

# Opportunity Cost Consideration

STEPHEN A. SPILLER

Normatively, consumers should incorporate opportunity costs into every decision they make, yet behavioral research suggests that consumers consider them rarely, if at all. This research addresses when consumers consider opportunity costs, who considers opportunity costs, which opportunity costs spontaneously spring to mind, and what the consequences of considering opportunity costs are. Perceived constraints cue consumers to consider opportunity costs, and consumers high in propensity to plan consider opportunity costs even when not cued by immediate constraints. The specific alternatives retrieved and the likelihood of retrieval are functions of category structures in memory. For a given resource, some uses are more typical of the category of possible uses and so are more likely to be considered as opportunity costs. Consumers who consider opportunity costs are less likely to buy focal options than those who do not when opportunity costs are appealing, but no less likely when opportunity costs are unappealing.

Consumers have unlimited wants but limited resources, so satisfying one want means not satisfying another (the opportunity cost). An opportunity cost is “the evaluation placed on the most highly valued of the rejected alternatives or opportunities” (Buchanan 2008) or “the loss of other alternatives when one alternative is chosen” (*Oxford English Dictionary* 2010). Opportunity costs are foundational to the science of economics and, normatively, consumers should account for opportunity costs in every decision. Though training can increase consideration (Larrick, Morgan, and Nisbett 1990), a stream of behavioral research concludes that individuals often neglect their opportunity costs (Becker, Ronen, and Sorter 1974; Frederick et al. 2009; Friedman and Neumann 1980; Jones et al. 1998; Langholtz et al. 2003; Legrenzi, Girotto, and Johnson-Laird 1993; Northcraft and Neale 1986). I define opportunity cost consideration as “considering alternative uses for one’s resources when deciding whether to spend resources on a focal option.” When do consumers consider opportunity costs? Who considers opportunity costs? Which opportunity costs do they consider?

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What are the consequences of considering versus neglecting opportunity costs?

Five studies provide initial answers. Consumers consider opportunity costs when they perceive immediate resource constraints and when they use limited-use resources (i.e., resources that may only be spent on particular products); planners chronically consider opportunity costs even when they do not face immediate constraints. Categories of resource uses influence which opportunity costs are considered and the particular ones that are considered matter. Consumers who consider opportunity costs are more sensitive to their value than those who do not.

Opportunity cost consideration affects personal and societal well-being. Individuals who consider opportunity costs are more likely to obtain desirable life outcomes than those who neglect them (Larrick, Nisbett, and Morgan 1993). Personal bankruptcies are linked to credit card debt and spending on housing and automobiles that leave people with insufficient savings to withstand adverse events (Domowitz and Sartain 1999; Zhu, forthcoming). Controlling for demographics, propensity to plan for the use of money (possibly reflecting differences in opportunity cost consideration) is associated with higher FICO credit scores (Lynch et al. 2010).

I begin by discussing research on focal and outside options and propose how constraint and categorization may increase opportunity cost consideration. Five studies demonstrate the effects of constraint, planning, and resource-use accessibility.

## FOCAL AND OUTSIDE OPTIONS

Consumers consider opportunity costs when they pay attention to outside options. Other constructs, such as pain of

paying (Prelec and Loewenstein 1998; Rick, Cryder, and Loewenstein 2008) or the value of the marginal dollar (Chandukala et al. 2007), may curb consumption too but are not the focus of the present work. This usage of opportunity cost consideration is consistent with previous research (e.g., Jones et al. 1998; Legrenzi et al. 1993). Because the way consumers value money may be divorced from its possible uses (Hsee et al. 2003; van Osselaer, Alba, and Manchanda 2004), and therefore from opportunity costs, it is important to understand when they incorporate alternative resource uses, not just the value of money, into their decisions.

Previous research has largely ignored the drivers of opportunity cost consideration, although some has focused on the consequences of opportunity cost consideration versus neglect. Although framing one option as focal may not change the decision structure, and thus should not affect the decision, it can have important effects on choice (Jones et al. 1998). Appealing focal options are more likely to be chosen than appealing outside options (Posavac et al. 2004, 2005), more information is gathered about focal than outside options (Cherubini, Mazzocco, and Rumiati 2003; Del Missier, Ferrante, and Constantini 2007; Legrenzi et al. 1993), and sometimes purchase decisions are made as if outside options do not exist (Frederick et al. 2009). Research on hypothesis testing similarly finds that more evidence is gathered about focal hypotheses than alternative hypotheses (Klayman and Ha 1987; Sanbonmatsu et al. 1998), culminating in overconfidence regarding a focal hypothesis (McKenzie 1997, 1998). Although focal options take on a privileged status, consumers sometimes spontaneously recruit outside options into focal decisions (Jones et al. 1998; Posavac, Sanbonmatsu, and Fazio 1997). The purpose of the present work is to determine what drives such spontaneous recruitment of outside options. I propose two critical drivers are perceived constraint and the accessibility of alternate resource uses.

### The Effect of Perceived Constraint on Opportunity Cost Consideration

The first proposed driver of opportunity cost consideration is perceived constraint. When consumers recruit inputs to evaluate a single alternative, they rely on a metacognitive sense of sufficiency to terminate search (Chaiken, Liberman, and Eagly 1989; Cohen and Reed 2006; Lynch, Marmorstein, and Weigold 1988). I posit that the laws governing the consideration of alternatives that are not part of the focal decision are similar to the laws governing the retrieval of inputs to evaluate a single alternative. For example, as outside options become more relevant to goal-based choices, they are more likely to be incorporated into consideration sets (Hauser and Wernerfelt 1990; Mitra and Lynch 1995; Roberts and Lattin 1991). Perceived constraint may increase the threshold for the sufficiency judgment, prompting consumers to ask themselves "What else should I consider?" and thereby increase opportunity cost consideration.

### H1: Resource constraints increase opportunity cost consideration.

In support of this hypothesis, tight mental budgets can reduce consumption (Heath and Soll 1996; Krishnamurthy and Prokopec 2010; Shefrin and Thaler 1988; Stille, Inman, and Wakefield 2010), and merely making smaller, more constrained accounts more accessible leads to a lower likelihood of purchase (Morewedge, Holtzman, and Epley 2007). Russell et al. (1999) speculate that consumers with tight budget constraints are more likely to construct cross-category consideration sets. Consumers tend not to consider alternatives that are not explicitly available (Legrenzi et al. 1993), but they are more likely to consider alternatives when they are more relevant, even if they are not focal (Cherubini et al. 2003; Del Missier et al. 2007). Thought protocols show that people construe resource allocation tasks one decision at a time, effectively ignoring opportunity costs, until they have few resources remaining (Ball et al. 1998). When they approach constraints, other expenditure opportunities are more diagnostic, and they construe the current decision as an allocation across multiple expenditure opportunities.

Constraint is dynamic and varies over time; opportunity cost consideration should vary accordingly. Consumers using monthly budgets for any given purchase feel less constraint than consumers using weekly budgets (Morewedge et al. 2007), expenses are more salient at the end of budgetary periods than at the beginning (Soster 2010), and food consumption declines over the month for individuals receiving monthly food stamps (Shapiro 2005). Collectively, these findings suggest that shorter budgeting periods may increase opportunity cost consideration.

### The Effects of Category Structures on the Accessibility of Opportunity Costs in Memory

The second proposed driver of opportunity cost consideration is the accessibility of alternate resource uses. Information in memory often is available without being accessible (Lynch and Srull 1982; Tulving and Pearlstone 1966), so increasing the accessibility of an alternative can increase its consideration (Mitra and Lynch 1995; Nedungadi 1990; Posavac et al. 1997; Priester et al. 2004). Accessibility is a function of both self-generated and externally present retrieval cues (Lynch and Srull 1982). The present work examines three important ways in which accessibility influences opportunity cost consideration.

