

Limited Means and What I Can't Buy:
Resource Constraints and Resource Use Accessibility
Drive Opportunity Cost Consideration

by

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Dissertation submitted in partial
fulfillment of the requirements for the degree
of Doctor of Philosophy in the Department of
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ABSTRACT

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Abstract

Every consumer decision incurs a cost. An hour spent researching products is an hour not spent working. Vacation days used in the winter are vacation days not used in the summer. A dollar spent on a car payment is a dollar not spent dining out. What determines the extent to which consumers consider such opportunity costs when making decisions?

Although every purchase requires an outlay cost (i.e., spending dollars in order to obtain a good), outlay costs only have economic significance because some other good or service must be given up as a result. Consumers have unlimited wants but limited resources, so satisfying one want means not satisfying another (the *opportunity cost*). An opportunity cost is “the evaluation placed on the most highly valued of the rejected alternatives or opportunities” (Buchanan 2008) or “the loss of other alternatives when one alternative is chosen” (*Oxford English Dictionary* 2010). Opportunity costs are foundational to the science of economics and, normatively, consumers should account for opportunity costs in every decision they make. I define opportunity cost consideration as “considering alternative uses for one’s resources when deciding whether to spend resources on a focal option.”

Because consumers face opportunity costs, every purchase decision is effectively a choice among alternative resource uses, not just a decision of whether or not to make a particular purchase. When consumers consider their opportunity costs, alternative

resource uses specify the broadest form of competition that products face: each resource use competes for share-of-wallet with all other potential resource uses. Understanding when consumers consider a purchase decision as an allocation across multiple options, and what those considered options are, allows researchers and practitioners to better understand why consumers make the purchases that they do, why they restrain from making the purchases that they do not, and how to influence purchases of focal options by increasing or decreasing consideration of alternative resource uses.

What determines when consumers consider opportunity costs? In Essay 1, I propose that consumers consider opportunity costs when they perceive immediate resource constraints. In Essay 2, I propose that consumers consider opportunity costs when the resource in use increases the accessibility of alternative resource uses in memory.

Beyond addressing when consumers consider opportunity costs, I address three additional questions. First, who is more likely to consider opportunity costs? Individuals with a high propensity to plan are likely to consider opportunity costs even when they are not immediately constrained. Second, which opportunity costs are consumers more likely to consider? Consumers are more likely to consider opportunity costs that are more typical of the category of possible resource uses than opportunity costs that are less typical of the category of possible resource uses. Third, what are the consequences of opportunity cost consideration? Individuals who consider their opportunity costs are more

sensitive to their value than those who do not consider them. In addition to aiding our understanding of the consumer decision process, understanding opportunity cost consideration has important implications for consumers' sensitivities to the structure of the decision environment, understanding the nature of competition and cross-price elasticities, memory for foregone options, and construction of preferences.

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Essay 1: Resource Constraints Drive Opportunity Cost Consideration

Consumer life is composed of a sequence of opportunities. Do I buy a new car or not? Do I watch the game this evening or not? Do I redeem airline miles for a first-class upgrade or not? Do I use food stamps to buy ice cream or not? Each opportunity sounds attractive in isolation, but each necessitates foregoing something else in exchange. By spending my money buying a new car, I cannot spend it remodeling the kitchen. By spending my time watching the game, I cannot spend it reading an article. By redeeming my airline miles for an upgrade, I cannot redeem them for another flight. By using food stamps to buy ice cream, I cannot use them to buy bread. If I ignore these opportunity costs, only the attractiveness of the car, the game, the upgrade, and the ice cream influence my focal decisions. If I consider them, the remodeled kitchen, the attractiveness of the article, the other flight, and the bread influence my focal decisions as well. Consumer life is not just composed of a sequence of opportunities; it is composed of a sequence of implied choices.

A major tenet of economics is that, given limited resources and unlimited wants, consumers face tradeoffs like those above. Purchase decisions are not isolated resource expenditures, but rather are narrow snapshots of a much larger resource allocation problem (e.g., Ando and Modigliani 1963). Spending \$2 on a cup of coffee today means that those \$2 may not be used to buy a cup of coffee tomorrow, may not be put towards a new car in 10 years, and may not be left as inheritance for one's children in 50 years. In

other words, the true cost of that cup of coffee is the next best item that those \$2 could have purchased: the opportunity cost. An opportunity cost is “the evaluation placed on the most highly valued of the rejected alternatives or opportunities” (Buchanan 2008) or “the loss of other alternatives when one alternative is chosen” (*Oxford English Dictionary* 2010). Opportunity cost consideration is a normative baseline and associated with professional success (Larrick, Nisbett, and Morgan 1993). Although opportunity costs are normatively important and facts of life, consumers often view purchase decisions as isolated purchase opportunities (e.g., deciding whether or not to buy a cup of coffee for \$2) rather than as pieces of the broader allocation problem (deciding whether to spend those \$2 on a cup of coffee or on a car in 10 years; Legrenzi, Girotto, and Johnson-Laird 1993; Frederick et al. 2009; Jones et al. 1998; Langholtz et al. 2003; Thaler and Shefrin 1981; Magen, Dweck, and Gross 2008; Read, Loewenstein, and Rabin 1999). What drives consumers to consider their opportunity costs and what are the downstream consequences of opportunity cost consideration?

