To Know and to Care: How Awareness and Valuation of the Future Jointly Shape Consumer Spending

DANIEL M. BARTELS
OLEG URMINSKY

Reducing spending in the present requires the combination of being both 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—helps motivate consumers to make far-sighted choices by changing their valuation of future outcomes (e.g., discount factors). However, this change only reduces spending when opportunity costs are considered. Correspondingly, cues that highlight opportunity costs reduce spending primarily when people discount the future less or are more connected to their future selves. Implications for the efficacy of behavioral interventions and for research on time discounting are discussed.

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. . . . In 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 continuous restraint that is difficult to execute. One must both account for future oppor-

tunities that current indulgences displace and 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—being aware of and valuing future outcomes—may help explain why people in similar economic circumstances save at different rates (Venti and Wise 2001). Contemporary research investigates each of these factors individually, but it has not integrated the two in a framework that would address how awareness and valuation of future outcomes jointly influence choices.

We argue that awareness of future outcomes and valuation of those outcomes are not only conceptually distinct but that the nature of the interaction between them is important for understanding everyday intertemporal choices. To illustrate the distinction, consider two people, Jan and Fran. Each of them spends as much time as she can tanning on the beach. Jan tans because she does not know it will cause wrinkles when she is older. Fran tans because, even though she knows it will cause wrinkles, she does not care. More important, each also spends all of her discretionary income every month on current consumption instead of saving for the future. Jan spends all her money because, even though she does care about her future welfare, she fails to consider her future financial needs when making purchases now. In contrast, Fran also spends all her money but does so because she does not sufficiently care about the resources she will have when she is older, despite being aware of the consequences. Thus, studying either factor in isolation would miss how these consid-

erations interact to shape intertemporal choices and would therefore fail to predict either Jan's or Fran's lack of restraint in spending.

The current studies focus on how both factors jointly affect decisions. We investigate the effect that being aware of future consequences has on spending by examining how much people consider the opportunity costs of their choices. (In this article, the terms *awareness of future trade-offs* and *opportunity cost consideration* are used interchangeably.) To examine the influence of valuing future outcomes, we measure and manipulate one antecedent of caring about future outcomes—psychological connectedness to the future self (which has been found to impact time discounting; Bartels and Urminsky 2011). We then also directly measure the valuation of future outcomes, via discount factors. The results reveal that awareness and valuation interact to promote thrift.

To fully develop the rationale for this argument, we discuss factors that influence valuation of future outcomes and consider how the awareness of opportunity costs affects choice. We then contrast our novel account, in which both factors are mutually reinforcing, with prior theories that assume awareness and valuation of future outcomes are either redundant or operate independently. Seven studies demonstrate that valuing future outcomes reduces spending primarily when opportunity costs are considered.

We see the contribution of this work as having three facets. First, our findings contradict related prior research, which generally assumes one of two possibilities, reviewed below as hypotheses 1 and 2. In contrast, we provide evidence for a new view of how valuation and consideration of future outcomes impact choice, summarized in hypothesis 3. Second, our results may help resolve the puzzle of why time preference (as measured by elicited discount factors) has been only inconsistently linked to consumers' saving or restraint in spending. Third, our supported account has novel practical implications for the potential limitations of well-intentioned interventions designed to improve consumer decisions.

THEORETICAL BACKGROUND

Valuation of Future Outcomes

Time discounting (i.e., the strength of preferences to receive outcomes sooner, forgoing larger outcomes that occur later) has been interpreted as revealing how much the future is valued and has been viewed as a primary determinant of savings and spending decisions (see Frederick, Loewenstein, and O'Donoghue [2002] and Urminsky and Zauberman [2015] 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 future outcomes so steeply and why some people are less patient than others. While prior work has primarily focused on economic considerations (e.g., liquidity constraints: Meyer 1976) and perceptual accounts (e.g., subjective time: Zauberman et al. 2009; comparison of delay relative to outcome: Scholten and Read

2010), time discounting has been shown to involve conflict between competing motivations (Urminsky and Kivetz 2011).

One starting point for understanding the underlying motivations is the idea that a person can be construed as a temporal sequence of overlapping but partly distinct selves (Parfit 1984) rather than as a single irreducible 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—that is, 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 finds that a higher sense of connectedness yields more patience in intertemporal choice tasks (Bartels, Kvaran, and Nichols 2013; Bartels and Rips 2010; Bartels and Urminsky 2011). Building on this work, in the current article we investigate time preferences both directly (using a measure of trade-off between present and future outcomes) and via an underlying motivation that affects time preferences (measuring and manipulating how connected people feel toward their future selves).

Most research on time discounting has measured preferences using explicit trade-offs between smaller rewards available sooner and larger rewards available later (e.g., would you rather have $500 in a week or $1,000 in a year?). The existing work on connectedness has likewise used explicit intertemporal trade-offs. Spending decisions, by contrast, rarely represent an explicit intertemporal trade-off (Rick and Loewenstein 2008). For example, a person might choose to spend $4 on a latte at Starbucks without thinking about the future opportunity costs of the expenditure. Furthermore, this distinction may help explain why studies using estimates of discounting from explicit trade-off tasks to predict "far-sighted" decision making with implicit long-term consequences in the field have yielded mixed results (e.g., Chabris et al. 2008; see Urminsky and Zauberman [2015] for a review).

Awareness of Future Outcomes

Studies have found that highlighting opportunity costs or trade-offs restrains spending. Explicitly directing people's attention to future consequences can increase their preference for delayed rewards (Hershfield et al. 2011), and a greater focus on long-term consequences predicts higher intent to save more money for retirement (Nenkov, Inman, and Hulland 2008) and higher (self-reported) incidence of healthy behaviors (Strathman et al. 1994). Merely reminding people that unspent money could be used for other purposes reduces intended spending (Frederick et al. 2009). Individual differences in the propensity for financial planning (e.g., explicit consideration of future spending) likewise predict accumulated wealth, coupon use, and credit score (Lynch et al. 2010). Thus, greater awareness of future consequences increases far-sighted behaviors, at least some people.

However, 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 distinctions nor possible interactions are typically discussed. For example, in empirical research using the widely studied trade-off tasks (choices between 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). Accounts of decision making based on this discounting literature, then, often assume that people vary in patience, without distinguishing between consideration and valuation of future consequences as determinants of patience.

