

Opportunity Cost Consideration

STEPHEN A. SPILLER*

*Stephen A. Spiller (stephen.spiller@duke.edu) is a doctoral candidate in marketing at the Fuqua School of Business, Duke University, 100 Fuqua Drive, Box 90120, Durham, NC 27708. This paper is based on the author's dissertation. The author is indebted to his dissertation committee, James Bettman, Richard Larrick, and Elizabeth Marsh, and in particular his co-chairs, John Lynch and Dan Ariely, for invaluable guidance and comments.

When do consumers consider opportunity costs? Normatively, consumers should incorporate opportunity costs into every decision they make, yet behavioral research suggests that consumers consider them rarely if at all. I examine when consumers consider opportunity costs, who considers opportunity costs, which opportunity costs spontaneously spring to mind, and what are the consequences of considering opportunity costs. 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 their opportunity costs are less likely to buy when opportunity costs are appealing, but no less likely to buy when opportunity costs are unappealing.

Consumers face opportunity costs: they have unlimited wants but limited resources, so satisfying one want means not satisfying another. I conceptualize opportunity cost consideration as considering a specific use for one's resources other than the focal option. Considering opportunity costs implies incorporating outside options into a given decision and reframing purchase decisions ("Do I buy?") as choices between different ways of allocating money ("What do I buy?"; Jones et al. 1998).

Economics is founded on the problem of resource allocation in the face of opportunity costs. Normatively, consumers should account for opportunity costs in every decision, yet a stream of behavioral research concludes that individuals neglect their opportunity costs in a variety of domains. In accounting (Becker et al. 1974; Friedman and Neumann 1980; Northcraft and Neale 1986), resource allocation (Brown, Chua, and Camerer 2009; Langholtz et al. 2003), and consumer choice (Frederick et al. 2009; Jones et al. 1998; Legrenzi et al. 1993), consumers fixate on focal options and ignore their opportunity costs. Unless opportunity costs are presented explicitly (e.g., by reframing a "do not buy" option as "keep your money for other purchases"), consumers sometimes act as though other possible uses of their resources do not exist.

Whether or not consumers consider their opportunity costs has enormous effects on personal and societal well-being. Personal bankruptcies are linked to household expenditures on durables such as houses and automobiles and excessive credit card debt that leave people with insufficient rainy day savings to withstand adverse events (Domowitz and Sartain 1999; Zhu 2008). Controlling for income, education, ethnicity, and gender, individuals higher in chronic propensity to plan for the use of their money have substantively higher FICO credit scores than those with average propensity to plan, possibly reflecting differences in thinking about opportunity costs (Lynch et al. 2010).

I pose four fundamental questions regarding consideration of opportunity costs:

1. When (i.e., under what conditions) do consumers consider opportunity costs?
2. Who considers opportunity costs?
3. Which opportunity costs do consumers consider?
4. What are the consequences of considering opportunity costs?

Without answers to these questions, it is impossible to assess or remedy opportunity cost neglect. In six studies, I provide initial answers to these questions:

- 1a. Consumers consider opportunity costs when they perceive that they are facing immediate resource constraints. This is a psychological phenomenon and not a purely economic one: two consumers with identical monetary resources may have different perceptions of constraint, triggering different retrieval of opportunity costs.
- 1b. Consumers consider opportunity costs when they use limited-use resources.
2. Planners chronically consider opportunity costs even when they do not face immediate resource constraints.
3. The category structure of potential resource uses influences which opportunity costs spontaneously come to mind.
4. Opportunity cost consideration leads to greater sensitivity to relative rather than absolute value, which affects people's likelihood of purchasing a focal option.

I argue that considering specific alternate uses of money as opportunity costs can be understood in terms of consideration sets that include alternate uses from nominally different product classes. Other mechanisms may restrain spending, such as pain of paying (Prelec and Loewenstein 1998; Rick, Cryder, and Loewenstein 2008) or the value of money (e.g., Chandukala et al. 2007), but these mechanisms do not account for the retrieval and use of

different and varying outside options as decision inputs. By recognizing that opportunity costs may be conceptualized as foregone alternatives in cross-category consideration sets, general principles that affect consideration in brand or benefit-level sets will aid our understanding of opportunity cost consideration.

CONSIDERATION SETS AND OPPORTUNITY COSTS

Nedungadi (1990) defines a consideration set as “the set of brands brought to mind on a particular choice occasion” (p. 264) and shows that consumers often include alternatives in their consideration sets beyond those that are explicitly presented to them (Alba and Chattopadhyay 1985; Alba, Hutchinson, and Lynch 1991). In order for an alternative to be chosen it must first be considered. Given that consumers’ consideration sets are limited in size for both psychological and economic reasons, it should not be surprising that consumers do not explicitly consider every potential outside use of a resource in their consideration sets for some focal purchase. By examining the principles that explain when and which alternatives are included in consideration sets, we can understand when and which alternatives are considered as opportunity costs.

The overwhelming majority of consideration set research has focused on consideration sets within a nominal product category (Hauser and Wernerfelt 1990; Mitra and Lynch 1995; Nedungadi 1990; Roberts and Lattin 1991), though some work has focused on consideration sets across product categories that share a well-defined benefit (Ratneshwar et al. 2001; Ratneshwar, Pechmann, and Shocker 1996; Ratneshwar and Shocker 1991; Russell et al. 1999). Much rarer is consumer research that examines consideration sets at the resource level, or equivalently, on opportunity costs, wherein a focal purchase is considered alongside alternatives in different

nominal product classes that do not provide nominally substitutable benefits (cf. Hauser and Urban 1986; Du and Kamakura 2008; Kasulis, Lusch, and Stafford 1979).

We can learn a great deal about when consideration sets will include options from nominally different categories by considering the determinants of consideration set composition within a nominal product category. The literature on consideration sets makes clear that the size and composition of a consideration set is explainable in terms of concepts from economics and cognitive psychology.

The key economic concept is that consumers do not incur the cost of considering an additional alternative when they sense that doing so will not yield an appreciably better decision than choosing from the set of already-considered options (Hauser and Wernerfelt 1990; Mitra and Lynch 1995; Roberts and Lattin 1991): if liking for the first alternative considered is very high, the expected gain from considering a second alternative is low. 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 explicitly available (Cherubini, Mazzocco, and Rumiati 2003; Del Missier, Ferrante, and Constantini 2007). I conjecture that a similar broad principle applies to opportunity cost consideration: before actually retrieving some alternative use of a resource, consumers judge whether doing so would be likely to change the decision. This is like the metacognitive sufficiency assessments used to explain how consumers terminate search in the process of recruiting inputs to evaluate a single alternative (Chaiken, Liberman, and Eagly 1989; Cohen and Reed 2006; Lynch, Marmorstein, and Weigold 1988). Though the prior literature has not applied these concepts to understand opportunity costs, I posit that very similar laws govern the retrieval of *alternatives* from memory

that are not physically salient to the consumer as have been shown to govern the retrieval of *inputs* to evaluating a single alternative.

The second key idea that emerges from the literature on consideration sets is that, when alternatives are not physically present, the structure of categories in memory dictates what is retrieved (Nedungadi 1990; Nedungadi and Hutchinson 1985). Independent of purely economic factors, consumers consider alternatives only if they can retrieve them and certain well-established principles of memory dictate which category members are more likely to be retrieved. Whereas some concepts in memory are chronically accessible, some are made temporarily accessible by externally provided or self-generated retrieval cues.

The next two sections address how these principles help us understand when consumers will consider opportunity costs, which opportunity costs are considered, and by whom are they considered.

The Cuing Role of Constraints on Opportunity Cost Consideration

The first key driver of within-category consideration is the value of considering an alternative, typically in terms of relative strength of preference (Hauser and Wernerfelt 1990; Mitra and Lynch 1995; Roberts and Lattin 1991). How might this same general principle manifest in consideration of opportunity costs? I conjecture that perceived constraint prompts consumers to ask themselves “what else should I consider?” Carlson et al. (2008) speculate that consumers with tight budget constraints are more likely to construct cross-category consideration sets. Building on this supposition, I argue that perceived budget constraints increase consideration of opportunity costs (i.e., consideration of alternatives from multiple categories).

Obviously, consumers will not purchase a focal option if they lack sufficient funds, but this does not cause them to think about alternative uses of their funds. My proposal is more subtle: consumers considering focal purchases do not think about alternate resource uses if they do not perceive that they are approaching a resource constraint. As they approach the constraint, they think more about alternate resource uses even though they are still able to purchase the focal option. When far from the constraint, the tradeoffs between buying in the focal product class and another are no less real, but outside options are less likely to be considered.

In support of this proposition, thought protocols taken in resource allocation tasks show that people construe such 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 for the current expenditure opportunity and they construe the current decision as an allocation across multiple expenditure opportunities. Constraint effectively leads to a choice of “which option do I buy?” rather than “do I buy?”