In this essay, I examine the effect of resource constraints on opportunity cost consideration and the effect of opportunity cost consideration on sensitivity to one’s environment. When consumers recruit inputs to evaluate a single alternative they rely on a metacognitive sense of sufficiency to terminate search (Chaiken, Liberman, and Eagly 1989; Cohen and Reed 2006; Lynch, Marmorstein, and Weigold 1988). I propose that similar laws may govern the consideration of alternatives that are not part of the focal decision. Resource constraints may increase the threshold for the sufficiency judgment,

thereby increasing the likelihood that an additional alternative is considered. Differences in perceived resource constraints result from differences in wealth endowments or pay cycles and they vary over time. Resource constraints influence different consumers to different extents. Any given absolute difference in constraint is a larger relative difference for consumers facing chronic constraints than it is for those not facing chronic constraints. Consumers with high propensities to plan are more likely to chronically consider future planned purchases and therefore consider opportunity costs even when they do not perceive immediate resource constraints. Because constraint leads to consideration of alternative resource uses, it leads to greater sensitivity to the environment, notably sensitivity to the value of foregone options and recognition of the tradeoff structure among options. I propose additional areas for future research including preference stability and memory for foregone options.

I begin with a brief review of previous research on consumers' tendencies to consider narrow choice brackets, neglect their opportunity costs, and focus on the medium rather than on the end outcome, but also consider alternatives within a particular domain even when they are not explicit in the choice environment. I then propose a model of when consumers will consider their opportunity costs and when they will not. Finally, I discuss implications of the model for the role of constraint and sensitivity to the environment before presenting six studies designed to test the model.

Focal and Outside Options

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

Though it has not typically been framed with respect to opportunity costs, research on choice bracketing has addressed the downstream effects of considering different choices in conjunction with one another versus in isolation from one another (Read et al. 1999). Much of this literature has focused on the different ways that individuals respond when decisions are explicitly presented in one format versus another. For example, research on selective hypothesis testing shows that when making judgments, people tend to focus on a target option and neglect alternative options unless explicitly directed to consider them (e.g., Hirt and Markman 1995; Lord, Lepper, and Preston 1984; see Sanbonmatsu et al. 1998 for a review). Even when all options are explicitly presented and the choice is well defined, focal options acquire privileged status,

receive undue attention, and are evaluated on their own rather than in comparison with other options (e.g., Sanbonmatsu et al. 1998; Posavac et al. 2004, 2005). This suggests a type of alternative neglect even when choices are well defined and all alternatives may be readily considered. Opportunity costs are rarely so well defined or explicitly presented and instead often must be retrieved or generated from memory.

Although externally imposed frames tend to be sticky, they do not completely determine the final frame that consumers use; individuals will sometimes modify their decision frames (Coupey 1994; Jones and Schkade 1995; Jones et al. 1998). In particular, consumers may construe the same purchase decision in one of two normatively equivalent but psychologically distinct ways. They may consider a given purchase decision as a choice between spending limited resources on one of two separate alternatives or as an opportunity to make a purchase versus not make a purchase. Jones et al. (1998) formalized this distinction as a difference in frames between “choices” and “opportunities”: choices necessitate deciding between two options, with neither taking on a privileged status, whereas opportunities necessitate deciding whether to accept a focal option or not. If individuals broaden their decision frame to consider a purchase decision as a choice rather than as an opportunity, they are more likely to consider their opportunity costs.

Opportunity Cost Neglect

Additional research has explicitly focused on the neglect of opportunity costs. Some of the earliest research on opportunity cost neglect comes from the experimental

accounting literature (Becker, Ronen, and Sorter 1974; Friedman and Neumann 1980; Hoskin 1983; Northcraft and Neale 1986). When opportunity costs are stated explicitly, accountants incorporate them into their cost assessments, but when they remain implicit, they are treated as though they did not exist. Accounting training increases neglect of opportunity costs, particularly in accounting problems, presumably due to an increased focus on outlay costs (Vera-Munoz 1998), whereas economics training increases consideration of opportunity costs (Larrick, Morgan, and Nisbett 1990).