The Joint Effects of Awareness and Valuation of Future Outcomes

In the current studies, we investigate the unaddressed question of whether and how these two factors interact in shaping people's spending decisions. In our studies, we measure and manipulate connectedness to the future self, a driver of the motivation underlying discounting, and we also measure discounting directly. We also manipulate the salience of opportunity costs to affect consumers' awareness of the trade-offs inherent in their choices—specifically, the other uses of money that current purchases displace. While some of the opportunity costs people consider may be in the present (e.g., other items in the same store), many of the opportunity costs of a current purchase could be construed as reduced consumption in the future and therefore relevant to discounting.

Next, we discuss three distinct possibilities—our account and two competing accounts implied by the prior literature—for how the combination of considering future consequences and valuation of future consequences influence decisions. 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).

One possibility is that the two factors are closely linked in people's deliberation. Thinking more about future consequences may induce people to place a higher value on future outcomes than they would otherwise. Correspondingly, people with higher valuations of future outcomes in general might 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 has taken a position consistent with this view. The degree of consideration of future outcomes has been interpreted as one determinant of discounting (Logue 1988; Radu et al. 2011). Conversely, impatience (i.e., steep discounting) has been proposed as underlying inattention to future outcomes (Ainslie and Haslam 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 2012; Strathman et al. 1994).

If hypothesis 1 holds, manipulating one factor would also affect the other. A manipulation that increased valuation of future outcomes would also increase consideration of future outcomes (e.g., opportunity costs) and a manipulation that increased consideration of future outcomes

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)
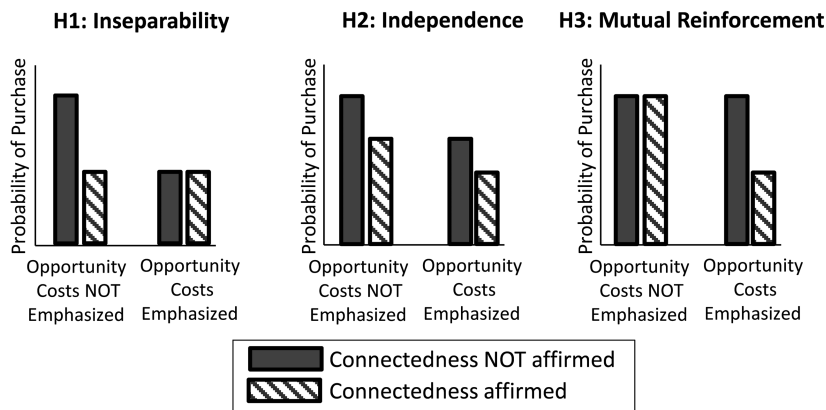
would also increase valuation of those outcomes. So prompting either (i) consideration of future consequences, or (ii) valuation of future consequences, or (iii) both would all produce similar outcomes as each is sufficient to promote far-sighted behavior (see first panel of fig. 1). Purchases would be most likely specifically when people both are not thinking about opportunity costs and do not value future outcomes.

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

An alternative possibility is that each factor independently influences choices. Many previous approaches investigated the effect of one factor independently of the other, usually uninvestigated, factor. More explicitly in line with this assumption, Adams and Nettle (2009) correlated measures of smoking with a measure of discounting and, separately, with the propensity to consider future consequences, without considering interactions. Similarly, quantitative models of consumer 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 hypothesis 2 holds, manipulating either factor does not affect the influence of the other factor—the likelihood of purchase would reveal two simple effects with no interaction (see middle panel of fig. 1).

Finally, we propose a third view, distinct from hypothesis 1 and hypothesis 2 and unexplored in the literature thus far. We argue that consideration of and concern for future outcomes may be neither equivalent nor independent but may instead be mutually reinforcing. Specifically, consideration of future consequences will promote restrained spending more when the person cares about the welfare of his/her future self, and this concern for the future will motivate thrift more when he/she sees how his/her current consumption will reduce future welfare.

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

To illustrate the differences between these hypotheses, let us return to our earlier example: Jan spends all her money because, although she cares about her future needs, she does not think about them when making purchases. In contrast, Fran understands the consequences of her current spending, but she does not care about what happens to her when she is old. How would Jan and Fran be affected by interventions that target the awareness or valuation of future consequences? First, hypothesis 1 suggests that (i) interventions that increase valuation of future consequences or (ii) reminders to consider trade-offs would help both people reduce their spending (because both interventions impact the same construct), which is inconsistent with the distinction drawn between Jan and Fran.

Similarly, hypothesis 2 would imply that either intervention should be helpful, because it assumes that getting Jan to care even more about her future needs or getting Fran to pay even more attention to future consequences would reduce their spending. However, in this example, the first intervention actually would not help Jan (who does not think about the future), and the second would not help Fran (who does not care about her future). Hypothesis 3, on the other hand, implies that making Jan care more about her future self will not reduce spending nor will reminding Fran of the trade-offs she is making. But doing the reverse—reminding Jan and inducing caring in Fran—would reduce spending, as would combining these interventions.

While hypothesis 3 is reflected conceptually in some quantitative models of decision making (e.g., Winer 1997), the two factors have not been jointly estimated due to the difficulty of empirically identifying both factors from choices observed in field data. However, we can test hypothesis 3—and distinguish its predictions from those of hypothesis 1 and hypothesis 2—using direct measurement and experimental methods. Under hypothesis 3, 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 (see last panel of fig. 1). As a result, reduced spending will occur primarily when opportunity costs are recognized and valuation of future outcomes is high.

In this article, we test the mutual reinforcement account (hypothesis 3) against the other accounts suggested by prior literature (hypothesis 1 and hypothesis 2). As noted earlier, we operationalize the valuation of future outcomes in two ways: (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 (via discount factors). To operationalize awareness, 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 find that awareness of future outcomes and valuation of the future interact to predict people's choices, as described by hypothesis 3. Our finding that awareness of future outcomes plays a moderating role may offer insights into why financial outcomes have not been consistently predicted by measures of discounting in the prior literature. 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 recognition of the trade-offs inherent in choices and how valuation of the future (which increases with greater connectedness to the future self—study 1A—and is reflected in measures of discounting—study 1B) jointly determine financial deci-