H1: Resource constraints increase opportunity cost consideration.

The sense that one is approaching a constraint is itself a metacognitive judgment. Two economically similar individuals can perceive very different constraints. For example, if a couple shares bank accounts and credit cards but one spouse is in charge of the family finances, that spouse may perceive greater constraints and thus be more likely to think about opportunity costs.

Constraint is dynamic and varies over time. As consumers spend money, resources decrease, constraint increases, and the diagnosticity of considering some outside alternative increases. As consumers earn money, resources increase, constraint decreases, and the diagnosticity of some outside alternative decreases. Opportunity cost consideration should vary accordingly. For example, consumers using monthly budgets for any given purchase feel less

constraint than consumers using weekly budgets (Morewedge, Holtzman, and Epley 2007) and expenses are more salient at the end of budgetary periods than at the beginning (Soster 2010), suggesting that shorter budgets may increase opportunity cost consideration. In support of this proposition, food consumption declines over the course of the month (as constraint increases) for individuals receiving monthly food stamps (Shapiro 2005). Note an important difference between this and previous work on resource partitions (Cheema and Soman 2008). Research on partitioning shows that *after* a consumer has exhausted her set of resources, she stops and deliberates before initiating consumption again. The present proposal suggests that *before* she has exhausted her resources, she considers alternate resource uses. These two effects of partitioning income into smaller intervals or amounts are distinct and complementary.

The Effects of Category Structures on Memory Accessibility of Opportunity Costs

The second key concept that emerges from prior work on consideration set formation is the role of memory and the structure of mental categories (Nedungadi 1990; Nedungadi and Hutchinson 1985). As alternatives are made more accessible in memory, they are more likely to be used in decisions. Although consideration sets sometimes consist only of options present in one's environment, they often necessitate retrieving options from memory (Alba et al. 1991; Mitra and Lynch 1995; Nedungadi 1990). 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 (Nedungadi 1990; Posavac, Sanbonmatsu, and Fazio 1997; Priester et al. 2004). For example, Nedungadi showed that well-

liked brands in a minor subcategory tend to be forgotten if not cued, so they benefit more from priming or awareness advertising than well liked brands in major categories or less liked brands.

This previous work has been concerned with choices among alternatives within a particular product category, rather than whether or not opportunity costs are considered. Nonetheless, it suggests that the more accessible alternative resource uses are, the more likely they are to be considered as opportunity costs when making a decision. Accessibility is a function of both self-generated and externally present retrieval cues (Lynch and Srull 1982). I deduce from these general principles three important ways in which accessibility influences opportunity cost consideration. First, individuals with chronically accessible opportunity costs are more likely to incorporate them into their decisions; second, opportunity costs that are temporarily more accessible than others are more likely to be incorporated into decisions; and third, resources that make opportunity costs more accessible are more likely to evoke opportunity cost consideration.

Chronic Accessibility. Just as other concepts in memory are 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), opportunity costs may be only situationally accessible for some individuals but chronically accessible for others. Larrick, Morgan, and Nisbett (1990) find that individuals who have been trained in cost-benefit reasoning are more likely to consider opportunity costs in their daily choices. Because opportunity costs are incurred in the future, consumers with more accessible plans for the use of their money are more likely to incorporate those planned purchases into their current decisions. Individual differences in domain-specific 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 (Lynch et al. 2010). Propensity to plan is a domain-specific, trait-like construct reflecting generation and consideration of future plans. Because future planned purchases reflect potential opportunity costs of current purchases, these opportunity costs are likely to be more accessible for individuals with high propensities to plan. Chronic planners are more likely to consider opportunity costs when they are not constrained than chronic non-planners; when they are constrained, even non-planners will consider their opportunity costs.

H2a: When not facing immediate constraints, planners are more likely to consider opportunity costs than non-planners.

H2b: Resource constraints increase opportunity cost consideration for non-planners more than for planners.

Resource Use Typicality. Activation of a category concept makes its typical instances more accessible than its atypical instances (Boush and Loken 1991; Hutchinson, Raman, and Mantrala 1994; Loftus 1973; Nedungadi and Hutchinson 1985; Rosch 1975; Rosch and Mervis 1975). Activating the category *bird* activates the concept *robin* (making it more accessible) more than it activates *ostrich* because *robin* is a particularly typical member of the category *bird* whereas *ostrich* is not. Mental accounts and gift cards associate resources 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. I conjecture that considering a focal purchase with one of these resources will activate more typical purchases more than less typical purchases that can be made with that resource. Considering the purchase of a belt may activate a

mental account for clothing, and thus makes thoughts of shirts (more typical category members) more accessible than thoughts of gloves (less typical category members). Considering using a Starbucks gift card to buy a CD makes thoughts of coffee (a more typical category member) more accessible than thoughts of muffins (less typical category members).

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, as in the fan effect (Anderson 1974). 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. Similarly, 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 1980) and are types of categories themselves (Heath and Soll 1996; Henderson and Peterson 1992). 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): any given use of a Starbucks gift card is more typical of the category “things to buy with a \$20 Starbucks card” than “things to buy with \$20.” Narrow categories thus activate category instances more than broad categories (Alba and Chattopadhyay 1985; Boush and Loken 1991; Landauer and Meyer 1972; Meyvis and Janiszewski 2004). As a result, resources that are associated with categories of purchases (particularly narrow categories) activate those purchases more than resources that are unassociated with categories of purchases.

H4: Resource use limitations increase consideration of opportunity costs.

Consequences of Considering Opportunity Costs

Considering opportunity costs can, in general, reduce the likelihood of using a resource for 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).

Interestingly, considering opportunity costs need not decrease the likelihood of use for some purchases. Instead, 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 happens to be retrieved. Compared to people who fail to consider opportunity costs, those considering attractive, high-value opportunity costs will be less likely to purchase, whereas those considering unattractive, low-value opportunity costs may not be (Frederick et al. 2009; Jones et al. 1998). In fact, those considering unattractive, low-value opportunity costs may be more likely to purchase when the decision is construed as an “either-or” decision (Jones et al. 1998). 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 identity of the outside good.

H5: Opportunity cost consideration increases sensitivity to the value of outside options. The probability of purchasing a focal option is inversely related to the value of the outside option only when that outside option is considered. Considering opportunity costs may be associated

with a decreased probability of purchase when those opportunity costs are more valuable than the focal option, but an increased probability of purchase when they are less valuable.

Six studies described below provide evidence for the proposed drivers of opportunity cost consideration. Table 1 summarizes the hypotheses and specifies the experiment in which each is tested. I focus on the role of constraint in Studies 1, 2, and 3; on the role of planning in Studies 2 and 3; and on the role of resource use limitations in Studies 4, 5, and 6.

STUDY 1: MONTHLY VS. WEEKLY BUDGETS AND SEQUENTIAL SHOPPING

Study 1 demonstrates the effect of constraint on opportunity cost consideration (H1) and the relationship between opportunity cost consideration and sensitivity to the value of outside options (H5). The paradigm used in this study captures the essence of everyday consumer choices by presenting consumers with a sequence of opportunities to purchase products, any one of which they are able to afford, but which combined exceed their budgets, requiring them to make tradeoffs across different options. Constraint is operationalized holding total income constant by manipulating payment frequency (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), opportunity cost consideration is assessed as information search about other ways one could spend resources. Sensitivity to the value of outside options is assessed as the effect of the value of outside options on the likelihood of making a purchase.

Method

Participants. Eighty-five students participated in Study 1 during a single lab session for a small payment. The task was incentive compatible: participants had a chance to win a set of products of their choosing worth up to \$80.

Design. 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 (1 opportunity per simulated “day”, 5 days per week, over 4 weeks). Before deciding to buy or not buy each product, participants could consider each of the next three days’ product offers. Participants who spent too much money on the current opportunities had less money to spend on future opportunities, so future opportunities were opportunity costs; revealing them was indicative of opportunity cost consideration. To examine the effect of 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 analyzed 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 access to 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.

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 observable within the experiment. In the instructions, participants were shown the full set of 20 products and told that prices ranged from \$5.95 to \$18.95.

Participants with weekly budgets received \$20 in store credit each Monday of the month (i.e., on the first, sixth, eleventh, and sixteenth days). Those with monthly budgets received \$80 in store credit the first Monday of the month (i.e., on the first day). 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, and their current balance, along with 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 of the product was greater than the participant's current balance. To the right of the current product offer were three blank boxes representing the next three days' offers, each box accompanied by a button. By clicking on a button 20 times, participants could reveal that day's offer and price.

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 choose to purchase from the total set. They could choose any subset they liked as long as the total cost did not exceed their total budget constraint of \$80.