Research on dynamic resource allocation reveals similar neglect of opportunity costs using a very different experimental paradigm. Resources are acquired and depleted over time, such that outlay costs are realized in the present and opportunity costs are not realized until the future. Langholtz and colleagues considered a set of such dynamic resource allocation problems and found that individuals typically act as though they ignore their opportunity costs yet still display relatively high rates of performance (Ball et al. 1998; Langholtz, Gettys, and Foote 1993, 1994, 1995; Langholtz et al. 1997; Gonzalez, Langholtz, and Sopchak 2002; see Langholtz et al. 2003 for a review; see also Brown, Chua, and Camerer 2009). Think-aloud protocols revealed that individuals generally took the task one day at a time and relied on resource conservation heuristics rather than considering the task across days and planning future resource expenditures (Ball et al. 1998). An important exception was that when individuals had nearly depleted their resources, they considered expenditures as allocations across periods. Shu (2008) found that individuals given a single coupon that could be used on one of a sequence of

products often held onto it too long, realizing that using it now would mean that it could not be used on a better (though improbable) option later. These convergent results suggest that consumers may neglect opportunity costs when resources are plentiful but consider them when resources are highly constrained.

Might consumers be more likely to consider opportunity costs when making normal expenditures in their daily lives? Individuals often do not consider other uses for their time when presented with potential target activities in the absence of additional context (Legrenzi et al. 1993). For example, when considering whether or not to attend a hypothetical movie, participants did not ask about other things they could do with their time unless they were provided with a specific context (e.g., the opportunity is in the midst of a brief trip to Rome). Recent work suggests that unless opportunity costs are made explicit, consumers neglect their opportunity costs altogether when making purchases (Frederick et al. 2009). Merely rephrasing the alternative to “buy” as “keep your money for other purchases” rather than “do not buy” significantly reduces the proportion of participants who purchase the target item.

Focusing on the Medium

A particularly relevant instantiation of opportunity cost neglect is consumers’ fixation on resources rather than on the end use of those resources. Medium maximization is the tendency of individuals to maximize their nominal income (or minimize their nominal expenditures) without regard for their real income (or real expenditures; Hsee et al. 2003; van Osselaer et al. 2004). For example, people work

harder to obtain more points, even when more points are not exchangeable for more valuable goods. They also prefer large increases in income with high inflation to small increases in income with low inflation (the “money illusion”; Fehr and Tyran 2001; Fisher 1928; Shafir, Diamond, and Tversky 1997), consistent with a focus on maximizing the medium (nominal dollars) rather than consumption (real dollars). As a result, when consumers focus on prices, lower value currencies lead to higher nominal prices and therefore higher perceived costs, thereby reducing spending (Raghubir and Srivastava 2002). When they focus on the resources remaining in a budget, however, lower value currencies lead to higher nominal resources remaining in a budget and therefore lower perceived costs, thereby increasing spending (Wertenbroch, Soman, and Chattopadhyay 2007).

Consideration Sets

When consumers consider their opportunity costs, they are effectively constructing a consideration set comprising items on which they could spend their available resources. Nedungadi (1990) defines a consideration set as “the set of brands brought to mind on a particular choice occasion” (264) and Ratneshwar, Pechmann, and Shocker (1996) emphasize that “consumers might create consideration sets that include alternatives from fairly diverse product categories” (240). Mere consideration is an important determinant of choice: Hauser (1978) found that consideration set composition can account for 78% of the explainable variation in choice. The extent to which one product competes with another depends on the extent to which they coexist in the same

consideration sets (e.g., Nedungadi 1990; Mitra and Lynch 1995). Most consideration set research has been at the level of product categories (e.g., Hauser and Wernerfelt 1990; Mitra and Lynch 1995; Nedungadi 1990; Roberts and Lattin 1991), though some work has focused on the level of benefits as well (Ratneshwar et al. 2001; Ratneshwar et al. 1996; Ratneshwar and Shocker 1991; Russell et al. 1999). Less consumer research has focused on competition at the level of resources, or competition for the same dollars (cf. Hauser and Urban 1986; Du and Kamakura 2008). To the extent that individuals consider their opportunity costs, they generate cross-benefit consideration sets and consider competition at the resource level.

Why do consumers use consideration sets? Considering additional options is effortful and consideration sets make choices more manageable; options are only considered to the extent that their consideration is perceived to be needed (Shugan 1980; Roberts and Lattin 1991; Hauser and Wernerfelt 1990). Similarly, when evaluating a single option, consumers rely on a metacognitive sense of sufficiency to determine when to terminate search (Chaiken et al. 1989; Cohen and Reed 2006; Lynch et al. 1988). Factors that increase the need to consider additional options or increase the sufficiency threshold will increase consideration of additional alternatives. Perceived resource constraints are one such factor. Russell et al. (1999) proposed that consumers facing tight budgets are more likely to consider options across categories. Given that opportunity cost consideration is a type of cross-category consideration, a restatement of Russell et al.'s

(1999) argument is that consumers facing tight budgets consider their opportunity costs when making purchase decisions.

The Role of Resource Constraints

Opportunity costs play an important normative role in decision-making, yet research suggests that consumers often ignore them when making purchases. I propose that prior research has neglected an important driver of opportunity cost consideration: resource constraints. Because resource constraints increase the sufficiency threshold for making a decision, consumers are more likely to consider additional alternative when constrained than when unconstrained. This relationship is magnified by chronic resource constraints and moderated by propensity to plan. Next I define each construct, provide support from the literature for the proposed links, and discuss some properties of constraint and consideration that the model implies.