*Chronic Accessibility.* Just like other concepts in memory, opportunity costs may be only situationally accessible for some individuals but chronically accessible for others (Bargh et al. 1986; Higgins, King, and Mavin 1982; Johar, Moreau, and Schwarz 2003; Markus 1977). Consumers with chronically accessible plans for the use of their money are likely to incorporate planned purchases into current decisions, much as listing ways one might spend \$20 increases consideration of opportunity costs (Frederick et al. 2009). Propensity to plan is a domain-specific, traitlike construct

reflecting generation and consideration of future plans (Lynch et al. 2010). Individual differences in propensity to plan reflect individual differences in frequency of plan formation, frequency and depth of subgoal planning, use of reminders and props to see the big picture, and preference to plan. Chronic planners are more likely than chronic nonplanners to consider opportunity costs (i.e., incorporate future resource uses into current decisions) when they are not constrained; when they are constrained, even nonplanners will consider them. In other words, chronic planning and constraint interact to affect opportunity cost consideration.

**H2a:** Nonplanners are less likely than planners to consider opportunity costs when they do not face immediate resource constraints, but nonplanners are as likely as planners to consider opportunity costs when they do face immediate resource constraints.

**H2b:** Resource constraints increase opportunity cost consideration for nonplanners, but resource constraints do not affect opportunity cost consideration for planners.

*Resource-Use Typicality.* Activation of a category concept (e.g., *bird*) makes its typical instances (*robin* or *sparrow*) more accessible than its atypical instances (*ostrich* or *penguin*; Boush and Loken 1991; Hutchinson, Raman, and Mantrala 1994; Loftus 1973; Nedungadi and Hutchinson 1985; Rosch 1975; Rosch and Mervis 1975). Mental accounts and gift cards are associated with categories of purchases (Cheema and Soman 2006; Heath and Soll 1996; Henderson and Peterson 1992). Such categories are ad hoc or goal-derived categories (Barsalou 1983, 1985, 1987) that may include products from disparate product categories. For example, different sources of income are associated with different categories of possible expenditures, each of which includes resource uses that differ in typicality (Fogel 2009; Zelizer 1997). I conjecture that considering a focal purchase with one of these resources will activate more typical resource uses more than less typical resource uses. As a result of their greater accessibility, they are more likely to be considered as alternatives to the focal option.

**H3:** More typical uses of a resource are more likely to be considered as opportunity costs than less typical uses of a resource.

*Resource-Use Limitations.* Weber and Johnson (2006) argue that products do not readily come to mind when thinking of money because money is not associated with a meaningful category structure; it is tied to so many uses that it is not a good cue to any of those uses (Anderson 1974). Mental accounts are often organized around categories of purchases (Heath and Soll 1996; Zelizer 1997) or sources of income (Fogel 2009; Shefrin and Thaler 1988; Thaler 1985) and are types of categories themselves (Heath and

Soll 1996; Henderson and Peterson 1992). Similarly, gift cards that are usable at different stores are limited in use to the categories of products available at those stores; these categories are usually not random collections but rather are often aligned with natural product categories. Any given item in a narrow category is generally a more typical instance of that category than it is of a broader category (Boush and Loken 1991), so narrow categories activate category instances more than broad categories (Alba and Chattopadhyay 1985; Boush and Loken 1991; Landauer and Meyer 1972; Meyvis and Janiszewski 2004). Resources that are associated with narrow categories of purchases activate alternative purchases, increasing the likelihood of consideration (Nedungadi 1990); such activation is less likely when categories are broad rather than narrow.

**H4:** Restricting the uses of a resource can increase consideration of opportunity costs while (weakly) decreasing the value of opportunity costs.

## Consequences of Considering Opportunity Costs

Considering opportunity costs can, in general, reduce the likelihood of using a resource on some focal purchase. This can help rein in overspending, though sometimes it leads to underconsumption: when given a single free coupon, consumers may hold onto it too long because they wait for a better opportunity to use it (Shu 2008; see also Shu and Gneezy 2010).

Considering opportunity costs changes the key decision input from the absolute value of the focal option to the value of the focal option relative to the opportunity cost that is retrieved. Compared to people who fail to consider opportunity costs, those considering high-value opportunity costs will be less likely to purchase, whereas those considering low-value ones may not be (Frederick et al. 2009; Jones et al. 1998) or may even be more likely to purchase (Jones et al. 1998). The probability of making a purchase is inversely related to the value of the outside option only when that outside option is considered. Relative to opportunity cost neglect, opportunity cost consideration should be associated with a decreased probability of purchase when it is more valuable than the focal option, but an increased probability of purchase when it is less valuable. This effect is counter to the perspective of economic models that assume that the utility of money is used as a standard for all purchases, as they do not contemplate contextual effects on the outside good.

**H5:** Opportunity cost consideration increases sensitivity to the value of outside options.

In the remainder of the article, I provide evidence for these hypotheses in five studies. I begin by providing evidence for the role of constraint (studies 1, 2, and 3), emphasizing the role of pay cycle (studies 1 and 2) and constraint's interaction with dispositional planning (studies 2 and 3). Finally, I discuss the role of resource-use limitations

and accessibility (studies 4 and 5). Table 1 summarizes the hypotheses and specifies the study in which each is tested.

### STUDY 1: MONTHLY VERSUS WEEKLY BUDGETS AND SEQUENTIAL SHOPPING

Study 1 demonstrates the effect of constraint on opportunity cost consideration (hypothesis 1) and the relationship between opportunity cost consideration and sensitivity to the value of outside options (hypothesis 5). The paradigm in this study captures the essence of everyday consumer choices: consumers encounter a sequence of products that are individually affordable but collectively unaffordable, requiring them to make trade-offs across products over time. Constraint is operationalized holding total income constant by manipulating pay cycle (weekly vs. monthly). Those paid monthly and weekly have identical global constraints but face different real and perceived momentary constraints. In line with previous work on opportunity cost consideration (Cherubini et al. 2003; Del Missier et al. 2007; Legrenzi et al. 1993), I assess opportunity cost consideration as information search about other ways one could spend resources.

#### Method

**Participants and Design.** Students ( $N = 85$ ) participated in the lab for a small payment; the entire study took place during a single session. The task was incentive-compatible: participants had a chance to win their set of chosen products. All participants completed a Daily Shopping task and a Budget Allocation task. In the Daily Shopping task, participants were given a budget and a sequence of 20 purchase opportunities (one per simulated day, 5 days per week, for 4 weeks). Before deciding to buy or not buy, participants could consider each of the next 3 days' offers. Money spent one day was not available to be spent on future days, so future opportunities were potential opportunity costs; revealing them indicated opportunity cost consideration. To manipulate constraint, participants were assigned to one of two Budget Frame conditions: Weekly (paid \$20 per week, resulting in more constraint) or Monthly (paid \$80 per month, resulting in less constraint). Consideration was an-

alyzed as a function of Budget Frame and Week (measured within subject: 1, 2, 3, 4). In the Budget Allocation task, participants were given their full \$80 budget and faced with the choice of the same 20 products simultaneously. Because participants had full information and all decisions could be made jointly during the Budget Allocation task, these purchases were used as a measure of full information preferences; these allocations did not vary by condition.

**Materials and Procedure.** Participants had the opportunity to buy products from the University Store using store credit granted by the experimenter. One participant, selected at random, received his or her chosen products. Unused store credit was forfeited: all opportunity costs were within the experiment. Participants were shown the full set of 20 products in the instructions and told that prices ranged from \$5.95 to \$18.95; as in everyday consumer decisions, participants knew the range of prices they would encounter without knowing exact prices.

Participants with weekly budgets received \$20 in store credit each "Monday" (i.e., on trials 1, 6, 11, and 16). Those with monthly budgets received \$80 in store credit the first Monday (i.e., on trial 1). Any money not spent one week carried over to the next. Each day, participants saw the day of the week, the week of the month, their current balance, the current product offer, its price (which was the real product price), and "buy" and "do not buy" buttons. The "buy" button was inactive if the price was greater than the current balance. To the right of the current offer were three blank boxes representing the next three days' offers, each box accompanied by a button. By clicking the button 20 times, participants could reveal that day's offer and price. This instantiated a small effort cost akin to search or thinking costs required in everyday consumer environments.

After completing the Daily Shopping task, participants completed the Budget Allocation task. Participants were shown all 20 products with prices on the same screen and chose which products they would purchase. They could choose any subset they liked as long as the total cost did not exceed their total budget of \$80.