Variables. All computations and analyses are based on trials on which the product was affordable (i.e., the price was less than or equal to the balance); results are largely consistent when all trials are used. Budget Frame (Weekly vs. Monthly) is the constraint manipulation. Rather than asking respondents to rate perceived constraint repeatedly over trials with potential for sensitization, I measured it unobtrusively as Average Constraint -- the average daily constraint ($1 / \text{balance}$) over the first 19 days (no opportunity costs could be considered on the

twentieth day). Consideration of opportunity costs is the key dependent measure of interest and is assessed as the proportion of future opportunities considered. Budget Task Choice is the binary purchase decision during the Budget Allocation task. Product Appeal is the percent 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 -- a measure of how attractive opportunity costs would be in the daily shopping task if a respondent had looked ahead on a given trial. 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); these last two variables are based on all trials.

Results

Average Constraint. Participants with monthly budgets faced less momentary constraint than participants with weekly budgets ($M_{\text{Monthly}} = .023$, $M_{\text{Weekly}} = .045$; $t(83) = 11.19$, $p < .01$).

Consideration. In support of H1, participants with weekly budgets looked ahead more frequently (26%) than did participants with monthly budgets (18%; $t(83) = 2.20$, $p = .03$). 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. Preacher and Hayes' (2008) SPSS macro with 5,000 bootstrapped samples (Zhao, Lynch, and Chen 2010) revealed indirect-only mediation:

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 (coded Monthly = 0, Weekly = 1) on Consideration was not significant ($B = -.08$; $t(82) = -1.52$, $p = .13$). The indirect pathway had an estimated coefficient of .16 with 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 within individuals, opportunity cost consideration should also vary over time within individuals. In the last week of the month, participants with monthly budgets face similar constraints as participants with weekly budgets and so should similarly consider their opportunity costs. I analyzed Consideration per week 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 missing data for participants who had no affordable trials in weeks 3 (1 participant) or 4 (7 participants).

There was an interaction between Week and Budget Frame ($F(3, 249) = 2.71$, $p < .05$). In the first three weeks, participants with weekly budgets were more likely to consider opportunity costs than participants with monthly budgets ($F(1, 198) = 13.66$, $p < .01$), and this effect of Budget Frame did not vary across Weeks ($F(2, 249) = .48$, ns). In the fourth and final week, however, participants with monthly budgets were just as likely as those with weekly budgets to consider their opportunity costs ($F(1, 198) = .01$, 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 different across weekly and monthly participants ($F(1, 249) = 6.46$, $p < .01$). This change was driven by participants with

monthly budgets ($F(1, 249) = 7.75, p < .01$); there was no change for those with weekly budgets ($F(1, 249) = .64, ns$). See figure 1. This effect of monthly versus weekly budget on the change across weeks in consideration was fully mediated by the change across weeks in momentary constraint; see Appendix for details.

Opportunity Cost Consideration and Sensitivity to Value of Opportunity Costs. The impact of opportunity cost consideration on purchase probability depends on the value of those opportunity costs. 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 (H5).

Indeed, Consideration and Opportunity Cost Appeal interacted to affect purchase likelihood ($B = -4.47, z = -2.49, p = .01$), so spotlight analysis (Cohen, Cohen, Aiken, and West 2002; Fitzsimons 2008; Irwin and McClelland 2001) was used to consider high and low simple effects for each. Unsurprisingly, when no options were considered, Opportunity Cost Appeal was unassociated with likelihood of purchase ($B = -.35, z = -.49, ns$). When all options were considered, Opportunity Cost Appeal was negatively associated with likelihood of purchase ($B = -4.83, z = -2.81, p < .01$). When the three most appealing options were the opportunity costs, Consideration was marginally negatively associated with likelihood of purchase ($B = -1.08, z = -1.72, p = .09$). When the three least appealing options were the opportunity costs, Consideration was positively associated with likelihood of purchase ($B = 1.42, z = 3.12, p < .01$). Moreover, consideration was positively associated with choosing products in the daily shopping task that matched those chosen in the later budget allocation task with all 20 options available simultaneously. See 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 unconstrained and constrained 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. In Study 2, I build on these results in three ways. First, I use a different operationalization of opportunity cost consideration. Second, I show that these results hold when considering adult consumers facing real differences in pay cycle. Third, I consider the role of planning and show that greater propensity to plan is associated with greater opportunity cost consideration among consumers not facing immediate constraints (H2a) and that greater constraint is associated with greater opportunity cost consideration only among consumers with low propensities to plan (H2b).

Method

Users of a popular tax-preparation software program were recruited via email 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” ($\alpha = .83$).

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). To assess constraint, respondents reported how often they are paid with response options of Once per day, Once per week, Once every other week, Once per month, Less than once per month, Irregularly, Other, and 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; analysis focusing just on comparisons between biweekly and monthly pay cycles (the two most frequent responses) and using number of weeks between paydays among weekly, biweekly, and monthly pay cycles were generally consistent. Finally, respondents also reported their income range in \$25,000 increments from “Less than \$25,000” to “\$200,000 or more.” Participants with complete data ($N = 216$) including pay cycle (i.e., other than “Other” or “Prefer not to answer”) and income (i.e., other than “Prefer not to answer”) are included in the analysis below.

Results

Opportunity Cost Consideration was taken as the mean of the three scale items. Consideration was regressed on Income (as a covariate; standardized), Pay Cycle (contrast coded: Short = 1, Long = -1), Long-Run Propensity to Plan (standardized), and the interaction of Pay Frequency with Long-Run Propensity to Plan. There was a main effect of Income ($B = -.49$, $F(1, 211) = 40.08$, $p < .01$), indicating that high-income individuals consider opportunity costs less than low-income individuals. Controlling for Income, there was a significant interaction between Pay Cycle and Propensity to Plan ($B = -.24$, $F(1, 211) = 8.20$, $p < .01$).

In support of H2a, among respondents with short pay cycles, there was no relationship between planning and consideration ($B = .13$, $F(1, 211) = 1.92$, $p = .17$), but among respondents with long pay cycles, there was a positive relationship between planning and consideration ($B = .60$, $F(1, 211) = 19.51$, $p < .01$).

To assess the effect of Pay Cycle for planners and non-planners (H2b), Propensity to Plan was recentered at one standard deviation above and below the mean. Non-planners with short pay cycles reported considering opportunity costs more than those with long pay cycles ($B = .41$, $F(1, 211) = 12.46$, $p < .01$). Planners with short pay cycles reported considering opportunity costs as much as those with long pay cycles ($B = -.07$, $F(1, 211) = 0.34$, ns). See figure 2.

These results provide a robustness check on the results obtained in Study 1 and extend them to demonstrate the role of dispositional planning. As in Study 1, controlling for income, respondents with long pay cycles considered opportunity costs less than those with short pay cycles. Furthermore, non-planners with long pay cycles consider opportunity costs less than non-

planners with short pay cycles, but planners with long pay cycles consider opportunity costs just as much as planners with short pay cycles.

STUDY 3: SPONTANEOUS CONSIDERATION OF OPPORTUNITY COSTS

Frederick et al. (2009) propose that merely reminding consumers that opportunity costs exist might lead them 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 (H1) 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 (H2a) and the effect of constraint on consideration is most pronounced among non-planners (H2b).

Method

Undergraduate students ($N = 194$) participated in this study for credit towards fulfillment of a research requirement. All participants were presented with the scenario below in either a constrained or unconstrained version:

“Imagine that you are spending all day in Charlotte interviewing for summer internships. One interview session is scheduled from 9:00 AM until 11:00 AM, and a second session is scheduled from 2:30 PM until 4:30 PM. You arrive in Charlotte at 8:20 AM without having had

breakfast, and you plan to stick around Charlotte until at least 7:30 PM to avoid having to deal with rush-hour traffic as you drive back east.

As you run in to 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 what they would purchase, participants described how they made their purchase according to the following instructions:

“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 the possibility of 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 eight weeks later using Lynch et al.’s (2010) six-item scale in an unrelated study. Of the original 194, 168 participants completed this scale and are included in the analyses below.

Results

Consideration was analyzed using logistic regression as a function of Constraint, mean-centered Propensity to Plan, and their interaction. This analysis revealed a significant interaction of Constraint with Propensity to Plan ($\chi^2(1) = 3.75, p = .053$). In support of H1, constrained individuals were more likely to consider their opportunity costs than unconstrained individuals at the mean propensity to plan ($\chi^2(1) = 4.05, p < .05$). In support of H2a, Propensity to Plan was not associated with Consideration for constrained participants ($\chi^2(1) = .62, ns$), but it was positively associated with Consideration for unconstrained participants ($\chi^2(1) = 3.46, p = .06$). In support of H2b, there was an effect of Constraint for individuals with low propensities to plan ($\chi^2(1) = 6.37, p = .01$), but not for those with high propensities to plan ($\chi^2(1) = .01, ns$); see figure 3.