EFFECTS OF MANIPULATED REMINDERS TO CONSIDER OPPORTUNITY COSTS AND MEASURED VALUATION OF THE FUTURE
(CONNECTEDNESS AND DISCOUNTING) ON PURCHASE PROBABILITY
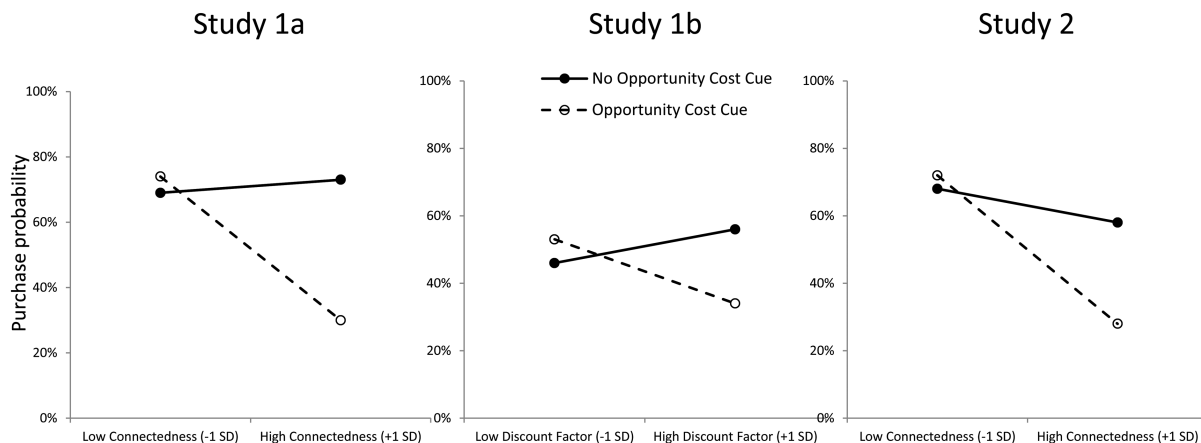
sions. Any single contemplated expenditure, by itself, rarely jeopardizes any other specific spending or savings goals and so may often be made without considering opportunity costs. However, the notion of opportunity cost can be readily cued, and we predict that doing so will potentiate the relation between connectedness and thrift.

Method

Eighty-eight adults were approached on the University of Chicago campus and a nearby museum to complete a short survey in return for a candy bar. They rated psychological connectedness to their future self—how much they felt that the important psychological properties that define their current selves would be preserved in their future selves, and on a corresponding visual scale using Euler circles, each coded to 0–100 (see app. A for materials; apps. A–F are available online). 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

Consistent with prior work, providing an information-neutral opportunity cost cue marginally reduced purchase intentions (from 71% to 51%; $\chi^2(1) = 3.69$; $p = .055$). More important, as predicted by hypothesis 3, 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 $r (45) = .04$, NS; difference between correlations $z = 2.14$, $p < .05$).

A floodlight analysis (Spiller et al. 2013) based on a fitted logistic regression model (fig. 2; app. B, table 1) found that the opportunity cost cue significantly decreased purchase rates for people with connectedness scores 0.11 standard deviations above the mean and higher. Among those consumers whose connectedness scores were one standard deviation above the mean, for example, the opportunity cost reminder decreased purchase rates from 73% to 30%. Among those whose connectedness scores were less than 0.11 standard deviations above the mean, the opportunity cost cue did not have any significant effect. See the left panel of figure 2.

These results are inconsistent with the alternative possibilities (hypothesis 1 and hypothesis 2). Under hypothesis 1 (inseparability), we would not expect to see an effect of highlighting opportunity cost among people who were high in connectedness to the future self because hypothesis 1 predicts that people high in connectedness would spontaneously consider opportunity costs. Under hypothesis 2 (in-

dependence), 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 hypothesis 3—that restraint in spending arises from the combination of highlighting opportunity cost (which facilitates the recognition that money saved now can be spent later) and connectedness to the future self (which motivates caring about the future selves that benefit from savings).

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 trade-offs 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 Zauberman [2015] for a review). In particular, to our knowledge, there is no research linking level of spending (e.g., purchase probabilities or amount spent) and separately measured discounting measures. The results of study 1A suggest that, in contrast with the stylized choices involving explicit trade-offs that have been studied in discounting tasks, many real world choices lack explicit trade-off cues. So we predict that measures of discounting will correlate more strongly with purchase choices when trade-offs between the choice options are highlighted.

Method

Two hundred and thirty-three participants using an online survey (hosted on Amazon Mechanical Turk) 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. Note that the discount factor (δ) and discount rate (often represented by r) 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 greater patience, or valuation of the future, while a low discount factor signals impatience, or steep discounting (i.e., a high discount rate). Discount factors at the time of measurement can be thought of as reflecting both potentially stable individual traits as well as situational factors (Urminsky and Zauberman 2015). 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 hypothesis 3, and inconsistent with both hypothesis 1 and hypothesis 2, 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) $= .09$, NS; difference between correlations $z = 2.21. p < .05$). A floodlight analysis based on a fitted logistic regression model (see fig. 2; app. B, table 2) found that for the more patient respondents (those with discount factors of .74 or higher; 46% of the sample), the opportunity cost reminder significantly decreased purchase rates. However, for the more impatient respondents, with discount factors below .74, the manipulation of opportunity cost did not have any significant effect on purchases. See the middle panel of figure 2.

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 trade-offs in the purchase context are highlighted. 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, these findings suggest a solution to the puzzle of why estimates of discounting do not consistently predict consumer behavior in previous studies despite representing a somewhat stable individual difference (as evidenced by test-retest reliability, per Simpson and Vuchinich [2000]; see Urminsky and Zauberman [2015] for a review). When behaviors are not spontaneously construed as a trade-off 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 trade-offs (e.g., trading off time and inconvenience now to avoid periodontal disease or interest charges later), discount factors, as elicited via explicit intertemporal trade-offs, should be an effective predictor. Conversely, many behavioral interventions (or "nudges"), such as providing information about future consequences (Koehler, White, and John 2011) 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. However, some people may be less likely to 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. This suggests that connectedness to the future self may 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 and ninety-nine adult consumers completed an online survey (hosted on Amazon Mechanical Turk) involving the DVD scenario from study 1 and, after making their choice, completed the connectedness measures from study 1A. They then completed 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 1-year time frame. We also measured the "Elaboration of Potential Outcomes" scale (Nenkov et al. 2008), but only weak nonsignificant relationships were found, which we do not discuss further.

Results and Discussion

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

A floodlight analysis based on a fitted logistic regression model (fig. 2; app. B, table 3) found that among people higher in connectedness (.06 SD above the mean or higher), the opportunity cost cue significantly reduced purchase intentions, from 60% to 34%. Conversely, among those whose connectedness scores were below the mean, the manipulation had no effect (70% vs. 73%). See the right panel of figure 2.