Construct Definitions

Resource Constraints

One consumer perceives greater resource constraints than another to the extent that he or she feels as though he or she has fewer resources available. Such resource constraints may be real liquidity constraints (e.g., little cash on hand and no access to credit) or apparent psychological constraints (e.g., little money left in a mental account for dining out). Perceived resource constraints will typically covary with exogenous resource constraints, but they may also be driven by salient contextual factors. Different mental accounts vary in accessibility over time, leading consumers with the same

exogenous constraints to perceive varying degrees of apparent constraints (Morewedge, Holtzman, and Epley 2009).

Opportunity Cost Consideration

I define opportunity cost consideration as considering alternative uses for one's resources when deciding whether to spend resources on a focal option. Opportunity cost consideration could be parsed more finely into cases in which additional uses are considered but do not compete for resources, and those in which additional uses are considered and do compete for resources. I focus on the coarser definition without distinguishing the two cases, but discuss the distinction in the discussion. I expect the case in which alternative resource uses are generated but do not conflict is a limited set.

Chronic Constraint

A consumer who consistently faces resource constraints from one moment to the next faces chronic constraint.

Propensity to Plan

Propensity to plan, as defined by Lynch et al. (2010), reflects individual differences in “a) frequency of forming planning goals, b) frequency and depth of thinking through means of implementing subgoals, c) use of activities and props to serve as reminders and to help see the big picture and constraints, and d) personal preference to plan.” (109).

Proposed Links

Resource Constraints Increase Opportunity Cost Consideration

Consumers may be approximated as cognitive misers who use only as much information as necessary (Simon 1955; Wyer and Srull 1986). When consumers recruit inputs to evaluate a single alternative, they rely on a metacognitive sense of sufficiency to terminate processing: they continue to process additional information, possibly recruiting new inputs, until a given level of confidence (sense of sufficiency) is reached (Chaiken et al. 1989; Cohen and Reed 2006; Lynch et al. 1988). As Chaiken et al. note, “what is deemed sufficient in one situation may be considered insufficient (or more than sufficient) in another setting” (221). The effects of making poor expenditure decisions weigh more heavily under constraint than under plenty, so resource constraints increase the motivation to make good expenditure decisions. Under constraint, the effects of poor decisions are more conceivable (e.g., it is easier to imagine running out of money), immediate (e.g., one might run out of money tomorrow rather than next month), identifiable (e.g., it is easier to concretely identify what one might have to give up), and valuable (e.g., one might have to give up food rather than a concert ticket). By increasing the motivation to make good expenditure decisions, constraints increase the sufficiency threshold, necessitating more information to ensure a given level of confidence that a particular option is a good use of resources.

Supporting this proposition, consideration set size within a given category increases as the expected benefit of adding an option to one’s consideration set increases

(Hauser and Wernerfelt 1990; Roberts and Lattin 1991). Individuals tend not to consider information beyond that which is explicitly available (Legrenzi et al. 1993), but they are more likely to consider outside information when it is relevant, whether or not it is explicit (Cherubini, Mazzocco, and Rumiati 2003; Del Missier, Ferrante, and Constantini 2007). These findings indicate that opportunity costs are not neglected, but rather are considered to the extent that they are needed as part of the decision. This analysis leads to my first hypothesis:

H1: Resource constraints increase consideration of opportunity costs.

Some research provides more direct evidence for this effect. Thought protocols taken in a dynamic resource allocation task showed that people construed the task one decision at a time without regard for future allocations, effectively ignoring their opportunity costs (Ball et al. 1998). An important exception was that participants were more likely to construe the decision as an allocation across days at the end of the task when they had fewer resources remaining. Indeed, such behavior can sometimes lead to overweighting opportunity costs. When given a single free coupon, consumers are more likely to hold onto it too long because they wait for the best opportunity to use it (Shu 2008, 2011; see also Shu and Gneezy 2010).

An important moderator of this effect is the ease with which these opportunity costs are retrieved from memory. Opportunity costs are often absent from the immediate stimulus environment and thus must be generated or retrieved from memory. Inputs from memory are likely to be used to the extent that they are both diagnostic and accessible

(Feldman and Lynch 1988; Johnson, Haubl, and Keinan 2008). Because generation and retrieval from memory are self-limiting processes, the number of alternatives that feasibly could be considered is limited in practice (Alba and Chattopadhyay 1985, 1986; Hutchinson, Raman, and Mantrala 1994; Lynch and Srull 1982; Nickerson 1984; Roediger 1978). I discuss the role of accessibility (as driven by the resource in use) more fully in Essay 2. It is sufficient to note here that the value of consideration alone is not enough for opportunity cost consideration if alternative resource uses are sufficiently inaccessible.