To test whether reported opportunity cost consideration was reflected in choice (H5), Spending 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 ($F(1, 163) = 3.01, p = .08$), indicating that Spending decreased with Value among those who considered their opportunity costs ($F(1, 163) = 7.40, p < .01$) but not

among those who did not consider their opportunity costs ($F(1, 163) = 2.33, p = .13$); see figure 4. It is worth noting that 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%; $\chi^2(1) = 15.34, p < .01$), 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, 5, and 6 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 foregone 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 will consideration of opportunity costs vary as a function of their accessibility. In Study 4, I consider how accessibility impacts consideration of different opportunity costs as a result of differences in resource use typicality (H3).

Method

Undergraduate students ($N = 177$) participated in Study 4 for credit towards a class research requirement. Participants were assigned to one of two replicates, reflecting two focal uses of a Starbucks gift card: a tall caffe mocha or an apple fritter. The independent variables of

interest were the value of the focal purchase, the value of a typical, more accessible opportunity cost (a beverage), and the value of an atypical, less accessible opportunity cost (a food). The dependent variable was whether or not participants chose to make the focal purchase.

All participants imagined that their parents mailed them a \$10 gift card to Starbucks and that as they are walking 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.

Next, participants 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 $p < .01$.

Impact of Value of Opportunity Costs on Purchase Decision. The results were analyzed using a logistic regression of the decision to purchase the focal option on Focal Option Replicate (Food vs. Beverage), Focal Option Value (enjoyment of target purchase), Beverage Value (enjoyment of self-generated beverage opportunity cost), and Food Value (enjoyment of self-generated food opportunity cost). 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 as opportunity costs than foods because beverages are more typical uses of Starbucks gift cards.

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

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 ($B = -0.66$, $\chi^2(1) = 11.08$, $p < .01$), 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 ($B = 0.03$,

$\chi^2(1) = 0.04, ns$), indicating that they neglected foods as opportunity costs. These two coefficients were significantly different ($B = -0.35, \chi^2(1) = 5.50, p < .02$) and this difference was eliminated once differences in typicality were controlled for ($B = 0.06, \chi^2(1) = 0.06, ns$); see Appendix for these analyses. This study provides support for the hypothesis that opportunity cost accessibility (as driven by typicality) leads to opportunity cost consideration (H3).

STUDY 5: LIMITED-USE RESOURCES AND ACCESSIBILITY

Study 4 showed that for a given resource, consideration varies as a function of resource use typicality. Consideration should similarly vary as a function of resource use typicality across different 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 should activate their members more than broader categories (Landauer and Meyer 1972). In Study 5, I assess the accessibility of resource uses as a function of the specificity of the category of potential resource uses. Participants generated possible uses of different gift cards and rated the specificity of each gift card. If limited-use resources (i.e., those associated with narrow categories) increase the accessibility of their uses more than unlimited-use resources (i.e., those associated with broad categories), participants will be faster to generate uses for gift cards that have more limited uses than for those that have less limited uses.

Method

Participants in Study 5 were recruited from a popular online science blog: 187 participants consented to participate; 120 participants completed the study. Participants completed one of two replicates (one containing 11 gift cards, one containing 10 gift cards); results did not differ across replicates (p 's > .5), so results are pooled. Participants saw pictures of gift cards from different retailers and were asked, "What could you purchase with the \$25 gift card pictured below?" Once they had thought of an answer (e.g., retrieved a potential use from memory), they proceeded to the next page. All gift cards were presented in random order.

After considering all gift cards, participants reported familiarity with each retailer (defined by recognition of the retailer's name and knowledge of the retailer's product offering). Only retailers with which participants were familiar were used in the analyses below.

Participants rated the specificity of gift cards to each retailer with which they were familiar:

"Think about how general or limited your use of each gift card is. To take two extremes, your use of cash is very general because it can be used to purchase nearly anything, whereas your use of a promotional coupon is very limited because it can be used to purchase only a single item. How general or limited is each gift card below?"

Participants responded on a 7-point scale from "Very general (like cash)" to "Very limited (like a coupon)".

The key dependent variable was the within-subject correlation between these ratings and accessibility of resource use. Accessibility was measured as the time participants required to generate a resource use before moving to the next page. Faster response times reflect greater accessibility. These correlations were then converted to z scores using Fisher's r -to- z transform.

Results

The average transformed correlation between specificity and accessibility was significantly less than 0: $r = -.12, p < .01$. Participants were faster to think of products that could be purchased using gift cards with more limited uses. This result was robust to weighting by the inverse of the variance to account for different numbers of observations per participant and to use of Spearman's rank-order correlations to minimize any effect of extreme outliers or non-linear relationships. This result provides support for H4: limited-use currencies make resource uses more accessible than unlimited-use currencies. Such resource uses represent opportunity costs when considering a focal purchase.

STUDY 6: USING LIMITED-USE RESOURCES

Study 5 demonstrated that resource uses are made more accessible by limited-use resources than by unlimited-use resources. Consider a case when alternative resource uses are highly attractive and made accessible when considering a different focal option. Because attractive opportunity costs are made accessible by a limited-use resource, but no opportunity costs are made accessible by an unlimited-use resource, a consumer may be more likely to spend an unlimited-use resource than a limited-use resource! From a normative perspective, the consumer should be more likely (or at least no less likely) to spend the limited-use resource because it necessarily has lower opportunity costs. This is the situation I test in Study 6.

Method

Participants ($N = 412$) were recruited from Amazon's Mechanical Turk to participate in this study. First, participants were shown a selection of nine music CDs and specified their favorite. This ensured that the focal purchase was an attractive option. 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 buy anything that could be purchased using the Starbucks gift card, plus many more products. Participants imagined the option to buy the specified CD for \$9.95 using their gift card, on sale from \$12.95. After reporting what their opportunity cost was, the degree to which they thought about it, how much they would enjoy the opportunity cost and how much they would enjoy the CD, participants were asked whether or not they considered themselves "someone who loves Starbucks coffee." This measure could not have been taken before the measure of choice, as it could have cued participants to consider coffee as an opportunity cost.

I expect to find that individuals using a Starbucks gift card are more likely to consider their opportunity costs than individuals using a Visa gift card, because their opportunity costs are made more accessible. 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 because those with a Visa gift card are less likely to consider their opportunity costs, even though they necessarily have greater 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%; $\chi^2(1) = 4.10$, $p = .04$). Similarly, among self-identified Starbucks coffee lovers, participants given a Starbucks gift card were significantly less likely to buy the CD (63%) than those given a Visa gift card (85%; $\chi^2(1) = 9.44$, $p < .01$). Although consumers faced with a Starbucks gift card necessarily had lower (or at least no higher) opportunity costs than those faced with a Visa gift card, they were less likely to use their gift card.

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 a model drawing from research on consideration sets and provide evidence over six studies addressing 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 6).

When 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 schedule (Studies 1

and 2). Usage constraints may arise from specific categories of uses based on gift cards of varying specificity (Studies 5 and 6).

Who considers opportunity costs? Individuals who are constrained consider their opportunity costs, but among individuals who are not constrained, those who plan how they will use their resources in the future consider their opportunity costs in the present (Studies 2 and 3).

Which opportunity costs are considered? Opportunity costs that are made most accessible by the resource (Study 4); more typical uses of a resource are more likely to be considered as opportunity costs than less typical uses of a resource.

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, on average, consideration of opportunity costs increases or decreases likelihood to buy a given option depends on the average attractiveness of goods in that economy.

Implications and Future Research

Consumer Welfare. In general, consumers who consider their opportunity costs should be better off financially than those who do not (Ameriks, Caplin, and Leahy 2003; Larrick, Nisbett, and Morgan 1993; Lynch et al. 2010). The various manipulations used in this paper 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 tradeoffs and may be objectively better off. Yet though constraint increases opportunity cost consideration, it may not necessarily increase optimal opportunity cost consideration. A

consumer using tight mental budgets might make better within-category tradeoffs, especially with regards to prototypical purchases (Heath and Soll 1996), but may make worse between-category tradeoffs because the decisions have been artificially partitioned (Thaler 1980, 1985, 1999). Much of the work on mental accounts has focused on this latter decrement to performance rather than the former benefit. Future research should address a complete model of the two.

At least as important as the financial outcomes are the hedonic outcomes. Are consumers who consider their opportunity costs left happier? Maximizers, who seek the best option for every particular choice, are left unhappier and less satisfied than satisficers (Iyengar, Wells, and Schwartz 2006; Schwartz et al. 2002), and comparing alternatives against one another can make consumers feel as though both alternatives are worse than they would have been had they not compared them (Brenner, Rottenstreich, and Sood 1999). Opportunity cost consideration necessitates focusing on tradeoffs, potentially resulting in poorer feelings about outcomes.

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, p. 517). Because competition is defined by the products that coexist in the same consideration sets (Mitra and Lynch 1995; Nedungadi 1990; Ratneshwar and Shocker 1991), a consumer is most likely to assess competition at the level of consumer dollars when opportunity costs are considered: constraints lead to greater cross-category and cross-benefit competition. Because constraints vary over time, cross-category competition will vary over time as well. Given that paydays predictably vary across the population, increased competition for dollars at the individual level may result in differential cross-elasticities across disparate categories over time.