**Variables.** All computations and analyses are based on affordable trials (i.e., trials on which the price did not exceed

TABLE 1  
SUMMARY OF HYPOTHESES AND STUDIES IN WHICH THEY ARE TESTED

Hypothesis	Study
H1: Resource constraints increase opportunity cost consideration.	1, 2, 3
H2a: Nonplanners are less likely than planners to consider opportunity costs when they do not face immediate resource constraints, but nonplanners are as likely as planners to consider opportunity costs when they do face immediate resource constraints.	2, 3
H2b: Resource constraints increase opportunity cost consideration for nonplanners, but resource constraints do not affect opportunity cost consideration for planners.	2, 3
H3: More typical uses of a resource are more likely to be considered as opportunity costs than less typical uses of a resource.	4
H4: Restricting the uses of a resource can increase consideration of opportunity costs while (weakly) decreasing the value of opportunity costs.	5
H5: Opportunity cost consideration increases sensitivity to the value of outside options.	1, 3

the balance). Budget Frame is the constraint manipulation (Weekly vs. Monthly). Consideration of opportunity costs is assessed as the proportion of future opportunities considered. Average Constraint (a proxy for perceived constraint) was calculated as  $(1/\text{balance})$  averaged over the first 19 days; no opportunity costs could be considered on the last day. Budget Task Choice is the binary purchase decision during the Budget Allocation task. Product Appeal is the proportion of all participants choosing a given product in the Budget Allocation task when all products were simultaneously available. Opportunity Cost Appeal on any given trial is the average Product Appeal of the next three products for that respondent. Allocation Quality is the number of dollars spent during the Daily Purchase task on products that were also purchased in the Budget Allocation task (i.e., the number of products purchased in both tasks, each weighted by price); this variable is based on all trials.

## Results

**Consideration.** In support of hypothesis 1, participants with weekly budgets looked ahead more frequently ( $M = .26$ ,  $SD = .19$ ) than did participants with monthly budgets ( $M = .18$ ;  $SD = .14$ ;  $t(83) = 2.20$ ,  $p = .03$ ). This provides direct evidence that constraint increases opportunity cost consideration.

**Mediation of Consideration by Average Constraint.** Average Constraint fully mediated the effect of Budget Frame on Consideration. Average Constraint was lower in the Monthly condition ( $M = .023$ ,  $SD = .006$ ) than in the Weekly condition ( $M = .045$ ,  $SD = .011$ ;  $t(83) = 11.19$ ,  $p < .01$ ). Preacher and Hayes's (2008) SPSS macro with 5,000 bootstrapped samples revealed indirect-only mediation (Zhao, Lynch, and Chen 2010): controlling for Budget Frame, Average Constraint was positively associated with Consideration ( $B = 7.65$ ;  $t(82) = 3.90$ ,  $p < .01$ ). Controlling for Average Constraint, the direct effect of Budget Frame (Monthly = 0, Weekly = 1) on Consideration was not significant ( $B = -.08$ ;  $t(82) = -1.52$ ,  $p = .13$ ). The indirect path ( $B = .16$ ) had a 95% confidence interval that did not include 0 (.06, .27).

**Consideration over Time.** If constraint drives opportunity cost consideration and constraint varies over time, opportunity cost consideration should vary over time too. In the last week, participants with monthly budgets faced similar constraints as participants with weekly budgets and so should similarly have considered their opportunity costs. Consideration per week was analyzed using a mixed ANOVA with Week (1, 2, 3, 4) as a within-subject measure and Budget Frame (Weekly, Monthly) as a between-subject measure. Data from the preceding week were used to fill in missing data for participants from the Monthly condition who had no affordable trials in weeks 3 (one participant) or 4 (seven participants). On these trials, the products were unaffordable, so the participants had no choices and thus no opportunity costs to consider. Note that this makes the test

more conservative: I predict Consideration in the Monthly condition will increase more than Consideration in the Weekly condition, but using preceding weeks to fill missing data for the Monthly condition reduces the change in the Monthly condition without affecting the Weekly condition.

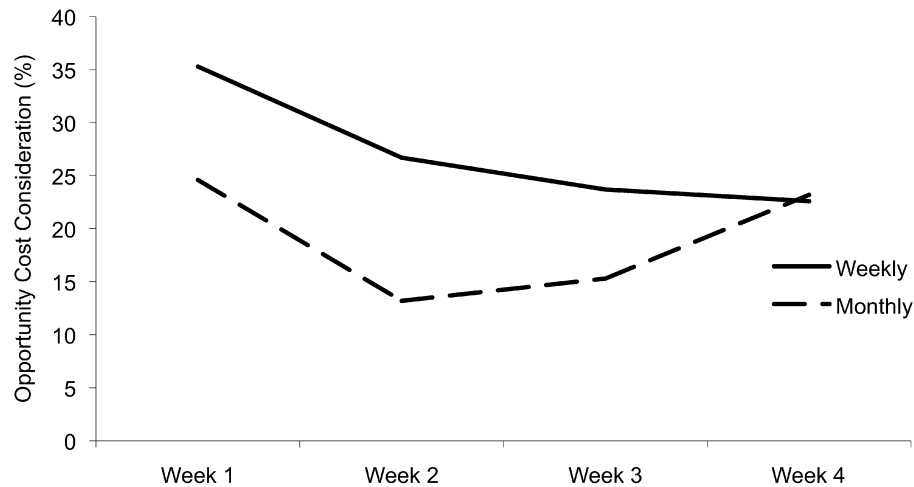
Week and Budget Frame interacted to affect Consideration ( $F(3, 249) = 2.71$ ,  $p < .05$ ). In the first 3 weeks, participants with weekly budgets were more likely to consider opportunity costs ( $M_1 = .35$ ,  $SD_1 = .28$ ;  $M_2 = .27$ ,  $SD_2 = .26$ ;  $M_3 = .24$ ,  $SD_3 = .23$ ) than participants with monthly budgets ( $M_1 = .25$ ,  $SD_1 = .23$ ;  $M_2 = .13$ ,  $SD_2 = .12$ ;  $M_3 = .15$ ,  $SD_3 = .18$ ;  $F(1, 198) = 13.66$ ,  $p < .01$ ), and this effect did not vary across Week ( $F(2, 249) = .48$ , NS). In the fourth and final week, participants with monthly budgets ( $M_4 = .23$ ,  $SD_4 = .30$ ) considered their opportunity costs just as much as those with weekly budgets ( $M_4 = .23$ ,  $SD_4 = .21$ ;  $F(1, 198) = .01$ , NS). Excluding week 1 (a period during which consideration was elevated across both groups due to exploratory behavior), the change from weeks 2 and 3 (which did not differ;  $F(1, 249) = .96$ , NS) to week 4 was greater for monthly than weekly participants ( $F(1, 249) = 6.46$ ,  $p < .01$ ). Consideration increased among participants with monthly budgets ( $F(1, 249) = 7.75$ ,  $p < .01$ ); there was no change among those with weekly budgets ( $F(1, 249) = .64$ , NS; see fig. 1). This effect of Budget Frame on the change in Consideration across Week was fully mediated by the change in Average Constraint across Week (see the appendix for details).

**Sensitivity to Opportunity Cost Value.** When opportunity costs are valuable, incorporating them into one's decision reduces the likelihood of purchase, but when opportunity costs are not valuable, incorporating them into one's decision can lead to an *increased* likelihood of purchase (hypothesis 5). Indeed, Consideration and Opportunity Cost Appeal interacted to affect purchase likelihood ( $B = -4.47$ ;  $z = -2.49$ ,  $p = .01$ ), so spotlight analysis was used to consider simple effects of each factor at high and low levels of the other (Cohen et al. 2003; Fitzsimons 2008; Irwin and McClelland 2001). Unsurprisingly, when no options were considered, (unobserved) Opportunity Cost Appeal of the next three options was unassociated with likelihood of purchase ( $B = -.35$ ;  $z = -.49$ , NS). When all three options were considered, Opportunity Cost Appeal was negatively associated with likelihood of purchase ( $B = -4.83$ ;  $z = -2.81$ ,  $p < .01$ ). When upcoming opportunity costs were the three most appealing options of the 20, Consideration was marginally negatively associated with likelihood of purchase ( $B = -1.08$ ;  $z = -1.72$ ,  $p = .09$ ). When upcoming opportunity costs were the three least appealing options of the 20, Consideration was positively associated with likelihood of purchase ( $B = 1.42$ ;  $z = 3.12$ ,  $p < .01$ ). Moreover, Consideration was positively associated with Allocation Quality. See the appendix for details on these analyses.