Chronic Constraint Magnifies the Effect of Temporary Resource Constraints

I hypothesize that consumers facing chronic constraints are more sensitive to differences in resource constraints than those not facing chronic constraints. Any given difference in resource constraints represents a larger percentage of one's normal available resources for consumers facing chronic constraint compared to those not facing chronic constraint. Across a wide variety of contexts, people are more sensitive to a given absolute difference when it represents a greater relative difference (Dehaene 2003; Grewal and Marmorstein 1994; Tversky and Kahneman 1981; Zaubermaier et al. 2009). Just as low-income households price-search more and have better memory for prices than high-income households (e.g., Beatty and Smith 1987; Gabor and Granger 1979; Stigler 1961), I propose that their consideration of opportunity costs is more sensitive to differences in available resources. This leads to my second hypothesis:

H2: Consumers who are more chronically constrained are more sensitive to differences in temporary resource constraints than consumers who are less chronically constrained.

Propensity to Plan Moderates the Effect of Resource Constraints

How does consideration vary with chronic propensity to plan? I propose that individuals with high propensities to plan consider opportunity costs at lower levels of constraint than individuals with low propensities to plan. Propensity to plan reflects differences in frequency of forming plans, depth of thinking through subgoals, use of environmental aids, and preference to plan (Lynch et al. 2010). Relative to consumers with low propensities to plan, consumers with high propensities to plan are more likely to dedicate their resources for use on planned future expenditures than are consumers with low propensities to plan: they form plans more frequently, have higher FICO scores (an important determinant of the cost of credit; Lynch et al. 2010), and accumulate greater wealth for retirement (Ameriks, Caplin, and Leahy 2003).

There are two reasons why planners may be more likely to consider their opportunity costs than non-planners. I do not empirically disentangle these two mechanisms, but discuss distinct implications in the discussion section. First, just like other concepts in memory, opportunity costs may be only situationally accessible for some individuals but chronically accessible for others (Bargh et al. 1986; Higgins, King, and Mavin 1982; Johar, Moreau, and Schwarz 2003; Markus 1977). Consumers with chronically accessible plans for the use of their money are likely to incorporate planned

purchases into current decisions, much as listing ways one might spend \$20 increases consideration of those ways as opportunity costs (Frederick et al. 2009). Propensity to plan reflects chronic differences in planning, suggesting that chronic planners are more likely than chronic non-planners to consider opportunity costs (i.e., incorporate future resource uses into current decisions) when they are not constrained; when they are constrained, even non-planners will consider them. Second, for any given set of resources, consumers with high propensities to plan will have allocated more of their resources and will thus face greater perceived constraints than consumers with low propensities to plan. As a result, the sufficiency threshold for making a purchase increases with propensity to plan when facing moderate resource constraints.

H3a: Non-planners are less likely than planners to consider opportunity cost when they do not face immediate resource constraints, but non-planners are as likely as planners to consider opportunity costs when they do face immediate resource constraints.

H3b: Resource constraints increase opportunity cost consideration for non-planners, but resource constraints do not affect opportunity cost consideration for planners.

Model Implications

Constraints Vary Over Time

Constraint is not a static construct. Constraint increases as resources are spent and decreases as they are accumulated. Even if not consciously calculating available

resources, consumers are sensitive to such dynamics (e.g., Stille, Inman, and Wakefield 2010). Expenses are more salient at the end of budgetary periods than at the beginning (Soster 2010), and food consumption declines over the month for individuals receiving monthly food stamps (Shapiro 2005). Consider a consumer living paycheck to paycheck. At the beginning of a pay period, she faces few constraints and so she does not consider additional alternatives when deciding on a focal purchase. Towards the end of a pay period, however, her paycheck is nearly exhausted, she faces serious constraints, and so she does consider additional alternatives when deciding on a focal purchase. At the beginning of a pay period, consumers consider focal options in isolation, whereas at the end of a pay period, they consider focal options in comparison to their opportunity costs.

These dynamics within a given pay cycle imply corresponding differences across different pay cycles. The end of a long pay cycle is much like the entirety of a short pay cycle. Consumers operating with monthly budgets are less constrained on average than consumers operating with weekly budgets and are therefore less likely to consider their opportunity costs. Supporting this, consumers with accessible monthly budgets spend more than consumers with accessible weekly budgets (Morewedge et al. 2007).

