connectedness to their future selves rather than other beliefs about the future that might affect financial decision making.

APPENDIX E: STIMULI USED IN STUDY 5

Product Category	Less Expensive Product			More Expensive Product		
	Picture	Title	Amazon Price	Picture	Title	Amazon Price
Pocket Video Cameras		Flip UltraHD Video Camera	\$78		Sony MHS-PM5 bloggie HD Video Camera	\$96
Blenders		Oster 5 Cup Fusion Blender Food Processor	\$75		KitchenAid 5-Speed Blender w/ Polycarbonate Jars	\$90
Bed Sheets		Pinzon Hemstitch 400 Thread Count Cotton Sheet Set, Smokey Blue	\$60		Olympic 1200 Thread Count Cotton Sheet Set, Stripe Blue	\$76
Pocket Watches		Charles Hubert 3846 Two-Tone Mechanical Pocket Watch	\$90		Stuhrling Original Lifestyle Collection Monarch Moon Mechanical Pocket Watch	\$108
Laser Printers		Samsung ML-2525W Mono Laser Printer	\$73		Brother HL-2240 Mono Laser Printer	\$86
Nonstick Frying Pans		Calphalon One Infused 12-Inch Anodized Nonstick Fry Pan	\$90		All-Clad Stainless 12-Inch Nonstick Fry Pan	\$103