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, p's < .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 $r = -.17$, $p < .05$, respectively). However, as predicted by hypothesis 3, higher connectedness was related to a lower probability of purchase intent

when opportunity costs were highlighted ($\beta = -.94$, $p < .001$) but not in the control condition ($\beta = -.21$, NS). The difference between logistic regression slopes is statistically significant ($\beta_{INT} = -.37$, $p < .05$; table 3 in app. B). Additionally, when opportunity costs were experimentally highlighted, the spontaneous propensity to plan became a marginally weaker predictor of purchase intent ($r = -.31$ vs. $-.09$, $p = .10$), as did consideration of future consequences ($r = -.24$ vs. $-.12$, NS).

These results suggest three insights. Consistent with the findings of study 1A, psychological connectedness to the future self has a greater effect on purchase decisions when trade-offs are highlighted. Highlighting trade-offs reduced spending more for participants low in propensity to plan, similar to Spiller (2011). In this study, highlighting trade-offs also 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 important, the three-way interaction was significant (all p's < .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, where we have z-scored the continuous variables and coded the opportunity cost manipulation as -1 (no reminder) or 1 (reminder). A second analysis using consideration of future consequences instead of propensity to plan yields similar results (see table 5 in app. B).

The predicted means in figure 3 suggest that connectedness depressed purchase intent when opportunity costs were either chronically salient (for people with a high propensity to plan) or situationally salient (an opportunity cost cue was provided). A floodlight analysis reveals that, in the salient opportunity cost condition, higher connectedness consistently predicted lower likelihood of purchase, a re-

FIGURE 3

EFFECT OF OPPORTUNITY COST CUE, CONNECTEDNESS, AND PLANNING
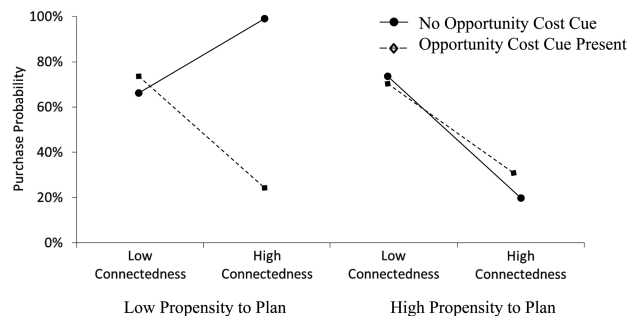
lationship that was significant for propensity to plan 1.07 SD above the mean or lower. In the no reminder condition, connectedness predicted lower purchase probability for people with propensity to plan scores of .70 SD above the mean or higher. Unexpectedly, among those with low propensity to plan (.20 SD below the mean or lower) who were not cued to consider trade-offs, 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 return to this potential unanticipated result in the General Discussion, where we provide meta-analysis results.

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 do not 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 trade-offs (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 indicated that they would consider buying a tablet computer. (The survey was hosted on Amazon Mechanical Turk.) Using a 2×2 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) that induces the belief that one's identity will (or will not) substantially change. 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 ($M_{high} = 77.1$, SD = 16.3 vs. $M_{low} = 62.8$, SD = 19.5; $t(135) = 4.68$, $p < .01$).

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$) but was stated explicitly for participants in the "salient opportunity cost" condition ($N = 70$). These prices were accurate at the time 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%, $\chi^2 = .18$, NS). The difference in connectedness 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%, $\chi^2 = .50$, NS). A logistic regression on choice of the premium product reveals no effect of connectedness, a significant effect of opportunity cost cue, and a significant interaction ($\beta_{INT} = -.490$, Wald = 3.9, $p < .05$; see table 6 of app. B).

To understand the average amount spent, we coded the cost of the chosen option ($0, $635, or $735) and regressed this measure on connectedness, opportunity cost cue, and their interaction. The predicted interaction was significant ($\beta_{INT} = -59.97$, $t = -2.11$, $p < .05$, bootstrap $p < .05$ to correct for the ordinal DV) with no main effects ($\beta s = -12.10$ and -22.32, $ts < 1$ for connectedness and opportunity cost cue; see table 7 of app. B). Similarly, to account for the ordinal dependent variable, an ordinal regression analysis revealed the predicted interaction ($\beta_{INT} = -.377$, Wald = 4.4, $p < .05$; see fig. 4 and table 8 of app. B) and no significant main effects. Likewise, the interaction when predicting probability of any purchase was significant ($\beta = -.490$, Wald = 4.0, $p < .05$, table 9 of app. B). These results suggest that exercising financial restraint requires both high connectedness to one's future self and a reminder to consider opportunity costs of current expenditures.
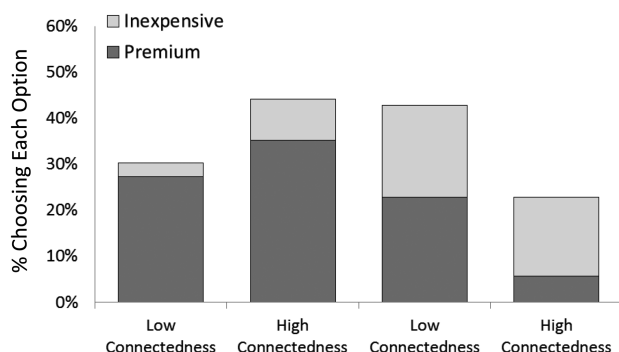
STUDY 4: CONNECTEDNESS TO THE FUTURE SELF AFFECTS CHOICES BY DECREASING TEMPORAL DISCOUNTING

Discount factors measure an in-the-moment time preference, which is sometimes viewed as a somewhat stable individual difference. However, as noted earlier, manipu-

FIGURE 4

JOINT EFFECT OF CONNECTEDNESS AND OPPORTUNITY
COST REMINDERS ON PROPORTION CHOOSING TO
PURCHASE THE PREMIUM PRODUCT, PURCHASE THE
INEXPENSIVE PRODUCT, OR SAVE THEIR MONEY IN STUDY 3

lating connectedness to the future self affects time discounting, as measured by explicit trade-offs between receiving lump sums of money at discrete times (Bartels and Urminsky 2011). Time discounting, in turn, is often theorized to underlie consumer decisions about spending and saving. Consistent with this view, parallel effects of measured connectedness and discount factors were found in studies 1A and 1B, such that valuing the future corresponded to less purchasing only when opportunity costs were cued.

Study 4 tests for a direct link between connectedness and discount factors in influencing 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 also help address the puzzle of why estimates of discounting often weakly predict consumer behavior. Replicating our earlier result in study 1B, we will again find that discount factors predict discretionary purchase behavior only when trade-offs are highlighted. Specifically, the results indicate 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 versus saving decisions.