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 play a role in which opportunity costs are considered. Herr (1989) and Gourville (1998) find that products with prices similar to a focal option are likely to be recruited as reference points when making a decision. Similarly, products in the same price range may be more likely to be elicited as opportunity costs, even across different categories.

Money as a Means. When consumers consider their opportunity costs, they are more likely to conceive of money as a means to an end rather than as an end. Specifying money as a means to an end, or earmarking it, implies that it will be treated more like its intended use and less like fungible money (Zelizer 1997; Shafir and Thaler 2006). Such earmarks may be affectively tagged (Levav and McGraw 2009) and, if the earmarked resources are used in unintended ways, could lead to loss aversion for money (Novemsky and Kahneman 2005). This viewpoint suggests that consumers may be more likely to consider 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 and thus be less susceptible to the money illusion (Fisher 1928; Shafir, Diamond, and Tversky 1997), medium maximization (Hsee et al. 2003; van Osselaer, Alba, and Manchanda 2004), and various currency effects (Raghubir and Srivastava 2002; Wertenbroch, Soman, and Chattopadhyay 2007).

Context-Dependent Constraints. In Study 1, I formalized constraint as the inverse of available resources, though the differences in results across alternative operationalizations (available resources, or price / available resources) were small. In economic theory, the value of

an outside good is context independent, the marginal value of money. Nonetheless, it is clear that constraint must be context-dependent. Having \$10,000 available is a meaningful constraint when buying a new 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 aid in more precisely specifying when opportunity costs are likely to be considered.

Consumers must be aware of constraints in order to be affected by them. If one is unaware that constraints exist, they will not affect the retrieval of opportunity costs. A common example is found in household financial decision-making. When one member of the household is in charge of the finances, he or she has a greater sense of constraint than other members of the household. As a result, that member will be more sensitive to constraints simply because he or she is aware of them. This basic deduction has important implications for justifying spending or saving (Tetlock 1992) and for marital harmony (Rick, Small, and Finkel forthcoming).

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 consider other resources as well. Time is a useful first extension. Frederick et al. (2009) posit that consumers may neglect opportunity costs of time even more because the value of time may be flexibly interpreted. Legrenzi et al. (1993) found that people neglected opportunity costs of their time when given no context. However, 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. More generally, by proposing what drives opportunity cost consideration, the model should be generalizable across resources and product usage situations whenever the appropriate conditions hold.

Conclusion

Opportunity costs are a fundamental concept in consumer behavior and facet of everyday life. I propose a model of when consumers consider their opportunity costs, who considers them, which ones are considered, and what are some of the consequences. These findings have implications for, and set the foundation for future research on, a set of fundamental topics in marketing and consumer behavior, including consumer welfare, the nature of 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 one's opportunity costs.

APPENDIX

Study 1

Mediation of Consideration per Week by Average Constraint per Week. 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 $2 * \text{Week 4 Consideration} - (\text{Week 2 Consideration} + \text{Week 3 Consideration})$) represents the difference in consideration between Week 4 and Weeks 2 and 3. DiffConstraint (calculated as $2 * \text{Week 4 Average Constraint} - (\text{Week 2 Average Constraint} + \text{Week 3 Average Constraint})$) represents the difference in constraint between Week 4 and Weeks 2 and 3.

DiffConsider was greater for Monthly participants ($M = .18$) than Weekly participants ($M = -.05$; $F(1, 83) = 5.11, p = .03$), representing increasing consideration over time for Monthly participants but consistent consideration over time for Weekly participants. DiffConstraint was also greater for Monthly participants ($M = .044$) than Weekly participants ($M = -.008$; $F(1, 83) = 36.26, p < .01$), 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 Consideration using Preacher and Hayes' (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 (coded 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 Constraint over time.

Sensitivity to the Value of Opportunity Costs. Individuals who consider their opportunity costs are more affected by relative evaluations (H5). Using general estimating equations 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, resulting in a variable ranging from 0 to 1), Opportunity Cost Appeal (average Product Appeal of opportunity costs on that trial), and the Consideration x 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. Consideration and Opportunity Cost Appeal interacted ($B = -4.47$, $z = -2.49$, $p = .01$), so spotlight analysis (Cohen, Cohen, Aiken, and West 2002; Fitzsimons 2008; Irwin and McClelland 2001) was used to consider high and low simple effects for each. When Opportunity Cost Value is set to the average of the three most appealing options, Consideration is marginally negatively associated with likelihood of purchase ($B = -1.08$, $z = -1.72$, $p = .09$). When Opportunity Cost Appeal is set to the average of the three least appealing options, Consideration is positively associated with likelihood of purchase ($B = 1.42$, $z = 3.12$, $p < .01$).

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' (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 ($B = -0.63$, $\chi^2(1) = 7.17$, $p < .01$). More importantly, the greater the difference in value between beverage opportunity costs and food opportunity costs, the less likely she was to make the focal

purchase ($B = -0.35$, $\chi^2(1) = 5.50$, $p < .02$). Thus, in support of H3, I find that more typical (beverage) opportunity costs impact purchase decisions whereas less typical (food) opportunity costs do not, and that 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 Differences in Typicality.

Replicating the previous analyses, there were significant main effects of Focal Option ($B = 1.05$, $\chi^2(1) = 6.77$, $p < .01$), Focal Option Value ($B = 1.03$, $\chi^2(1) = 39.07$, $p < .01$), and Average Opportunity Cost Value ($B = -0.64$, $\chi^2(1) = 6.92$, $p < .01$). The interaction between Difference in Opportunity Cost Value and Difference in Typicality was significant ($B = -0.15$, $\chi^2(1) = 5.26$, $p = .02$). When Difference in Typicality was equal to 0 (that is, when beverages and foods were seen as *equally* typical), there was no simple effect of Difference in Value ($B = 0.06$, $\chi^2(1) = 0.06$, *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.

REFERENCES

- Alba, Joseph W. and Amitava Chattopadhyay (1985), "Effects of Context and Part-Category Cues on Recall of Competing Brands," *Journal of Marketing Research*, 22 (3), 340-49.
- Alba, Joseph W., J. Wesley Hutchinson, and John G. Lynch Jr. (1991), "Memory and Decision Making," in *Handbook of Consumer Behavior*, ed. Harold H. Kassarijian and Thomas S. Robertson, Englewood Cliffs, NJ: Prentice Hall, 1-49.
- Ameriks, John, Andrew Caplin, and John Leahy (2003), "Wealth Accumulation and the Propensity to Plan," *Quarterly Journal of Economics*, 118 (3), 1007-1047.
- Anderson, John R. (1974), "Retrieval of Propositional Information from Long-Term Memory," *Cognitive Psychology*, 6 (4), 451-74.
- Ball, Christopher T., Harvey J. Langholtz, Jacqueline Auble, and Barron Sopchak (1998), "Resource-Allocation Strategies: A Verbal Protocol Analysis," *Organizational Behavior and Human Decision Processes*, 76 (1), 70-88.
- Bargh, John A., Ronald N. Bond, Wendy J. Lombardi, and Mary E. Tota (1986), "The Additive Nature of Chronic and Temporary Sources of Construct Accessibility," *Journal of Personality and Social Psychology*, 50 (5), 869-78.
- Barsalou, Lawrence W. (1983), "Ad Hoc Categories," *Memory and Cognition*, 11 (3), 211-227.
- (1985), "Ideals, Central Tendency, and Frequency of Instantiation as Determinants of Graded Structure in Categories," *Journal of Experimental Psychology: Learning, Memory, Cognition*, 11 (4), 629-54.
- (1987), "The Instability of Graded Structure: Implications for the Nature of Concepts," in *Concepts and Conceptual Development: Ecological and Intellectual Factors in Categorization*, ed. Ulric Neisser, New York, NY: University of Cambridge, 101-40.
- Becker, Selwyn W., Joshua Ronen, and George H. Sorter (1974), "Opportunity Costs - an Experimental Approach," *Journal of Accounting Research*, 12 (2), 317-29.
- Boush, David M. and Barbara Loken (1991), "A Process-Tracing Study of Brand Extension Evaluation," *Journal of Marketing Research*, 28(1), 16.
- Brenner, Lyle, Yuval Rottenstreich, and Sanjay Sood, (1999), "Comparison, Grouping, and Preference," *Psychological Science*, 10 (3), 225-229.
- Brown, Alexander L., Zhikang Eric Chua, and Colin F. Camerer (2009), "Learning and Visceral Temptation in Dynamic Saving Experiments," *Quarterly Journal of Economics*, 124 (1), 197-231.
- Carlson, Kurt A., Chris Janiszewski, Ralph L. Keeney, David H. Krantz, Howard C. Kunreuther, Mary Frances Luce, J. Edward Russo, Stijn M. J. van Osselaer, and Detlof von