To summarize, study 1 demonstrated that weekly budgets result in greater opportunity cost consideration than monthly budgets and that this effect is driven by resource constraints. The difference between less constrained and more con-

FIGURE 1

STUDY 1: OPPORTUNITY COST CONSIDERATION AS A FUNCTION OF BUDGET FRAME AND WEEK



NOTE.—Week 1 consideration is elevated in comparison to other weeks, presumably because of extra exploration early in the study. Importantly, the effect of budget frame is consistent across weeks 1–3, and the interaction is driven by increased consideration in week 4 by participants with monthly budgets.

strained consumers is eliminated as consumers approach the end of their budgets because less constrained consumers (those paid monthly) face increasing constraint. Individuals who consider their opportunity costs are more sensitive to the value of their future alternatives than those who do not consider their opportunity costs, so opportunity cost consideration leads to a lower likelihood of purchase when future alternatives are appealing, but a higher likelihood of purchase when future alternatives are unappealing. Consideration leads to greater choice consistency with full information decisions.

## STUDY 2: PAY CYCLES AND PLANNING

Study 1 demonstrated the effect of perceived constraint, operationalized by pay cycle, on opportunity cost consideration, operationalized by information search. Study 2 builds on these results in three ways. First, it uses a different operationalization of opportunity cost consideration. Second, it shows that these results hold when considering adult consumers facing real differences in pay cycle. Third, it demonstrates that greater propensity to plan is associated with greater opportunity cost consideration only among consumers not facing immediate constraints (hypothesis 2a) and that greater constraint is associated with greater opportunity cost consideration only among consumers with low propensities to plan (hypothesis 2b).

## Method

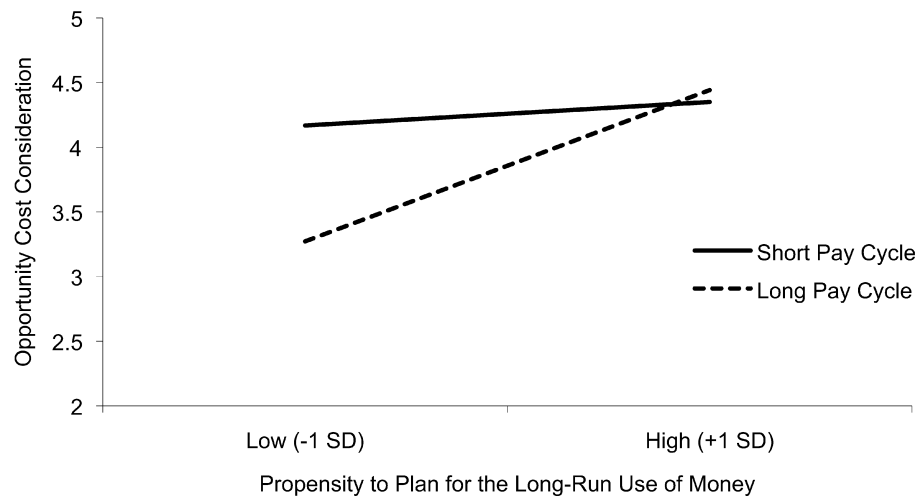
Users of a popular tax-preparation software program were recruited via e-mail to participate in an online survey on household financial management; 454 consented to participate, 271 completed the study. The primary variables of interest for the present analyses, described in detail below, were designed to assess how opportunity cost consideration varied as a function of constraint (operationalized as pay cycle as in study 1) and propensity to plan.

Respondents completed a three-item scale of opportunity cost consideration: “I often think about the fact that spending money on one purchase now means not spending money on some other purchase later”; “When I’m faced with an opportunity to make a purchase, I try to imagine things in other categories I might spend that money on”; and “I often consider other specific items that I would not be able to buy if I made a particular purchase.” Each item used a 1 (strongly disagree) to 6 (strongly agree) response scale. Consideration was assessed as the mean response across the three items ( $\alpha = .85$ ).

To assess individual differences in propensity to plan, respondents reported their propensity to plan for the long-run use of money (1–2 years) using the six-item scale from Lynch et al. (2010; e.g., “I set financial goals for the next 1–2 years for what I want to achieve with my money”). Each item used a 1 (strongly disagree) to 6 (strongly agree) response scale; Propensity to Plan was assessed as the mean response across the six items ( $\alpha = .93$ ). This scale demonstrated discriminant validity from the opportunity cost

FIGURE 2

STUDY 2: OPPORTUNITY COST CONSIDERATION AS A FUNCTION OF PAY CYCLE AND PROPENSITY TO PLAN



consideration measure: the nine items yielded two factors, all own-loadings were greater than .80, all cross loadings were lower than .20, and the two measures were correlated at  $r = .20$ . To assess constraint, respondents reported how often they are paid (once per day, once per week, once every other week, once per month, less than once per month, irregularly, other, prefer not to answer). Because this scale was ordinal, participants were divided into short pay cycle (once per day; once per week; once every other week) and long pay cycle (monthly, less than monthly, irregularly) groups; analyses focusing on biweekly and monthly pay cycles (the two most common responses) and using number of weeks between paydays among weekly, biweekly, and monthly pay cycles were generally consistent. Participants with complete data including pay cycle (i.e., did not respond “other” or “prefer not to answer”) are included in the analysis below ( $N = 242$ ). Income was not related to pay cycle ( $p > .4$ ), but all analyses are consistent when income is used as a covariate.

## Results

Consideration was regressed on Pay Cycle (Short = 1, Long = -1), standardized Propensity to Plan (raw  $M = 4.26$ ,  $SD = 1.11$ ), and their interaction. The interaction was significant ( $B = -.25$ ;  $F(1, 238) = 8.53$ ,  $p < .01$ ). In support of hypothesis 2a, the association between planning and consideration was positive and significant for respondents with long pay cycles ( $B = .59$ ;  $F(1, 238) = 18.15$ ,  $p < .01$ ), but it was trivial and nonsignificant for those with short pay cycles ( $B = .09$ ;  $F(1, 238) = 0.84$ , NS).

To assess the effect of Pay Cycle for planners and nonplanners (hypothesis 2b), I used spotlight analysis to examine the effects of Pay Cycle at one standard deviation

above and below the mean Propensity to Plan. Nonplanners with short pay cycles reported considering opportunity costs more than those with long pay cycles ( $B = .45$ ;  $F(1, 238) = 13.94$ ,  $p < .01$ ). Planners with short pay cycles reported considering opportunity costs as much as those with long pay cycles ( $B = -.05$ ;  $F(1, 238) = 0.18$ , NS; see fig. 2).

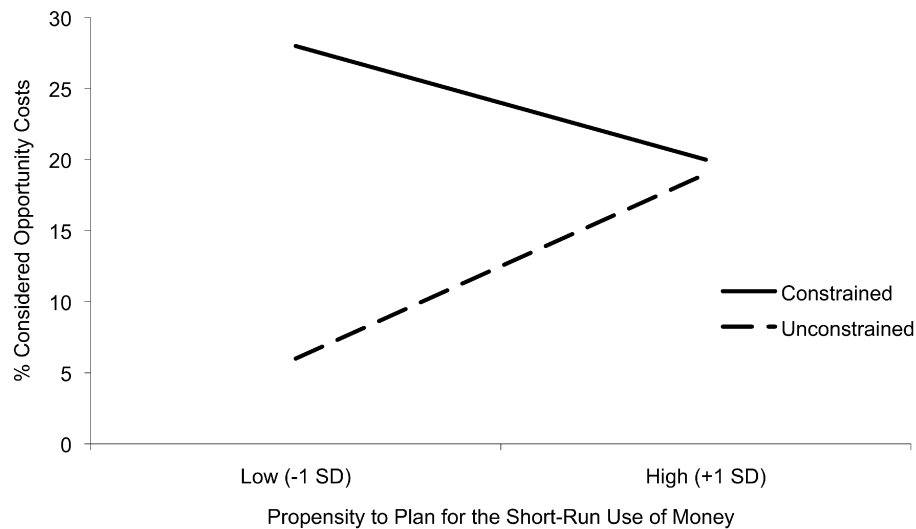
These results replicate the primary result from study 1 and extend them to demonstrate the role of dispositional planning. As in study 1, respondents with long pay cycles considered opportunity costs less than those with short pay cycles. Furthermore, this effect was exacerbated for nonplanners but eliminated for planners.