Method

We collected 146 complete surveys from adult online participants who indicated that they would consider buying a tablet computer. (The survey was hosted on Amazon Mechanical Turk.) 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 at the time 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 amounts, as 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 explicitly specified future outcomes, as assessed by the discounting tasks (average discount factor $\delta = 0.51$, SD $= 0.21$ vs. average $\delta = 0.58$, SD $= 0.17$; $t(144) = 2.16$, $p < .05$; see also table 10 in app. B).

Spending on Discretionary Purchase. Increasing connectedness eliminated choices of the premium product when opportunity costs were cued (9% vs. 0%), but it 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 focused on amount spent, coding the cost 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 ($M_{low} = \$311$, SD $= 332$ vs. $M_{high} = \$159$, SD $= 268$; $t(65) = 2.08$, $p < .05$), but not when the cue was absent ($M_{low} = \$213$, SD $= 317$ vs. $M_{high} = \$273$, SD $= 324$; $t(77) = .83$, NS). We ran a linear regression predicting intended spend, with opportunity cost cue coded as -1 (no cue) versus 1 (cue) and connectedness coded as -1 (low) versus 1 (high). There were no significant main effects, but the predicted interaction between opportunity cost and connectedness was significant ($\beta_{INT} = -53.25$, $t = 2.05$, $p < .05$, bootstrap $p < .05$ to correct for the ordinal DV; table 11 of app. 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.

JOINT EFFECT OF CONNECTEDNESS AND OPPORTUNITY COST REMINDERS ON PROPORTION CHOOSING TO PURCHASE THE PREMIUM PRODUCT, PURCHASE THE INEXPENSIVE PRODUCT, OR SAVE THEIR MONEY IN STUDY 4
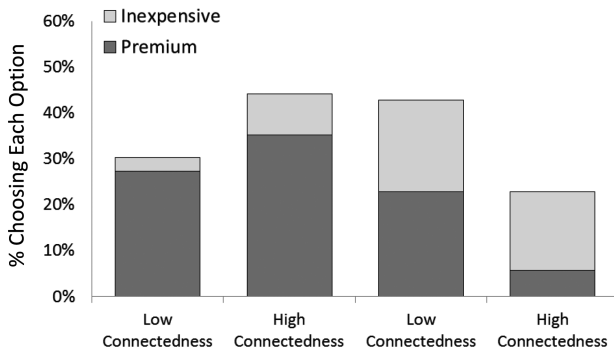
The reduction in spending caused by high connectedness when opportunity costs were cued was partially driven by a marginally significant increase in not purchasing (52% vs. 74%, $\chi^2 = 3.47$, $p = .06$). When opportunity costs were not cued, there was no increase in refraining from purchasing between the low versus high connectedness conditions (68% vs. 57%, $\chi^2 = .91$, NS). A logistic regression predicting nonpurchase reveals a significant interaction between opportunity cost salience and connectedness ($\beta_{INT} = -.352$, Wald $= 4.0$, $p < .05$; table 12 in app. B) 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 resembles the choices used to impute the discount factor—both are decisions explicitly framed as a trade-off. Consistent with this view, the more patient participants with higher discount factors (imputed from intertemporal choices; see app. 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 ($r = .08$, NS). These results help explain why discount factors imputed from choices involving explicit trade-offs may have limited predictive validity for a large variety of real-world choices, where the trade-offs may not be 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 fig. 6). When opportunity costs are cued, the connectedness-induced change in spending is mediated by connectedness-induced changes in time preference, as denoted by the significant bolded coefficients. In contrast, connectedness also induces

changes in time preference when opportunity costs are not cued, but time preference no longer affects spending.

A significant main effect of manipulating connectedness on the discount factor ($p < .05$, table 10 in app. B) and a significant interaction between the connectedness and opportunity cost cue manipulations on spending ($p < .05$, table 11 in app. B) support this interpretation. Also, the interaction between discount factor and opportunity cost cue ($p < .05$, table 13 in app. B) on spending was significant. The interaction between connectedness and opportunity cost is reduced when the model includes an interaction between discount factor and opportunity cost (table 14 in app. 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, opportunity cost cue significantly moderates the indirect effect of connectedness on spending (via discount factor; $\beta = -335.8$, $t = -2.39$, $p < .05$), in a moderated mediation model (fig. 6, based on model 3 in Preacher, Rucker, and Hayes [2007]).

Study 4 addresses both (i) why connectedness to the future self will not affect people's spending when opportunity costs are neglected and (ii) how 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 opportunity costs are highlighted. By making the opportunity costs of buying an iPad explicit, participants are reminded to think through the trade-offs in this purchase decision, and the purchase choice is therefore predicted by the discount factor imputed from choices involving explicit trade-offs. In contrast, the same discount factor may have limited validity for predicting those choices that the decision maker does not view as trade-offs.

FIGURE 6

DIAGRAM OF MODERATED MEDIATION MODEL IN STUDY 4
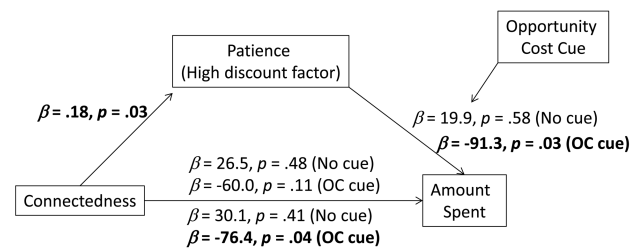
STUDY 5: CHANGES IN CONNECTEDNESS REDUCE CONSEQUENTIAL PURCHASES FOR PEOPLE WHO SPONTANEOUSLY CONSIDER OPPORTUNITY COST

Studies 1–4 have used realistic but hypothetical choice scenarios. In the next study, we investigate how manipulated connectedness and the measured tendency to consider opportunity costs jointly affect a consequential decision by having participants make a purchase in the lab.

Method

A sample of adults ($N = 102$) participated in a study in a Chicago decision laboratory for \$2. Participants were told that they would also be eligible for a performance-based bonus. In the study, participants completed four rounds of a task where they were asked to count the number of ones in an 8×8 matrix of zeros and ones and to enter that number. This task, adapted from Abeler et al. (2011), is designed to be tedious. Participants could not proceed to the next trial until they had entered the correct number. After completing these four trials, participants were notified that they had received a \$2 bonus for correctly completing the four counting tasks.