- Winterfeldt (2005), "A Theoretical Framework for Goal-Based Choice and for Prescriptive Analysis," *Marketing Letters*, 19 (3-4), 241-54.
- Chaiken, Shelly, Akiva Liberman, and Alice H. Eagly (1989), "Heuristic and Systematic Information Processing Within and Beyond the Persuasion Context," in *Unintended Thought*, ed., James S. Uleman and John A. Bargh, New York, NY: Guilford Press, 212-252.
- Chandukala, Sandeep R., Jaehwan Kim, Thomas Otter, Peter E. Rossi, and Greg M. Allenby (2007), "Choice Models in Marketing: Economic Assumptions, Challenges and Trends," *Foundations and Trends in Marketing*, 2 (2), 97-184.
- Cheema, Amar and Dilip Soman (2006), "Malleable Mental Accounting: The Effect of Flexibility on the Justification of Attractive Spending and Consumption Decisions," *Journal of Consumer Psychology*, 16 (1), 33-44.
- (2008), "The Effect of Partitions on Controlling Consumption," *Journal of Marketing Research*, 45 (6), 665-675.
- Cherubini, Paolo, Ketti Mazzocco, and Rino Rumiati (2003), "Rethinking the Focusing Effect in Decision-Making," *Acta Psychologica*, 113 (1), 67-81.
- Cohen, Jacob, Patricia Cohen, Stephen G. Aiken, and Leona S. West, (2003), *Applied Multiple Regression / Correlation Analysis for the Behavioral Sciences: Third Edition*, Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Cohen, Joel B. and Americus Reed II (2006), "A Multiple Pathway Anchoring and Adjustment (MPAA) Model of Attitude Generation and Recruitment," *Journal of Consumer Research*, 33 (1), 1-15.
- Del Missier, Fabio, Donatella Ferrante, and Erica Costantini (2007), "Focusing Effects in Predecisional Information Acquisition," *Acta Psychologica*, 125 (2), 155-74.
- Domowitz, Ian, and Robert L. Sertain, (1999), "Determinants of the Consumer Bankruptcy Decision," *Journal of Finance*, 54 (1), 403-420.
- Du, Rex Y. and Wagner A. Kamakura (2008), "Where Did All That Money Go? Understanding How Consumers Allocate Their Consumption Budget," *Journal of Marketing*, 72 (6), 109-31.
- Fisher, Irving (1928), *The Money Illusion*, New York, NY: Adelphi Company.
- Fitzsimons, Gavan J. (2008), "Death to Dichotomizing," *Journal of Consumer Research*, 35 (1), 5-8.
- Fogel, Suzanne (2009), "Income Source Effects," Chicago, IL: DePaul University.

- Frederick, Shane, Nathan Novemsky, Jing Wang, Ravi Dhar, and Stephen Nowlis (2009), "Opportunity Cost Neglect," *Journal of Consumer Research*, 36 (December), 553-61.
- Friedman, Laurence A. and Bruce R. Neumann (1980), "The Effects of Opportunity Costs on Project Investment Decisions: A Replication and Extension," *Journal of Accounting Research*, 18 (2), 407-19.
- Gourville, John T. (1998), "Pennies-a-Day: The Effect of Temporal Reframing on Transaction Evaluation," *Journal of Consumer Research*, 24 (4), 395-408.
- Hauser, John R. and Glen L. Urban (1986), "The Value Priority Hypotheses for Consumer Budget Plans," *Journal of Consumer Research*, 12 (4), 446-62.
- Hauser, John R. and Birger Wernerfelt (1990), "An Evaluation Cost Model of Consideration Sets," *Journal of Consumer Research*, 16 (4), 393-408.
- Heath, Chip and Jack B. Soll (1996), "Mental Budgeting and Consumer Decisions," *Journal of Consumer Research*, 23 (1), 40-52.
- Henderson, Pamela W. and Robert A. Peterson (1992), "Mental Accounting and Categorization," *Organizational Behavior and Human Decision Processes*, 51 (1), 92-117.
- Herr, Paul M. (1989), "Priming Price: Prior Knowledge and Context Effects," *Journal of Consumer Research*, 16 (1), 67-75.
- Higgins, E. Tory, Gillian A. King, and Gregory H. Mavin (1982), "Individual Construct Accessibility and Subjective Impressions and Recall," 43 (1), 35-47.
- Hsee, Christopher K., Fang Yu, Jiao Zhang, and Yan Zhang (2003), "Medium Maximization," *Journal of Consumer Research*, 30 (1), 1-14.
- Hutchinson, J. Wesley, Kalyan Raman, and Murali K. Mantrala (1994), "Finding Choice Alternatives in Memory - Probability-Models of Brand-Name Recall," *Journal of Marketing Research*, 31 (4), 441-61.
- Irwin, Julie R. and Gary H. McClelland (2001), "Misleading Heuristics and Moderated Multiple Regression Models," *Journal of Marketing Research*, 38 (1), 100-9.
- Iyengar, Sheena S., Rachael E. Wells, and Barry Schwartz (2006), "Doing Better But Feeling Worse. Looking For The 'Best' Job Undermines Satisfaction," *Psychological Science*, 17 (2), 143-150.
- Johar, Gita Venkataramani, Page Moreau, and Norbert Schwarz (2003), "Gender Typed Advertisements and Impression Formation: The Role of Chronic and Temporary Accessibility," *Journal of Consumer Psychology*, 13 (3), 220-229.

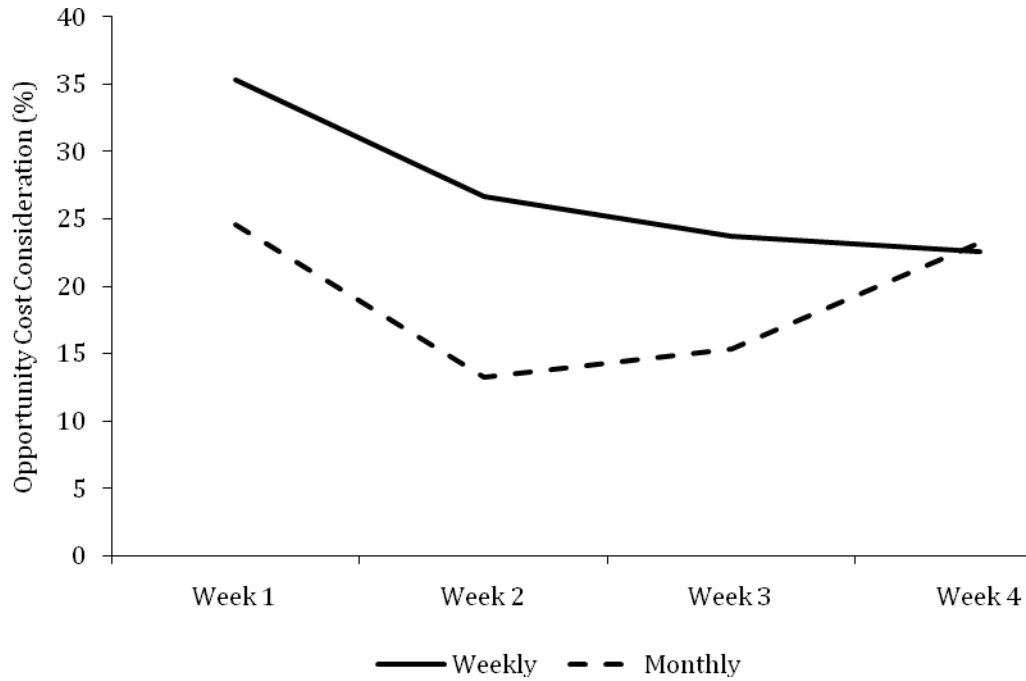
- Jones, Steven K., Deborah Frisch, Tricia J. Yurak, and Eric Kim (1998), "Choices and Opportunities: Another Effect of Framing on Decisions," *Journal of Behavioral Decision Making*, 11 (3), 211-26.
- Judd, Charles M., David A. Kenny, and Gary H. McClelland (2001), "Estimating and Testing Mediation and Moderation in Within-Subject Designs," *Psychological Methods*, 6 (2), 115-134.
- Kasulis, Jack J., Robert F. Lusch, and Edward F. Stafford, Jr. (1979), "Consumer Acquisition Patterns for Durable Goods," *Journal of Consumer Research*, 6 (1), 47-57.
- Kotler, Philip and Gary Armstrong (2009), *Principles of Marketing 12th Edition*, Upper Saddle River, NJ: Prentice Hall.
- Landauer, Thomas K. and David E. Meyer (1972), "Category Size and Semantic-Memory Retrieval," *Journal of Verbal Learning and Verbal Behavior*, 11 (5), 539-49.
- Langholtz, Harvey J., Antoinette T. Marty, Christopher T. Ball, and Eric C. Nolan (2003), *Resource-Allocation Behavior*, Norwell, MA: Kluwer Academic Publishers.
- Larrick, Richard P., James N. Morgan, and Richard E. Nisbett (1990), "Teaching the Use of Cost-Benefit Reasoning in Everyday Life," *Psychological Science*, 1 (6), 362-70.
- Larrick, Richard P., Richard E. Nisbett, and James N. Morgan (1993), "Who Uses the Cost-Benefit Rules of Choice? Implications for the Normative Status of Microeconomic Theory," *Organizational Behavior and Human Decision Processes*, 56 (3), 331-47.
- Legrenzi, Paolo, Vittorio Girotto, and Philip N. Johnson-Laird (1993), "Focusing in Reasoning and Decision Making," *Cognition*, 49 (1-2), 37-66.
- Levav, Jonathan and A. Peter McGraw (2009), "Emotional Accounting: How Feelings About Money Influence Consumer Choice," *Journal of Marketing Research*, 46 (1), 66-80.
- Loftus, Elizabeth F. (1973), "Activation of Semantic Memory," *American Journal of Psychology*, 86 (2), 331-37.
- Lynch, John G., Jr., Howard Marmorstein, and Michael F. Weigold (1988), "Choices from Sets Involving Remembered Brands: Use of Recalled Attributes and Prior Overall Evaluations," *Journal of Consumer Research*, 15 (2), 169-84.
- Lynch, John G., Jr., Richard G. Netemeyer, Stephen A. Spiller, and Alessandra Zammit (2010), "A Generalizable Scale of Propensity to Plan: The Long and the Short of Planning for Time and for Money," *Journal of Consumer Research*, 37 (1), 108-28.
- Lynch, John G. Jr. and Thomas K. Srull (1982), "Memory and Attentional Factors in Consumer Choice - Concepts and Research Methods," *Journal of Consumer Research*, 9 (1), 18-37.