## STUDY 3: SPONTANEOUS CONSIDERATION OF OPPORTUNITY COSTS

Frederick et al. (2009) propose that merely reminding consumers that opportunity costs exist might lead consumers to consider them. Though the paradigms used in studies 1 and 2 had many benefits, they conceivably could have cued participants to consider opportunity costs when they may not have otherwise. In study 3, I consider the effect of constraint on opportunity cost consideration (hypothesis 1) without any reminders. To consider opportunity costs, participants had to spontaneously retrieve them from memory. Moreover, I replicate the results of study 2 and show that planning increases consideration among consumers not facing immediate constraints (hypothesis 2a) and the effect of constraint on consideration is most pronounced among nonplanners (hypothesis 2b).

FIGURE 3

STUDY 3: OPPORTUNITY COST CONSIDERATION AS A FUNCTION OF CONSTRAINT AND PROPENSITY TO PLAN



## Method

Undergraduate students ( $N = 194$ ) participated in this study for credit toward a research requirement. All participants were presented with one of two versions of the scenario below:

Imagine that you are spending all day in Charlotte interviewing for summer internships. One interview session is scheduled from 9:00 a.m. until 11:00 a.m., and a second session is scheduled from 2:30 p.m. until 4:30 p.m. You arrive in Charlotte at 8:20 a.m. without having had breakfast, and you plan to stick around Charlotte until at least 7:30 p.m. to avoid having to deal with rush-hour traffic as you drive back east.

As you run into a local breakfast joint to get something to eat before your interview, you realize that you must have left your credit and debit cards at home, and you never carry a checkbook with you. All you have with you are the two [\$5 / \$20] bills you have in your wallet.

Below is the On-the-Move breakfast menu offered at the diner for patrons in a hurry. What would you buy? Choose as many or as few items as you would like.

Participants in the constrained version were told “two \$5 bills,” whereas those in the unconstrained version were told “two \$20 bills.” Participants were offered 12 breakfast items with prices (e.g., “Everything Bagel: \$1.25,” “Small Orange Juice: \$1.50”) and were free to choose as many or as few as they liked. They were also offered a “buy nothing” option.

After reporting their choices, participants described how they made their decisions:

Please use the space below to describe to us how you decided what to order. What went through your mind as you chose? There are no right or wrong answers; we’re simply interested in how you decided. Try to make a list of everything that came to mind (one thought per line), but only include items that came to mind while you were deciding what to order.

Two independent coders, blind to hypotheses and condition, coded these responses according to whether participants considered using their money for something else instead of breakfast. Coders agreed on 94% of codes; discrepancies were reconciled by the author. After describing how they made their decisions, participants specified their opportunity costs (“You had two [\$5 / \$20] bills that you could have used to buy breakfast. Instead of breakfast, for what else could you have used that money?”) and the relative value of those opportunity costs (“All else equal, would you be better off using that money for breakfast or [opportunity cost]?”) on a 7-point scale anchored with “breakfast” on the low end, “about equal” in the middle, and “[opportunity cost]” on the high end. Propensity to plan for the short-run use of money was measured 8 weeks later using Lynch et al.’s (2010) six-item scale in an unrelated study. Of the original 194 participants, 168 completed this scale and are included in the analyses below.

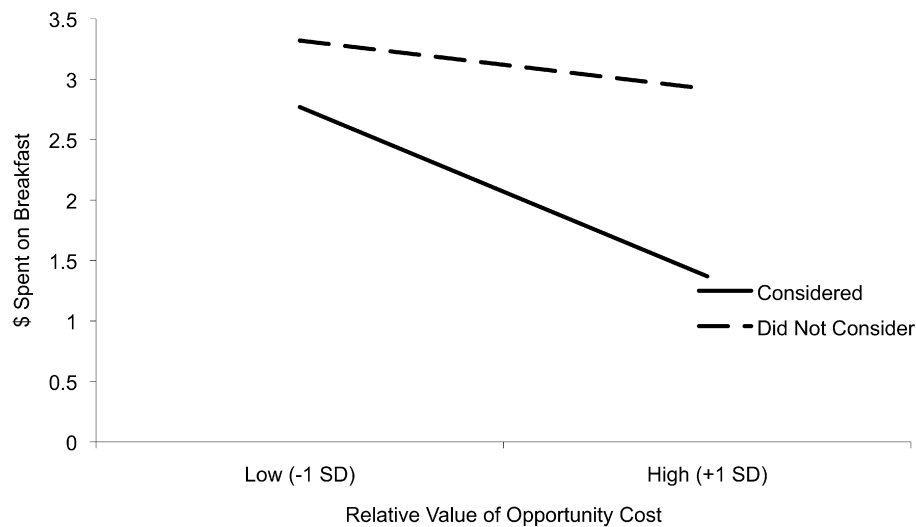
## Results

Consideration was analyzed using logistic regression as a function of Constraint (Constrained = 1, Unconstrained = 0), standardized Propensity to Plan (raw  $M = 3.67$ ,  $SD = 1.44$ ), and their interaction. The interaction was signif-



FIGURE 4

STUDY 3: BREAKFAST EXPENDITURES AS A FUNCTION OF CONSIDERATION AND OPPORTUNITY COST VALUE



icant ( $B = -.86$ ; Wald  $\chi^2(1) = 3.75, p = .053$ ). In support of hypothesis 1, at the mean propensity to plan, constrained individuals were more likely to consider their opportunity costs than unconstrained individuals ( $B = .91$ ; Wald  $\chi^2(1) = 4.05, p < .05$ ). In support of hypothesis 2a, Propensity to Plan was not associated with Consideration for constrained participants ( $B = -.22$ ; Wald  $\chi^2(1) = .62, NS$ ), but it was positively associated with Consideration for unconstrained participants ( $B = .64$ ; Wald  $\chi^2(1) = 3.46, p = .06$ ). In support of hypothesis 2b, there was an effect of Constraint for individuals with low propensities to plan (one standard deviation below the mean;  $B = 1.77$ ; Wald  $\chi^2(1) = 6.37, p = .01$ ), but not for those with high propensities to plan (one standard deviation above the mean;  $B = .05$ ; Wald  $\chi^2(1) = .01, NS$ ; see fig. 3).

To test whether reported opportunity cost consideration was reflected in choice (hypothesis 5), Spending (the total cost of all selected items) was regressed on Consideration, Value, and their interaction. One participant did not report Value and was excluded from this analysis. The interaction of Consideration and Value was marginally significant ( $B = -.50$ ;  $F(1, 163) = 3.01, p = .08$ ), indicating that Spending decreased with Value among those who considered their opportunity costs ( $B = -.69$ ;  $F(1, 163) = 7.40, p < .01$ ) but not among those who did not consider their opportunity costs ( $B = -.20$ ;  $F(1, 163) = 2.33, p = .13$ ; see fig. 4). In a separate sample that did not report propensity to plan, these results replicated: constrained individuals (45%) considered their opportunity costs more frequently than unconstrained individuals (9%;  $\chi^2(1) = 18.41, p < .01$ ), and those who considered opportunity costs were more sensitive to their value than those who did not ( $F(1, 104) = 4.71, p = .03$ ).