The Effect of Constraints Is Highly Non-Linear

How does opportunity cost consideration vary with objective resource constraints? Consideration likely increases at an increasing rate as resources dwindle. I briefly noted four mechanisms by which constraints may increase the sufficiency threshold: conceivability, immediacy, identifiability, and value. Each of these

mechanisms is highly non-linear (they increase at an increasing rate as resources decrease), suggesting that the relationship between constraint and consideration is also highly non-linear. First, the probability of conceiving of opportunity costs decreases sharply as resources become more available. There is a limit on the number of resource uses that can be considered, generated, or retrieved (e.g., Hauser and Wernerfelt 1990; Roberts and Lattin 1991; Shugan 1980; Lynch and Srull 1982; Nickerson 1984; Roediger 1978). Once the cost of those alternatives has been covered, the likelihood of conceiving of opportunity costs is largely insensitive to the pool of available resources. Second, because of present-biased preferences, the difference between incurring an opportunity cost tomorrow and incurring it today is much larger than the difference between incurring an opportunity cost 31 days from now and incurring it 30 days from now (Frederick, Loewenstein, and O'Donoghue 2002; Loewenstein and Elster 1992). Third, the identifiability of an opportunity cost drops sharply as constraint decreases. For example, the probability that any given target alternative, chosen at random, is an opportunity cost drops by 17% as one moves from two to three equally priced alternatives ($1/2 - 1/3$) but by only 1.7% as one moves from 20 to 30 equally priced alternatives ($1/20 - 1/30$). Fourth, if the strength of preference between options decreases as preference decreases, the impact of constraint on the marginal and average utilities of considered resource uses increases with constraint. The combined effect of each factor is that the effect of resource constraints increases as constraints increase, suggesting that the effect of constraint is not simply a linear one.

Values of Alternatives Influence Focal Decisions

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

H4: Opportunity cost consideration increases sensitivity to the value of outside options.

Recognition of Tradeoffs

Sometimes a given set of alternatives necessitates making difficult tradeoffs among different benefits, but sometimes it does not. Investors must accept some level of risk to receive a given level of reward, but the degree to which they must sacrifice safety in order to receive a greater reward varies across different sets of options. Sometimes consumers may be more sensitive to tradeoff difficulty (e.g., more likely to recognize that it is or is not possible to choose compromises between high risk, high reward options and low risk, low reward options), and sometimes they may be less sensitive (e.g., less likely

to recognize that it is or is not possible to choose compromises between high risk, high reward options and low risk, low reward options). If a consumer does not consider her alternative resource uses, she has no opportunity to consider tradeoffs among her alternatives. Consumers who consider their opportunity costs will be more aware of and sensitive to tradeoffs in the environment than those who neglect their opportunity costs. This observation, coupled with H1, suggests that:

H5: Resource constraints increase sensitivity to tradeoffs.

Table 1 summarizes the hypotheses above and specifies in which study each hypothesis is tested.

Table 1: Summary of Essay 1 hypotheses and tests.

Hypothesis	Study
H1 Resource constraints lead to opportunity cost consideration.	1, 2, 3A, 3B, 3C, 4
H2 Consumers who are more chronically constrained are more sensitive to differences in temporary resource constraints than consumers who are less chronically constrained.	3B, 3C
H3a Non-planners are less likely than planners to consider opportunity cost when they do not face immediate resource constraints, but non-planners are as likely as planners to consider opportunity costs when they do face immediate resource constraints.	2, 3C, 4
H3b Resource constraints increase opportunity cost consideration for non-planners, but resource constraints do not affect opportunity cost consideration for planners.	2, 3C, 4
H4 Opportunity cost consideration increases sensitivity to the value of outside options.	1, 3A, 3C
H5 Resource constraints increase sensitivity to tradeoffs.	4

Overview of Studies

In Study 1, I test the extent to which consumers incorporate future purchase opportunities into their current purchase decisions as a function of constraint (operationalized through differences in pay cycle) and how constraint varies over time; I also provide evidence that opportunity cost consideration increases sensitivity to those outside options. In Study 2, I consider the role of propensity to plan, replicating the effect of constraint in a different sample using a different operationalization of opportunity cost consideration. In Studies 3A, 3B, and 3C, I consider spontaneous consideration of opportunity costs as a function of constraint and its interactions with chronic constraint and propensity to plan. In Study 4, I consider one consequence of opportunity cost consideration, greater sensitivity to the structure of options in the environment, as a function of constraint and propensity to plan.

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 (H4). The paradigm in this study captures the essence of everyday consumer choices: consumers encounter a sequence of products that are individually affordable but collectively unaffordable, requiring them to make tradeoffs across products over time. Constraint is operationalized by manipulating pay cycle (weekly vs. monthly), holding total income constant. Those paid monthly and weekly have identical global constraints, but face different real and perceived momentary

constraints. In line with previous work on opportunity cost consideration (Cherubini et al. 2003; Del Missier et al. 2007; Legrenzi et al. 1993), I assess opportunity cost consideration as information search about other ways one could spend resources.

Method

Participants and Design

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

Budget Allocation task, these purchases were used as a measure of full information preferences; these allocations did not vary by condition.