- Markus, Hazel (1977), "Self-Schemata and Processing Information About the Self," *Journal of Personality and Social Psychology*, 35 (2), 63-78.
- Meyvis, Tom and Chris Janiszewski (2004), "When Are Broader Brands Stronger Brands? An Accessibility Perspective on the Success of Brand Extensions," *Journal of Consumer Research*, 31 (2), 346-57.
- Mitra, Anusree and John G. Lynch, Jr. (1995) "Toward a Reconciliation of Market Power and Information Theories of Advertising Effects on Price Elasticity," *Journal of Consumer Research*, 21 (4), 644-59.
- Morewedge, Carey K., Leif Holtzman, and Nicholas Epley (2007), "Unfixed Resources: Perceived Costs, Consumption, and the Accessible Account Effect," *Journal of Consumer Research*, 34 (4), 459-67.
- Nedungadi, Prakash (1990), "Recall and Consumer Consideration Sets - Influencing Choice without Altering Brand Evaluations," *Journal of Consumer Research*, 17 (3), 263-76.
- Nedungadi, Prakash and J. Wesley Hutchinson (1985), "The Prototypicality of Brands - Relationships with Brand Awareness, Preference and Usage," in *Advances in Consumer Research*, Vol. 12, ed. Elizabeth C. Hirschman and Moris B. Holbrook, Provo, UT: Association for Consumer Research, 498-503.
- Northcraft, Gregory B. and Margaret A. Neale (1986), "Opportunity Costs and the Framing of Resource Allocation Decisions," *Organizational Behavior and Human Decision Processes*, 37 (3), 348-56.
- Novemsky, Nathan and Daniel Kahneman (2005), "The Boundaries of Loss Aversion," *Journal of Marketing Research*, 42 (2), 119-28.
- Posavac, Steven S., David M. Sanbonmatsu, and Russell H. Fazio (1997), "Considering the Best Choice: Effects of the Salience and Accessibility of Alternatives on Attitude-Decision Consistency," *Journal of Personality and Social Psychology*, 72 (2), 253-61.
- Preacher, Kristopher J. and Andrew F. Hayes (2008), "Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models," *Behavior Research Methods*, 40 (3), 879-91.
- Prelec, Drazen, and George Loewenstein (1998), "The Red and the Black: Mental Accounting of Savings and Debt," *Marketing Science*, 17 (1), 4-28.
- Priester, Joseph R., Dhananjay Nayakankuppam, Monique A. Fleming, and John Godek (2004), "The a(2)Sc(2) Model: The Influence of Attitudes and Attitude Strength on Consideration and Choice," *Journal of Consumer Research*, 30 (4), 574-87.
- Raghubir, Priya and Joydeep Srivastava (2002), "Effect of Face Value on Product Valuation in Foreign Currencies," *Journal of Consumer Research*, 29 (3), 335-47.

- Ratneshwar, S., Lawrence W. Barsalou, Cornelia Pechmann, and Melissa Moore (2001), "Goal-Derived Categories: The Use of Personal and Situational Goals in Category Representations," *Journal of Consumer Psychology*, 10 (3), 147-57.
- Ratneshwar, S., Cornelia Pechmann, and Allan D. Shocker (1996), "Goal Derived Categories and the Antecedents of across Category Consideration," *Journal of Consumer Research*, 23 (3), 240-50.
- Ratneshwar, S. and Allan D. Shocker (1991), "Substitution in Use and the Role of Usage Context in Product Category Structures," *Journal of Consumer Research*, 28 (3), 281-95.
- Rick, Scott I., Cynthia E. Cryder, and George Loewenstein (2008), "Tightwads and Spendthrifts," *Journal of Consumer Research*, 34 (6), 767-782.
- Rick, Scott I., Deborah A. Small, and Eli J. Finkel (forthcoming), "Fatal (Fiscal) Attraction: Spendthrifts and Tightwads in Marriage," *Journal of Marketing Research*.
- Roberts, John H. and James M. Lattin (1991), "Development and Testing of a Model of Consideration Set Composition," *Journal of Marketing Research*, 28 (4), 429-40.
- Rosch, Eleanor H. (1975), "Cognitive Representations of Semantic Categories," *Journal of Experimental Psychology: General*, 104 (3), 192-233.
- Rosch, Eleanor H. and Carolyn B. Mervis (1975), "Family Resemblances: Studies in Internal Structure of Categories," *Cognitive Psychology*, 7 (4), 573-605.
- Russell, Gary J., S. Ratneshwar, Allan D. Shocker, David Bell, Anand Bodapati, Alex Degeratu, Lutz Hildebrandt, Namwoon Kim, S. Ramaswami, and Venkatesh H. Shankar (1999), "Multiple-Category Decision-Making: Review and Synthesis," *Marketing Letters*, 10 (3), 319-32.
- Schwartz, Barry, Andrew Ward, John Monterosso, Sonja Lyubomirsky, Katherine White, and Darrin R. Lehman (2002), "Maximizing versus Satisficing: Happiness is a Matter of Choice," *Journal of Personality and Social Psychology*, 83 (5), 1178-97.
- Shafir, Eldar, Peter Diamond, and Amos Tversky (1997), "Money Illusion," *Quarterly Journal of Economics*, 112 (2), 341-74.
- Shafir, Eldar and Richard H. Thaler (2006), "Invest Now, Drink Later, Spend Never: On the Mental Accounting of Delayed Consumption," *Journal of Economic Psychology*, 27 (5), 694-712.
- Shapiro, Jesse M. (2005), "Is there a daily discount rate? Evidence from the food stamp nutrition cycle", *Journal of Public Economics*, 89 (2-3), 303-325.
- Shefrin, Hersch M. and Richard H. Thaler (1988), "The Behavioral Life-Cycle Hypothesis," *Economic Inquiry*, 26 (4), 609-43.

- Shu, Suzanne B. (2008), "Future-Biased Search: The Quest for the Ideal," *Journal of Behavioral Decision Making*, 21 (4), 352-77.
- Shu, Suzanne B. and Ayelet Gneezy (forthcoming), "Procrastination of Enjoyable Experiences," *Journal of Marketing Research*.
- Soster, Robin L. (2010), "Costs of Time versus Money: A Mental Accounting View of Satisfaction," unpublished manuscript, University of South Carolina.
- Tetlock, Philip E. (1992), "The Impact of Accountability on Judgment and Choice: Toward a Social Contingency Model", *Advances in Experimental Social Psychology*, 25, 331-376.
- Thaler, Richard H. (1980), "Toward a Positive Theory of Consumer Choice," *Journal of Economic Behavior & Organization*, 1 (1), 39-60.
- (1985), "Mental Accounting and Consumer Choice," *Marketing Science*, 4 (3), 15-25.
- (1999), "Mental Accounting Matters," *Journal of Behavioral Decision Making*, 12, 183-206.
- Tulving, Endel and Zena Pearlstone (1966), "Availability and Accessibility of Information in Memory for Words," *Journal of Verbal Learning and Verbal Behavior*, 5 (4), 381-91.
- van Osselaer, Stijn M. J., Joseph W. Alba, and Puneet Manchanda (2004), "Irrelevant Information and Mediated Intertemporal Choice," *Journal of Consumer Psychology*, 14 (3), 257-70.
- Weber, Elke U. and Eric J. Johnson (2006), "Constructing Preferences from Memory," in *The Construction of Preference*, ed. Sarah Lichtenstein and Paul Slovic, New York: Cambridge University Press, 397-410.
- Wertenbroch, Klaus, Dilip Soman, and Amitava Chattopadhyay (2007), "On the Perceived Value of Money: The Reference Dependence of Currency Numerosity Effects," *Journal of Consumer Research*, 34 (1), 1-10.
- Zauberman, Gal and John G. Jr. Lynch (2005), "Resource Slack and Propensity to Discount Delayed Investments of Time Versus Money," *Journal of Experimental Psychology-General*, 134 (1), 23-37.
- Zelizer, Viviana A. (1997), *The Social Meaning of Money: Pin Money, Paychecks, Poor Relief, and Other Currencies*, Princeton, New Jersey: Princeton University Press.
- Zhao, Xinshu, John G. Lynch, Jr., and Qimei Chen (2010), "Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis," *Journal of Consumer Research*, 37 (2), 197-206.
- Zhu, Ning (2008), "Household Consumption and Personal Bankruptcy," unpublished manuscript, University of California, Davis.