## STUDY 4: RESOURCE-USE TYPICALITY

Studies 1, 2, and 3 focused on the relationships among consideration, constraint, and planning. Studies 4 and 5 focus on the role of categorization in making some opportunity costs more accessible than others and opportunity costs for some resources more accessible than opportunity costs for others. Such differences in categorization are normatively irrelevant; the only meaningful driver should be the value of forgone consumption. Yet just as consideration of an alternative in a consideration set varies as a function of its accessibility (Nedungadi 1990; Posavac et al. 1997; Priester et al. 2004), so consideration of an opportunity cost will vary as a function of its accessibility. Study 4 demonstrates the impact of accessibility on consideration of different opportunity costs as a result of differences in resource-use typicality (hypothesis 3).

## Method

Undergraduate students ( $N = 177$ ) participated in study 4 for credit toward a research requirement. Participants chose whether or not to make a focal Starbucks purchase. The independent variables of interest were the value of the focal purchase; the value of a typical, more accessible opportunity cost (a beverage); the value of an atypical, less accessible opportunity cost (a food); and a nuisance replication factor for the specific target item offered.

All participants imagined that their parents mailed them a \$10 gift card to Starbucks and that as they walk across campus, they are given the opportunity to purchase either a tall caffe mocha or an apple fritter (depending on the replicate) from a Starbucks vendor for \$2.75. Participants

first reported whether or not they would purchase the item and on the following page how confident they were in their decision. I focus on their dichotomous purchase decision.

Participants then specified an opportunity cost ("Not including [tall caffe mochas/apple fritters], what one item would you most like to buy from Starbucks?") and indicated whether it was a beverage, a food, or something else. Participants who reported a beverage were then asked to report a food opportunity cost, participants who reported a food opportunity cost were then asked to report a beverage opportunity cost, and participants who reported something else were then asked to report both a beverage and a food opportunity cost.

Finally, participants ranked and rated the value and typicality of four items (tall caffe mochas, apple fritters, self-reported beverage items, and self-reported food items). First, they ranked each item from most enjoyable to least enjoyable. Second, they rated their enjoyment of each item on a 7-point scale. Third, they ranked each item from most typical to least typical. Fourth, they rated the typicality of each item on a 7-point scale. I analyze the ratings data.

## Results

*Typicality Ratings.* As expected, typicality ratings differed significantly across items. In particular, tall caffe mochas ( $M = 5.73$ ,  $SD = 1.67$ ) and self-generated beverage opportunity costs ( $M = 5.81$ ,  $SD = 1.43$ ) were each rated as more typical uses of a Starbucks gift card than apple fritters ( $M = 3.70$ ,  $SD = 1.66$ ) and self-generated food opportunity costs ( $M = 4.71$ ,  $SD = 1.63$ ). Each pairwise comparison of a beverage against a food was significant at  $p < .01$ .

*Purchase Decisions.* I used logistic regression to analyze the decision to purchase the focal option on Focal Option (Beverage = 1, Food = 0), Focal Option Value (enjoyment of target purchase,  $M = 3.88$ ,  $SD = 1.78$ ), Beverage Value (enjoyment of self-generated beverage opportunity cost,  $M = 6.17$ ,  $SD = 1.05$ ), and Food Value (enjoyment of self-generated food opportunity cost,  $M = 5.72$ ,  $SD = 1.21$ ). If beverages and foods are considered as opportunity costs, the greater their values, the less likely one will be to purchase the focal option. If beverages and foods are neglected as opportunity costs, their values will be unrelated to the likelihood of purchasing the focal option. If typicality increases accessibility and accessibility increases opportunity cost consideration, beverages are more likely to be considered than foods because beverages are more typical uses of Starbucks gift cards.

Unsurprisingly, participants who valued the focal option more were more likely to buy than those who valued it less ( $B = 0.98$ ; Wald  $\chi^2(1) = 38.87$ ,  $p < .01$ ), and those faced with a beverage were more likely to purchase it than those faced with a food ( $B = 1.02$ ; Wald  $\chi^2(1) = 6.73$ ,  $p < .01$ ).

More important were the roles played by opportunity costs. The more people valued their beverage opportunity costs, the less likely they were to buy the focal option ( $B$

$= -0.66$ ; Wald  $\chi^2(1) = 11.08$ ,  $p < .01$ ), indicating that they considered beverages as opportunity costs. But the value of food opportunity costs was unrelated to how likely they were to buy the focal option ( $B = 0.03$ ; Wald  $\chi^2(1) = 0.04$ , NS), indicating that they neglected foods as opportunity costs. These two coefficients were significantly different (Wald  $\chi^2(1) = 5.50$ ,  $p < .02$ ), and this difference was eliminated once differences in typicality were controlled for (Wald  $\chi^2(1) = 0.06$ , NS); see the appendix for these analyses.

This study provides support for the hypothesis that opportunity cost accessibility (driven by typicality) leads to opportunity cost consideration (hypothesis 3). More typical opportunity costs are more likely to be "unpacked" from an abstract outside option than are less typical opportunity costs. Typical resource uses define the competitive environment that a particular product faces.

## STUDY 5: USING LIMITED-USE RESOURCES

Since any given member of a narrow category is more typical of its category than any given member of a broad category is of its category (Boush and Loken 1991), narrower categories activate their members more than broader categories (Landauer and Meyer 1972). In two pretests: (1) increasing the number of products associated with a medium of exchange significantly decreased reaction time to confirm or refute acceptable uses of that medium; and (2) consumers were significantly faster to generate possible uses of gift cards associated with more specific rather than more general categories of purchases. These pretests confirm that alternate resource uses are made more accessible by more specific resources, consistent with Weber and Johnson's (2006) finding that uncategorized sums of money do not activate potential purchases.

Because attractive opportunity costs may be made accessible by limited-use resources but none may be made accessible by unlimited-use resources, a consumer may be more likely to spend an unlimited-use resource than a limited-use resource. This is the focus of study 5. From a normative perspective, consumers should be more likely (or at least no less likely) to spend limited-use resources because they necessarily have less valuable alternative uses.

## Method

Participants ( $N = 412$ ) were recruited from Amazon Mechanical Turk (an online labor market for small piece work tasks). Participants were first shown a selection of nine music CDs and specified their favorite. This ensured that the focal option was attractive. Next, participants imagined that they were given either a \$10 Starbucks gift card (limited-use currency) or a \$10 Visa gift card (unlimited-use currency); note that the Visa gift card can be used to buy anything that could be purchased using the Starbucks gift card, plus many other alternatives. Participants imagined the option to buy the specified CD for \$9.95, on sale from

\$12.95, using their gift card and indicated their decision to buy or not. After making their decision, participants reported what else they would have purchased instead (i.e., their opportunity cost), the degree to which they thought about it, how much they would enjoy the opportunity cost, and how much they would enjoy the CD. They were then asked whether or not they considered themselves “someone who loves Starbucks coffee.” Because these measures were taken after the purchase decision, they could not have cued opportunity cost consideration during the purchase decision. The Starbucks-lover measure could not have been taken before the measure of choice, as it could have cued participants to consider coffee as an opportunity cost.

Because their opportunity costs are more accessible, individuals using a Starbucks gift card are more likely to consider opportunity costs than individuals using a Visa gift card. As a result, individuals who (1) have better uses for their resources than the CD (i.e., those who would enjoy the opportunity cost more than the CD) or (2) consider themselves “Starbucks coffee lovers” may be more likely to purchase using a Visa gift card than a Starbucks gift card: those with a Visa gift card are less likely to consider their (attractive) opportunity costs, even though they necessarily have more valuable opportunity costs.

## Results

Neither having a better use for their resources ( $n = 253$ ,  $\chi^2(1) = .21$ , NS) nor self-identification as a Starbucks coffee lover ( $n = 240$ ,  $\chi^2(1) = 2.45$ ,  $p = .12$ ) varied as a function of gift card. Among participants with a better use for their resources, those given a Starbucks gift card were significantly less likely to buy the CD (57%) than those given a Visa gift card (69%;  $\chi^2(1) = 4.13$ ,  $p < .05$ ). Similarly, among self-identified Starbucks coffee lovers, those given a Starbucks gift card were significantly less likely to buy the CD (63%) than those given a Visa gift card (85%;  $\chi^2(1) = 9.96$ ,  $p < .01$ ). Although consumers given a Starbucks gift card necessarily had less valuable (or at least no more valuable) opportunity costs than those given a Visa gift card, they were less likely to use their gift card.