Next, we manipulated connectedness using the information-based method described in study 3. On the following screen, participants were offered a chance to spend some of their \$2 in bonus money to buy zero, one, two, three, or four Ghiradelli chocolate squares for 50 cents each, a typical retail price. A bowl with multiple flavors of individually wrapped chocolates was displayed in the testing room. After indicating their choice, participants then filled out the Propensity to Plan scale, as in study 2. Any unspent money was paid to participants as a bonus.

Results and Discussion

In a regression analysis, we predicted the number of chocolates purchased by connectedness condition (-1 = low connectedness, $+1$ = high connectedness), propensity to plan score (z-scored), and their interaction. This analysis revealed no main effect of connectedness ($\beta = .06$, $t < 1$, NS), a marginal main effect of propensity to plan ($\beta = -.13$, $t = -1.80$, $p = .08$), and the predicted interaction ($\beta_{INT} = -.19$, $t = 2.62$, $p = .01$, table 15 in app. B). As predicted, people higher in propensity to plan bought fewer chocolates in the high connectedness condition ($r = -.32$, $p < .01$) but not in the low connectedness condition ($r = .09$, NS).

As a robustness check, we also ran a logistic regression predicting the decision whether or not to buy. This analysis revealed the predicted interaction ($\beta_{INT} = -.52$, $\chi^2 = 4.14$, $p < .05$) but no significant main effect of connectedness condition ($\beta = .10$, $\chi^2 = .16$, NS) nor propensity to plan ($\beta = -.18$, $\chi^2 = .52$, NS, table 16 in app. B).

This study replicates our prior findings in the context of an actual purchase in the lab. Next, we test the joint effects of manipulated connectedness and opportunity cost reminders on consumers' actual purchases in a field setting.

STUDY 6: THE IMPACT OF CONNECTEDNESS AND OPPORTUNITY COST REMINDERS ON PURCHASES IN THE FIELD

Method

Potential participants were approached while waiting to order at a coffee shop near the University of Chicago campus over the course of six mornings, in exchange for \$2. Participants ($N = 138$) filled out a brief survey before making their purchase. We used the information-based manipulation from study 3 and highlighted opportunity cost using a novel reminder paradigm.

Participants in the high opportunity cost salience condition were asked to think about five categories of spending (debt repayment, entertainment, coffee and pastries, savings, and transportation) and to rate whether, 1 year from now, they would wish they spent more or less in each category (1 = "I will wish I spent much less"; 5 = "I will wish I spent much more"). The manipulation was intended to promote thinking about the purchases displaced by overspending in any of these categories, where one category (i.e., coffee and pastries) represented the purchase decision they were about to make. Note that this activity is similar to what people often do when budgeting—consider how to prioritize their spending across categories.

Participants in the low opportunity cost salience condition were instead asked to rate whether they would wish they had spent more/less time reading about five categories (history, world events, entertainment, politics, and science). Thus, these participants were also reminded of trade-offs, but not between spending categories. After making their purchases, participants showed their receipt to a research assistant and rated how often they visited this coffee shop (0 = "This is my first time"; 6 = "I visit this store almost daily").

Results and Discussion

To test the effect of the manipulations, we regressed the amount spent on the connectedness (-1 = low connectedness, $+1$ = high connectedness) and opportunity cost salience (-1 = no opportunity cost cue, $+1$ = opportunity cost cue) conditions and their interaction, controlling for the frequency of visiting and fixed effects for each day (see table 17 in app. B). The regression revealed that the predicted interaction ($\beta_{INT} = -.72$, $t = 2.29$, $p < .05$) was significant. There were no main effects for connectedness or opportunity cost ($t < 1$), and frequency of visit ($\beta = -.54$, $t = -3.16$, $p < .01$) was significant, along with two of the six day-level fixed effects (t's ≥ 2.4, p's $\leq .05$). The regression-predicted mean spending in each condition is

plotted in figure 7. The estimate of the predicted interaction is similar ($\beta_{INT} = -.59$, $t = 1.84$, $p = .07$; see table 18 in app. B) when omitting the number of visits control and the fixed-effects, but the model fit is substantially worse ($R^2 = .03$, as opposed to $R^2 = .16$ in the full model).

This study extends our findings to a real world decision context, where consumers' choices about which items and how many to buy were jointly affected by manipulating connectedness and opportunity cost consideration. In the next study, we provide a further investigation of multiple product choices, by having participants repeatedly make purchase decisions in multiple categories.

STUDY 7: CHANGES IN CONNECTEDNESS CAUSE CHANGES IN PRICE SENSITIVITY WHEN TRADE-OFFS ARE CUED

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

Alternatively, those people who are both more connected and aware of opportunity costs may be more likely to trade off the short-term consumption value of the available product 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 is the case, more of the reduction in spending will be from products that provide low value to the person. To test this, in the following study we investigate a multi-purchase context and examine which purchases are most affected by our connectedness and opportunity cost manipulations. As in study 6, we use a common task (considering the relative desirability of multiple product categories before shopping) to highlight trade-offs.

Method

We collected 130 complete surveys from online participants (the survey was hosted on Amazon Mechanical Turk). We crossed a connectedness manipulation with a trade-off 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 remain very stable over the next year, after reading that most participants in a previous study could do so. Based on prior research (Bartels and 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 10 reasons would anticipate difficulty generating the reasons and would therefore inter-

FIGURE 7

JOINT EFFECT OF CONNECTEDNESS AND OPPORTUNITY COST REMINDERS ON COFFEE SHOP SPENDING IN STUDY 6
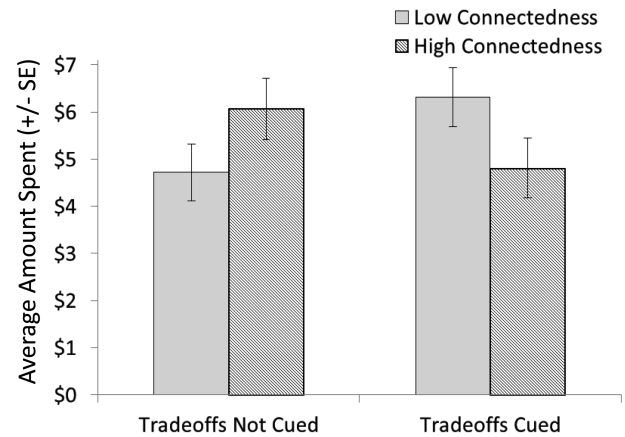
pret this experience as evidence of lower connectedness to their future selves.