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 as they adjusted to 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.

Figure 2. Study 2 opportunity cost consideration as a function of pay cycle and propensity to plan.

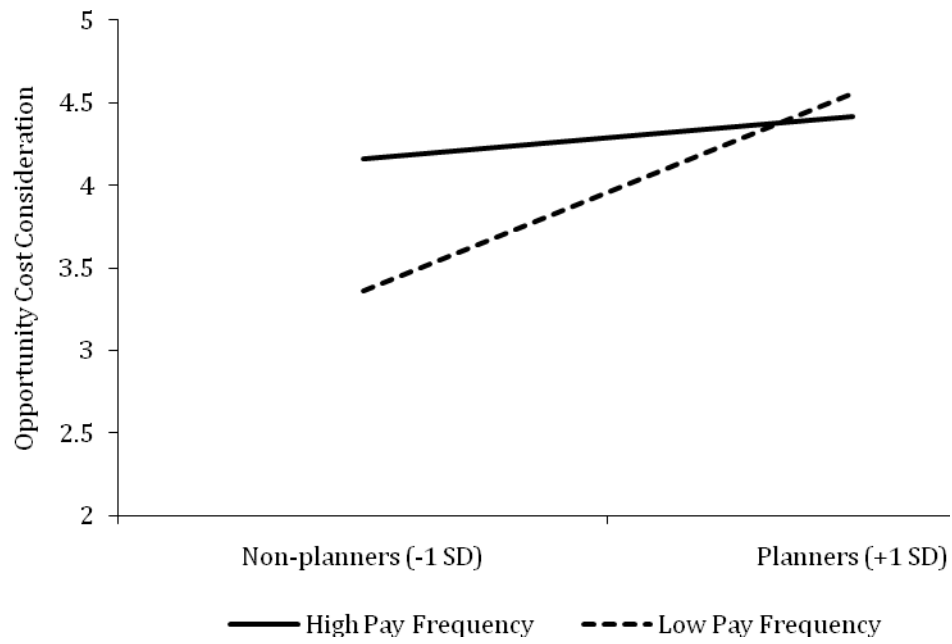


Figure 3. Study 3 opportunity cost consideration as a function of constraint and propensity to plan.

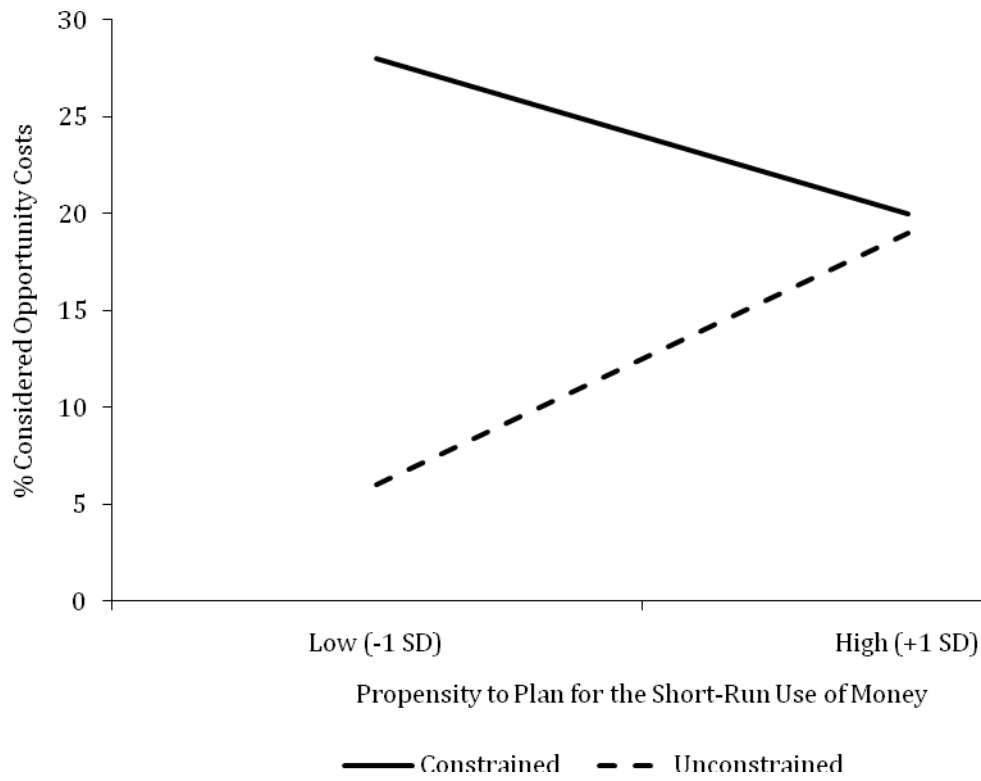


Figure 4. Study 3 breakfast expenditures as a function of consideration and opportunity cost value.

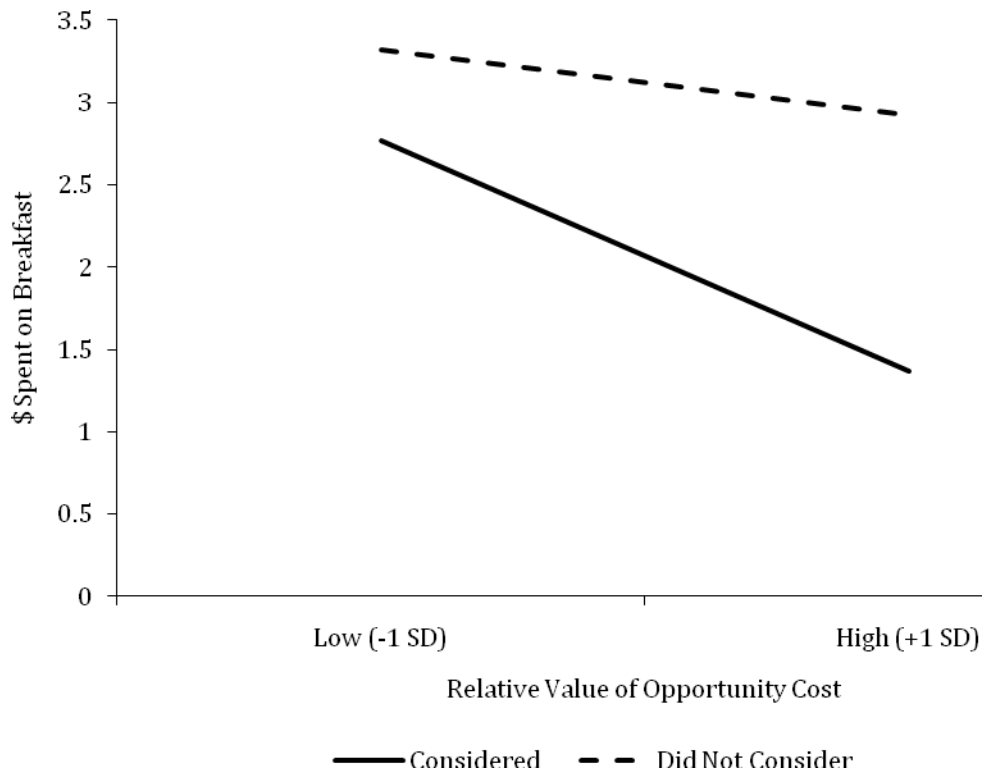


Table 1. Summary of hypotheses and tests by study.

Hypothesis	Study
H1 Resource constraints increase opportunity cost consideration.	1, 2, 3
H2a When not facing immediate constraints, planners are more likely to consider opportunity costs than non-planners.	2, 3
H2b Resource constraints increase opportunity cost consideration for non-planners more than 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 Resource use limitations increase opportunity cost consideration.	5, 6
H5 Opportunity cost consideration increases sensitivity to the value of outside options.	1, 3