A replication and extension of study 5 ruled out two potential alternative explanations: earmarking the Starbucks gift card but not the Visa gift card so that it may only be used to buy coffee (Prelec and Loewenstein 1998; Zelizer 1997) or using the Starbucks gift card but not the Visa gift card to justify coffee as a hedonic purchase (Kivetz and Simonson 2002). In the replication, participants reported how much they liked the CD before making their purchase decisions and whether they would rather spend the gift card on the CD or \$10 worth of Starbucks coffee after making their purchase decisions. Target participants were those who liked the focal option (rated the CD above the midpoint on a 7-point scale) but would prefer to buy Starbucks coffee (reported that they would rather spend their gift card on coffee than on the CD).

As in study 5, target participants were significantly more likely to buy the CD using a Visa gift card than using a

Starbucks gift card. If the result was driven by earmarking, the likelihood of choosing coffee over the CD should have been higher for those given a Starbucks gift card than for those given a Visa gift card when choosing between the two explicitly. It was not ( $p > .7$ ). If the result was driven by a need to justify hedonic purchases, the difference between gift cards would have been eliminated once the sample was limited to those who would explicitly choose \$10 worth of coffee over the CD; no matter which gift card is used, these individuals have no unmet need to justify a hedonic purchase. The difference held among this sample ( $p < .01$ ). The difference was eliminated when opportunity costs were made explicit using Frederick et al.’s (2009) manipulation of opportunity cost salience: making opportunity costs explicit did not affect those using a Starbucks gift card ( $p > .3$ ) but reduced purchase for those using a Visa gift card ( $p < .05$ ).

## GENERAL DISCUSSION

Opportunity costs are normatively important decision inputs. The economics literature suggests that consumers should always account for opportunity costs, but the psychology literature shows they often do not. I propose and provide evidence over five studies showing when opportunity costs are considered, who is most likely to consider them, which ones are considered, and what the consequences are. Across these studies, I use multiple methods to assess opportunity cost consideration, including information search (study 1), self-reported consideration (study 2), thought listings (study 3), and probability of purchase (studies 4 and 5).

Under what conditions are opportunity costs considered? They are considered when consumers face resource constraints and when using limited-use resources. Resource constraints may arise from temporary constraints in the moment (study 3) or from differences in pay cycle (studies 1 and 2). Usage constraints may arise from specific categories of uses based on gift cards of varying specificity (study 5).

Who considers opportunity costs? Consumers high in propensity to plan for the future use of their money consider opportunity costs in the present, independent of momentary constraints, but consumers low in propensity to plan for the future use of their money do so only when constrained (studies 2 and 3).

Which opportunity costs are considered? More typical uses of a resource are more likely to be considered as opportunity costs than are less typical uses of a resource (study 4).

What are the consequences of considering opportunity costs? Consumers are more sensitive to the value of their opportunity costs (studies 1, 3, 4); they need not spend less, as considering low-value opportunity costs can lead to increased spending (study 1). Whether consideration of opportunity costs increases or decreases likelihood of purchase on average depends on the average attractiveness of outside options.

## Implications and Future Research

*Cross-Category Competition.* A popular undergraduate marketing textbook states that competitors may be defined as “all companies that compete for the same consumer dollars” (Kotler and Armstrong 2009, 517). By increasing opportunity cost consideration, constraints lead to greater cross-category and cross-benefit consideration (Russell et al. 1999). Because competition is defined by the products that coexist in the same consideration sets (Mitra and Lynch 1995; Nedungadi 1990; Ratneshwar and Shocker 1991), consumers are most likely to perceive competition across categories and benefits under constraint, when opportunity costs are considered. Because constraints vary over time, cross-category competition will vary over time as well. Paydays predictably vary across the population, so increased competition for dollars at the individual level may result in differential cross-category cross elasticities over the pay cycle.

Study 4 indicated that more typical resource uses are more likely to be considered as opportunity costs than less typical resource uses, but other factors are likely to affect which opportunity costs are considered as well. Just as Herr (1989) and Gourville (1998) find that products with prices similar to a focal option are most likely to be recruited as reference points, products in the same price range may be more likely to be elicited as opportunity costs.

*Linking Money and Consumption.* When consumers consider their opportunity costs, they are more likely to link money to its end use than to view it as an end itself. Linking money to its end use implies that it will be treated more like its intended use and less like fungible money (Shafir and Thaler 2006; Zelizer 1997). This suggests that when they consider specific opportunity costs, consumers may be more likely to assess money in terms of its real value and how much consumption it can purchase rather than its nominal value and how many dollars there are. Consequently, considering specific opportunity costs may make consumers less susceptible to the money illusion (Fisher 1928; Shafir, Diamond, and Tversky 1997), medium maximization (Hsee et al. 2003; van Osselaer et al. 2004), and various currency effects (Raghubir and Srivastava 2002; Wertenbroch, Soeman, and Chattopadhyay 2007).

*Context-Dependent Constraints.* In economic theory, the value of an outside good is context-independent; the present work shows that the recruited outside good is context-dependent. However, it is clear that the feeling of constraint must be context-dependent as well. Ten thousand dollars are a meaningful constraint when buying a car but not when buying a hamburger, suggesting that price of the focal option is an important determinant of perceived constraint. Determining the drivers of perceived constraint will help to more precisely specify when opportunity costs will be considered.

*Moving beyond Money.* I have discussed and tested the proposed model of opportunity cost consideration with respect to opportunity costs of money, but it is useful to extend

the model to other resources such as time. Frederick et al. (2009) posit that consumers may neglect opportunity costs of time more because its value may be flexibly interpreted. Legrenzi et al. (1993) found that people neglected opportunity costs of their time when given no context. Given that many individuals feel more time-constrained than money-constrained in the present (Lynch et al. 2010; Zauberma and Lynch 2005), they may be more likely to consider opportunity costs for time than for money in the present. By specifying what drives opportunity cost consideration, the model should be generalizable across resources and product usage situations.

*Consumer Welfare.* Consumers who consider their opportunity costs are likely to be better off financially than those who do not (Ameriks, Caplin, and Leahy 2003; Larrick et al. 1993; Lynch et al. 2010). The various manipulations used in this essay increase consideration of opportunity costs: consumers who rely on self-imposed constraints, use shorter budget frames, or associate resources with specific types of purchases are more likely to consider their trade-offs and may be objectively better off. Yet although constraint increases opportunity cost consideration, it may not necessarily increase optimal opportunity cost consideration. A consumer using tight mental budgets may make better within-account trade-offs, especially against prototypical purchases, but may make worse between-account trade-offs because the decisions have been artificially partitioned (Heath and Soll 1996; Thaler 1985, 1999). A consumer using weekly (vs. monthly) budgets may make better within-week trade-offs but worse between-week trade-offs. Much of the mental accounting literature has focused on these latter decrements to performance rather than the former benefits.

At least as important as the financial outcomes are the hedonic outcomes. Are consumers who consider opportunity costs happier? Maximizers who seek the best option for every particular choice are left less happy and less satisfied despite objectively better outcomes than satisficers who are less concerned with comparisons against forgone alternatives (Iyengar, Wells, and Schwartz 2006; Schwartz et al. 2002). Moreover, comparing alternatives can make consumers feel as though each alternative is worse than it would have been had it not been compared (Brenner, Rottenstreich, and Sood 1999). Opportunity cost consideration necessitates focusing on trade-offs, potentially resulting in poorer subjective outcomes. However, while ignoring opportunity costs may make one happier in the present, it may result in a large negative shock in the long run when there are few resources remaining.

A complete understanding of the welfare implications of opportunity cost consideration requires understanding not only when consumers consider opportunity costs but also whether they consider the right ones, whether considering alternatives makes them feel more or less happy in the short run, and whether happy neglecters face unpleasant downstream changes in consumption. Policy makers might then ask: What are interventions that one could use to improve objective or subjective decision outcomes? The present re-

search gives some initial directions, conditional on considering the right opportunity costs. If consumers ignore their opportunity costs too much, breaking budgets down into smaller periods, purchase categories, or both will increase the extent to which trade-offs against forgone purchases are included in current decisions. If consumers fixate on opportunity costs too much, combining budgets into longer periods and broader categories may reduce consideration, perhaps enabling more satisfactory consumption—at least in the short run.