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 trade-off salience condition, the ranking task was done before choosing which products to purchase. The ranking task was intended to make trade-offs 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 trade-off salience condition, the same ranking task was instead completed after making the choices.

We expected the connectedness manipulation to have the strongest effect when trade-offs were highlighted by first completing the ranking task. Our analyses focused on how often and when participants "splurged" by buying the more expensive product across 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 trade-off salience motivates thrift across the board or whether knowing and caring about future outcomes causes people to reduce spending specifically for less-valued categories.

Results and Discussion

Number of Expensive Purchases. As predicted, people prompted to consider trade-offs (by initially ranking the

FIGURE 8

JOINT EFFECT OF CONNECTEDNESS AND OPPORTUNITY COST SALIENCE ON PRICE SENSITIVITY
(CHOOSING THE MORE EXPENSIVE OPTION) IN STUDY 7
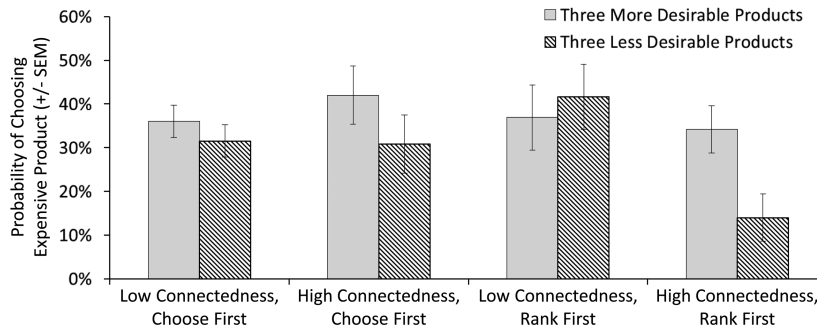
NOTE.—Because of the repeated measures test, error bars represent standard errors of the difference score. Trade-offs Cued = "rank first" condition; Trade-offs Not Cued = "choose first" condition.

categories) chose fewer premium products (vs. cheaper products) when made to feel more connected (M_{high} = 1.45, SD = 1.18 vs. M_{low} = 2.36, SD = 1.19; t = 3.08, $p <$ .01), but connectedness had no effect when the ranking task came second (M_{high} = 2.19, SD = 1.49 vs. M_{low} = 2.03, SD = 1.21; $t < 1$, NS). A linear regression confirmed that the predicted interaction was significant (β = −.27, t = −2.38, $p <$ .05; see table 19 in app. B) but found no effect of trade-off salience and a marginal main effect of connectedness. Analyzing the amount spent yields a similar result: when trade-offs are cued, higher connectedness yields lower spending (M_{high} = \$489, SD = 18.76 vs. M_{low} = \$503, SD = 18.28; t = 2.99, $p <$ .01) but otherwise has no effect (M_{high} = \$500, SD = 18.28 vs. M_{low} = \$498, SD = 19.45; NS). A linear regression predicting total intended spend confirms the significant interaction (β_{INT} = −3.78, t = −2.16, $p <$ .05; see table 20 in app. 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 (1–6) and his/her decision to purchase the more expensive (vs. less 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. Next, a regression analysis used connectedness condition (low vs. high), the trade-off salience condition (low vs. high), and their interaction to predict these within-subject correlations. The regression reveals a significant effect of connectedness (β = −0.09, SE = 0.03, t = −2.89, p = .005), no effect of trade-off salience ($t < 1$), and a significant interaction

(β_{INT} = −0.06, SE = 0.03, t = −1.99, $p <$ .05, table 21 in app. B).

Simple effects tests reveal that connectedness did not appreciably affect the magnitude of this correlation when trade-offs were not cued (i.e., when participants chose before ranking the product categories; M_{low} = −0.09, SD = 0.06 vs. M_{high} = −0.15, SD = 0.07, $F < 1$, NS). In contrast, inducing high connectedness increased the magnitude of this correlation when trade-offs were cued (i.e., when participants ranked the categories before choosing; M_{low} = 0.06, SD = 0.07 vs. M_{high} = −0.25, SD = 0.06, $F(1, 126)$ = 12.13, $p <$ .001) A mixed within-between ANOVA confirmed the three way interaction between category ranking, connectedness and opportunity cost salience ($p <$ .05; see table 22 in app. 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. This pattern was especially pronounced in the high trade-off salience conditions (i.e., when people ranked categories before choosing). To illustrate, figure 8 presents the fraction of times respondents chose to splurge in the higher ranked (top 3) versus lower ranked (bottom 3) product categories. As predicted, only those in the high connectedness, high trade-off salience condition had fewer choices of the premium product for the lower-ranked categories (M = .14, SD = .21) versus the higher-ranked categories (M = .34, SD = .29; $t(37)$ = 3.73, $p <$ .001). No such difference was observed in the other conditions (all p's > .10). Only when opportunity cost is highlighted and connectedness is heightened do people significantly reduce spending, specifically on less desirable products (relative to all other conditions).

We used actual list prices from the same source (Ama-

zon.com) in this study, and so we assume that the differences in observed desirability stem primarily from individual preferences rather than perceived value. However, when prices (and perceived value) vary, a similar pattern might also hold, such that people high in connectedness who do consider opportunity costs will reduce spending by either constraining their purchasing to those products perceived as providing better value or choosing not purchase when perceived prices are high.

Studies 6 and 7 manipulate the awareness of opportunity costs by prompting consideration of relevant trade-offs before making a decision. These findings raise the question of how related a ranking decision process needs to be to have an opportunity cost reminder effect. To test the boundaries of ranking interventions, we subsequently ran a second version of study 7 as a posttest, where 395 participants were instead asked to rank six irrelevant items—products unrelated to those in the purchase decision: running shoes, sunglasses, indoor grills, carry-on luggage, light fleece jackets, and noise-canceling headphones. We also measured propensity to plan. In a regression predicting the number of expensive choices (out of the six pairs), by (i) connectedness condition, (ii) trade-off salience—ranking before versus after choosing, (iii) propensity to plan, and all possible interactions, no simple effects of any variables and no two-way or three-way interactions appeared ($-.03 \leq \beta\text{'s} \leq .05$, $-.48 \leq t\text{'s} \leq .83$, $p\text{'s}$ all NS, table 23 in app. B). These results suggest that for prioritization to affect purchasing, the trade-offs considered may need to directly involve the goods to potentially be purchased and that simply cueing the idea of prioritization more generally, as a mind-set, may be insufficient.