Materials and Procedure

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

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

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

Variables

All computations and analyses are based on affordable trials (i.e., trials on which the price did not exceed the balance). *Budget Frame* is the constraint manipulation (Weekly vs. Monthly). *Consideration* of opportunity costs is assessed as the proportion of future opportunities examined. *Average Constraint* (a proxy for perceived constraint) was calculated as $(1 / \text{balance})$ averaged over the first 19 days; no opportunity costs could be considered on the last day. *Budget Task Choice* is the binary purchase decision during the Budget Allocation task. *Product Appeal* is the proportion of all participants choosing a given product in the Budget Allocation task when all products were simultaneously available. *Opportunity Cost Appeal* on any given trial is the average Product Appeal of the next three products for that respondent. *Allocation Quality* is the number of dollars spent during the Daily Purchase task on products that were also purchased in the Budget Allocation task (i.e., the number of products purchased in both tasks, each weighted by price); this variable is based on all trials.

Results

Consideration

In support of H1, participants with weekly budgets looked ahead more frequently ($M = .26, SD = .19$) than did participants with monthly budgets ($M = .18, SD = .14; t(83) = 2.20, p = .03$). This provides direct evidence that constraint increases opportunity cost consideration.

Mediation of Consideration by Average Constraint

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

Consideration over Time

If constraint drives opportunity cost consideration and constraint varies over time, opportunity cost consideration should vary over time too. In the last week, participants with monthly budgets faced similar constraints as participants with weekly budgets and so should similarly have considered their opportunity costs. Consideration per week was

analyzed using a mixed ANOVA with Week (1, 2, 3, 4) as a within-subject measure and Budget Frame (Weekly, Monthly) as a between-subject measure. Data from the preceding week were used to fill in missing data for participants from the Monthly condition who had no affordable trials in weeks 3 (1 participant) or 4 (7 participants). On these trials, the products were unaffordable so the participants had no choices and thus no opportunity costs to consider. Note that this makes the test more conservative: I predict Consideration in the Monthly condition will increase more than Consideration in the Weekly condition, but using preceding weeks to fill missing data for the Monthly condition reduces the change in the Monthly condition without affecting the Weekly condition.

Week and Budget Frame interacted to affect Consideration ($F(3, 249) = 2.71, p < .05$). In the first three weeks, participants with weekly budgets were more likely to consider opportunity costs ($M_1 = .35, SD_1 = .28, M_2 = .27, SD_2 = .26, M_3 = .24, SD_3 = .23$) than participants with monthly budgets ($M_1 = .25, SD_1 = .23, M_2 = .13, SD_2 = .12, M_3 = .15, SD_3 = .18; F(1, 198) = 13.66, p < .01$), and this effect did not vary across Week ($F(2, 249) = .48, ns$). In the fourth and final week, participants with monthly budgets ($M_4 = .23, SD_4 = .30$) considered their opportunity costs just as much as those with weekly budgets ($M_4 = .23, SD_4 = .21; F(1, 198) = .01, ns$). Excluding week 1 (a period during which consideration was elevated across both groups due to exploratory behavior), the change from weeks 2 and 3 (which did not differ; $F(1, 249) = .96, ns$) to week 4 was greater for monthly than weekly participants ($F(1, 249) = 6.46, p < .01$). Consideration

increased among participants with monthly budgets ($F(1, 249) = 7.75, p < .01$); there was no change among those with weekly budgets ($F(1, 249) = .64, ns$). See figure 1.

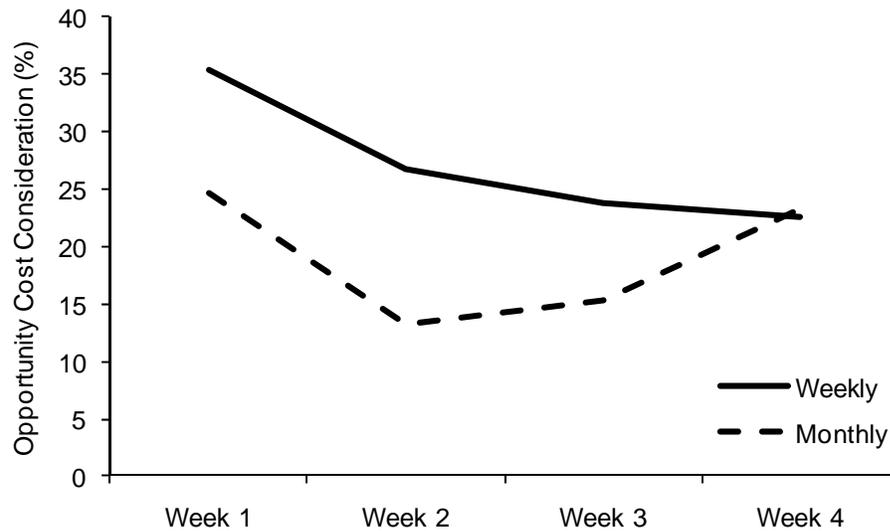


Figure 1: Study 1 opportunity cost consideration as a function of budget frame and week.

Mediation of Consideration per Week by Average Constraint per Week

Does the effect of Budget Frame on the change in Average Constraint from weeks 2 and 3 to week 4 mediate the effect of Budget Frame on the change 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 – (Week 2 Average Constraint + Week 3 Average Constraint)) represents the difference in constraint between week 4 and weeks 2 and 3.