Opportunity costs are fundamental to consumer behavior and part of everyday life. The present work proposes a model of when consumers consider their opportunity costs, who considers them, which ones are considered, and what some of the consequences are. These findings have implications for, and set the foundation for future research on, a set of fundamental topics in consumer research, marketing, economics, and psychology. These topics include consumer welfare, competition for dollars, decision construal, managerial resource allocation, and financial and hedonic outcome quality. In short, understanding when spending money makes consumers think about what they cannot buy helps us understand the purchase decisions they make and the consequences of considering their opportunity costs.

## APPENDIX

### STUDY 1

#### Mediation of Change in Consideration by Change in Average Constraint

Do between-group differences in constraint from weeks 2 and 3 to week 4 account for between-group differences in consideration from weeks 2 and 3 to week 4? To use Judd, Kenny, and McClelland's (2001) steps to assess this within-subject mediation, two variables are calculated for each participant: DiffConsider and DiffConstraint. DiffConsider (calculated as  $2 \times \text{week 4 Consideration} - [\text{week 2 Consideration} + \text{week 3 Consideration}]$ ) represents the difference in consideration between week 4 and weeks 2 and 3. DiffConstraint (calculated as  $2 \times \text{week 4 Average Constraint} - [\text{week 2 Average Constraint} + \text{week 3 Average Constraint}]$ ) represents the difference in constraint between week 4 and weeks 2 and 3.

DiffConsider was greater for Monthly participants ( $M = .18$ ,  $SD = .53$ ) than Weekly participants ( $M = -.05$ ,  $SD = .40$ ;  $F(1, 83) = 5.11$ ,  $p = .03$ ), representing increasing consideration over time for Monthly participants but consistent consideration over time for Weekly participants. DiffConstraint was also greater for Monthly participants ( $M = .044$ ,  $SD = .050$ ) than Weekly participants ( $M = -.008$ ,  $SD = .026$ ;  $F(1, 83) = 36.26$ ,  $p < .01$ ), representing increasing constraint over time for Monthly participants but consistent constraint over time for Weekly participants.

DiffConstraint was analyzed as a mediator of the effect of Budget Frame on DiffConsider using Preacher and Hayes's

(2008) SPSS macro with 5,000 bootstrapped samples (Zhao et al. 2010). This analysis revealed indirect-only mediation of the effect of Budget Frame on DiffConsider by DiffConstraint, meaning that Budget Frame's only effect on DiffConsider operated through DiffConstraint. Controlling for Budget Frame, DiffConstraint was positively associated with DiffConsider ( $B = 5.27$ ;  $t(82) = 4.54$ ,  $p < .01$ ). Controlling for DiffConstraint, the direct effect of Budget Frame (Monthly = 0, Weekly = 1) on DiffConsider was not significant ( $B = .04$ ;  $t(82) = .41$ , NS). The indirect pathway had an estimated coefficient of  $-.27$ , with a 95% confidence interval that did not include 0 ( $-.54$ ,  $-.05$ ). This analysis indicates that the varying effect of Budget Frame on Consideration over time is driven by the varying effect of Budget Frame on Average Constraint over time.

#### Sensitivity to the Value of Opportunity Costs

Individuals who consider their opportunity costs are more affected by relative evaluations (hypothesis 5). Using general estimating equations (PROC GENMOD in SAS 9.2) with a binomial distribution and logit link function, individual decisions to buy on affordable trials were analyzed as a function of Focal Appeal (Product Appeal of the focal option), Budget Task Choice, Consideration on that trial (proportion of options considered on that trial), Opportunity Cost Appeal (average Product Appeal of opportunity costs on that trial), and the Consideration  $\times$  Opportunity Cost Appeal interaction. Focal Appeal ( $B = 1.24$ ;  $z = 2.97$ ,  $p < .01$ ) and Budget Task Choice ( $B = 3.12$ ;  $z = 17.54$ ,  $p < .01$ ) were positive predictors of purchase likelihood. The Consideration  $\times$  Opportunity Cost Appeal interaction and simple effects of each individual effect are detailed in the text.

#### Budget Frame, Opportunity Cost Consideration, and Allocation Quality

Opportunity Cost Consideration was positively associated with spending resources in line with participants' full information preferences. There was no total effect of Budget Frame on Allocation Quality ( $B = -0.92$ ;  $t(83) = -0.29$ , NS). However, this apparent null effect masks evidence of indirect-only mediation (Zhao et al. 2010). Budget Frame affected Consideration ( $B = .080$ ;  $t(83) = 2.20$ ,  $p = .03$ ). Controlling for Consideration, Budget Frame had no effect on Allocation Quality ( $B = -2.82$ ;  $t(82) = -.88$ , NS). Controlling for Budget Frame, Consideration was positively associated with Allocation Quality ( $B = 23.64$ ;  $t(82) = 2.53$ ,  $p = .01$ ). Considering 10% more opportunity costs was associated with spending \$2.36 more in line with full information preferences. Using Preacher and Hayes's (2008) SPSS macro and 5,000 bootstrapped samples, the indirect effect of Budget Frame on Allocation Quality through Consideration was significant:  $B = 1.90$ , with a 95% confidence interval that did not include 0 (0.22, 4.99).

## STUDY 4

### Differential Sensitivity to Opportunity Costs

To examine whether the effect of beverage opportunity cost value significantly differed from the effect of food opportunity cost value, I used a logistic regression of the decision to purchase the focal option on Focal Option, Focal Option Value, Average Opportunity Cost Value (Beverage Value / 2 + Food Value / 2), and Difference in Opportunity Cost Value (Beverage Value – Food Value). The more an individual valued her opportunity costs on average, the less likely she was to make the focal purchase ( $B = -.63$ ; Wald  $\chi^2(1) = 7.17$ ,  $p < .01$ ). More important, the greater the difference in value between beverage opportunity costs and food opportunity costs, the less likely she was to make the focal purchase ( $B = -.35$ ; Wald  $\chi^2(1) = 5.50$ ,  $p < .02$ ). Thus, in support of hypothesis 3, more typical (beverage) opportunity costs affect purchase decisions, whereas less typical (food) opportunity costs do not, and these effects differ from one another.

### Role of Typicality

If beverages are considered as opportunity costs and foods are not, because beverages are more typical uses of Starbucks gift cards than foods, this difference will be exacerbated for individuals for whom beverages are even more typical than foods and eliminated for individuals for whom beverages are no more typical than foods. Difference in Typicality was calculated as Beverage Typicality Rating – Food Typicality Rating. On average, this score was positive ( $M = 1.10$ ,  $SD = 1.90$ ,  $t(176) = 7.70$ ,  $p < .01$ ), reflecting the finding that beverages were rated as more typical uses of Starbucks gift cards than foods. Interacting this term with Difference in Value revealed the extent to which the effect of Difference in Value was moderated by Difference in Typicality.

Replicating the previous analyses, there were significant main effects of Focal Option ( $B = 1.05$ ; Wald  $\chi^2(1) = 6.77$ ,  $p < .01$ ), Focal Option Value ( $B = 1.03$ ; Wald  $\chi^2(1) = 39.07$ ,  $p < .01$ ), and Average Opportunity Cost Value ( $B = -.64$ ; Wald  $\chi^2(1) = 6.92$ ,  $p < .01$ ). The interaction between Difference in Opportunity Cost Value and Difference in Typicality was significant ( $B = -.15$ ; Wald  $\chi^2(1) = 5.26$ ,  $p = .02$ ). When Difference in Typicality was equal to 0 (i.e., when beverages and foods were seen as equally typical), there was no simple effect of Difference in Value ( $B = .06$ ; Wald  $\chi^2(1) = 0.06$ , NS). This implies that when beverages and foods are equally typical, they are equally considered as opportunity costs. When one is more typical than the other, the more typical one is considered more as an opportunity cost than the less typical one.

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