Study 7 generalizes our findings to a multi-product purchase situation. A task that people often do before shopping —prioritizing categories of spending under consideration —can highlight trade-offs, and this facilitates the effect of connectedness on fiscal restraint. In particular, the restrained spending occurs for purchases of product categories that are less personally desirable. As a result, higher-connectedness respondents' spending is both reduced and more focused on valued purchases 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 article 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 trade-offs 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.

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 future consumption made possible by current thrift and therefore may be least prone to save for the future. Furthermore, 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.

It is plausible that under some circumstances a lack of caring about the future could contribute to a lower likelihood to consider future consequences, or vice versa. In particular, it seems possible that greater awareness of future outcomes could boost valuation of those outcomes. The evidence on this relationship is mixed in our studies. Highlighting opportunity costs had no effect on measured connectedness in study 2 ($r = -.02$, NS). Highlighting opportunity costs both modestly increased discount factors (in study 4, $r = .17$, $p < .05$) and decreased discount factors (in study 1B, $r = -.12$, $p = .06$), inconsistent with the idea that such interventions consistently prompt higher valuation. However, measures of propensity to plan and consideration of future consequences were significantly correlated with connectedness in study 2 ($r = .22$ PTP, $r = .18$ CFC, both $p\text{'s} < .01$). Overall, we conclude that while the two factors do consistently interact in predicting spending (per hypothesis 3) and are far from redundant (contrary to hypothesis 1), they may not be completely independent traits, particularly when measured.

In some of the studies we observe a seeming reversal of the connectedness effect when opportunity costs are not highlighted. Could it be that when people do not consider opportunity costs, being more connected would actually lead to higher spending? We did a meta-analysis, using correlation as the effect size statistic, to test this in the studies where opportunity cost salience was manipulated (studies 1–3, 4, 6, and 7). In the no reminder conditions, the weighted average correlation did not reveal a significant positive effect of connectedness (measured or manipulated) on purchasing ($r = .07$, 95% CI $[-.02, .15]$, NS, $N = 472$).

However, in a floodlight analysis of studies 2 and 5, we do see a significant reversal effect of connectedness for low propensity to plan. Those high in propensity to plan (more than .4 SD above the mean) spend significantly less under high connectedness than low connectedness, consistent with hypothesis 3. However, those people who are low in pro-

pensity to plan (more than .5 SD below the mean) spend significantly more under high connectedness than low connectedness, which is not predicted by any of the three candidate hypotheses.

One potential explanation of this unanticipated finding is that people who do not plan their future expenses are only focused on the benefits of the purchase (and not the alternative uses of money) but construe those benefits differently depending on their connectedness. People higher in connectedness may value the benefits of future consumption, whereas those lower in connectedness may only value more immediate benefits, making purchase less attractive. It would be useful for future research to investigate this possibility.

Implications for Theories of Intertemporal Decision Making

Overall, consistent with hypothesis 3, time preferences matter most when opportunity costs are salient—whether 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. This relationship is seen for both discount factors (as a measure of general time preference) and connectedness to the future self (which affects the motivation to preserve resources for the future). Potential confounds with connectedness are ruled out in the pretest reported in appendix D, as well as in Bartels and Urminsky (2011).

These 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 reasonable number, such as δ = .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; Nair 2007; Sun, Neslin, and Srinivasan 2003).

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 2014). Our findings imply that time preference and planning horizon are not equivalent, and they highlight the importance of qualifying the interpretation of models that make strong assumptions about either factor. In appendix F, we present an illustrative model of consumer decisions that captures the assumptions and predictions of our framework as it relates to this literature.

As captured in this model, the efficacy of highlighting trade-offs may depend on the specific opportunity costs that are highlighted. We would expect time discounting and connectedness (via its influence on discounting) to matter more if the opportunity costs were explicitly characterized as fu-

ture 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, with the exception of study 6, were not tailored to prompt thoughts of the future opportunities displaced by current indulgences, our findings may be a conservative test of the interaction we posit.

Implications for Interventions in Financial Decision Making

The literature on financial decision making has explored interventions aimed at promoting far-sighted behavior. Such interventions often target people's presumed lack of information to optimize their decisions. For example, credit card companies are required to disclose the monthly payment needed to pay off one's accumulated debt in 3 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 to summon it at the right time. For example, studies have found increased savings or reduced debt from interventions such as reminding people of the consequences of failing to save (e.g., Koehler et al. 2011). Presumably these manipulations affect behavior by bolstering the accessibility of intertemporal trade-offs in the face of competing cognitive demands. Other interventions, such as surveys about banking and savings (Dholakia and Morwitz 2002), or collecting deposits in person (Ashraf, Karlan, and Yin 2006) may provide inadvertent reminders, with similar effects, as can simply experiencing resource constraints, which can make opportunity costs more salient (Spiller 2011).

However, informational interventions have not always been found to be effective (e.g., Karlan, Morten, and Zinman 2012). The current studies suggest that these interventions can fail, either because such trade-offs are spontaneously taken into account 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 complement and increase the efficacy of informational manipulations. However, informational interventions that undercut connectedness may not have such positive synergies. For example, in an ad that emphasizes the costliness of medicating our frail older selves, portrayal of the older selves as very different could well undermine the feelings of connectedness that provides our motivation to save for those older selves in the first place.

When intertemporal preferences are stable, our results are consistent with the characterization of informational interventions as "nudges" (Sunstein and Thaler 2008) that help those who find it difficult to make far-sighted choices but

does not affect people who have a clear preference for current consumption. However, research on connectedness suggests that intertemporal choices may not represent fully 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 and Urminsky 2011), one that does act on preferences. Interventions that shift intertemporal preferences will primarily affect decisions where trade-offs 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 trade-off—unless she thinks about her "latte factor," as David Bach describes it.

The current studies suggest that greater attention should be paid to the interactions between factors underlying intertemporal cognition and behavior in future research. Interventions that succeed in both facilitating the recognition of trade-offs and in fostering feelings of connectedness will most effectively promote the interests of people's 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.

DATA COLLECTION INFORMATION

The first author supervised the collection of data by research assistants for study 1A (spring 2010) and conducted online data collection for study 2 (end of 2010), study 3 (end of 2010), study 4 (fall 2011), and study 7 (fall 2011). The second author conducted online data collection for study 1B (summer 2011). Both authors managed a staff member, who conducted data collection and supervised research assistants for studies 5 and 6 in spring 2014. The data were analyzed jointly by the authors.

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