DiffConsider was greater for Monthly participants ($M = .18, SD = .53$) than Weekly participants ($M = -.05, SD = .40; B = -.23; F(1, 83) = 5.11, p = .03$), representing increasing consideration over time for Monthly participants but consistent consideration over time for Weekly participants. DiffConstraint was also greater for Monthly participants ($M = .044, SD = .050$) than Weekly participants ($M = -.008, SD = .026; B = -.052; F(1, 83) = 36.26, p < .01$), representing increasing constraint over time for Monthly participants but consistent constraint over time for Weekly participants.

DiffConstraint was analyzed as a mediator of the effect of Budget Frame on DiffConsider using Preacher and Hayes' (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 (H4). Using general estimating equations (PROC GENMOD in SAS 9.2) with a binomial distribution and logit link function, individual decisions to buy on affordable trials were analyzed as a function of Focal Appeal (Product Appeal of the focal option), Budget Task Choice, Consideration on that trial (proportion of options considered on that trial), Opportunity Cost Appeal (average Product Appeal of opportunity costs on that trial), and the Consideration x Opportunity Cost Appeal interaction. Unsurprisingly, 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.

Of greater interest, Consideration and Opportunity Cost Appeal interacted to affect purchase likelihood ($B = -4.47, z = -2.49, p = .01$), so spotlight analysis was used to consider simple effects of each factor at high and low levels of the other (Cohen et al. 2002; Fitzsimons 2008; Irwin and McClelland 2001). Unsurprisingly, when no options were considered, unobserved Opportunity Cost Appeal of the next three options was unassociated with likelihood of purchase ($B = -.35, z = -.49, ns$). When all three options were considered, Opportunity Cost Appeal was negatively associated with likelihood of purchase ($B = -4.83, z = -2.81, p < .01$). When upcoming opportunity costs were the three most appealing options of the 20, Consideration was marginally negatively associated with likelihood of purchase ($B = -1.08, z = -1.72, p = .09$). When upcoming opportunity

costs were the three least appealing options of the 20, Consideration was positively associated with likelihood of purchase ($B = 1.42, z = 3.12, p < .01$).

Allocation Quality

Opportunity Cost Consideration was positively associated with spending resources in line with full information preferences. There was no total effect of Budget Frame on Allocation Quality ($B = -0.92; t(83) = -0.29, ns$), but 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).

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 consumers paid monthly and those paid weekly is eliminated as consumers approach the end of their budgets because consumers paid monthly face increasing constraint. Individuals who consider and search for their opportunity costs are sensitive to the value of their future alternatives, and (obviously)

those who do not consider their opportunity costs cannot be sensitive to their value. Opportunity cost consideration leads to a lower likelihood of purchase when future alternatives are appealing, and interestingly, a higher likelihood of purchase when future alternatives are unappealing. Consideration leads to greater choice consistency with full information decisions.

Study 2: Pay Cycles and Planning

Study 1 demonstrated the effect of perceived constraint, operationalized by pay cycle, on opportunity cost consideration, operationalized by information search. Study 2 builds on these results in three ways. First, it uses a different operationalization of opportunity cost consideration. Second, it shows that these results hold when considering adult consumers facing differences in real pay cycle. Third, it demonstrates that greater propensity to plan is associated with greater opportunity cost consideration only among consumers not facing immediate constraints (H3a) and that greater constraint is associated with greater opportunity cost consideration only among consumers with low propensities to plan (H3b).

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.” Each item used a 1 (Strongly Disagree) to 6 (Strongly Agree) response scale. Consideration was assessed as the mean response across the three items ($\alpha = .85$).

To assess individual differences in propensity to plan, respondents reported their propensity to plan for the long-run use of money (1-2 years) using the six-item scale from Lynch et al. (2010; e.g., “I set financial goals for the next 1-2 years for what I want to achieve with my money.”) Each item used a 1 (Strongly Disagree) to 6 (Strongly Agree) response scale; Propensity to Plan was assessed as the mean response across the six items ($\alpha = .93$). This scale demonstrated discriminant validity from the opportunity cost consideration measure: the nine items yielded two factors; all own-loadings were greater than .80; all cross loadings were lower than .20; and the two measures were correlated at $r = .20$.

To assess constraint, respondents reported how often they are paid (Once per day, Once per week, Once every other week, Once per month, Less than once per month, Irregularly, Other, Prefer not to answer). Because this scale was ordinal, participants were

divided into short pay cycle (Once per day; Once per week; Once every other week) and long pay cycle (Monthly; Less than monthly; Irregularly) groups. Analyses focusing on biweekly and monthly pay cycles (the two most common responses) and using number of weeks between paydays among weekly, biweekly, and monthly pay cycles were generally consistent. 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 including pay cycle (i.e., did not respond “Other” or “Prefer not to answer”) and income (i.e., did not respond “Prefer not to answer”) are included in the analysis below ($N = 216$). Income was not related to pay cycle ($p > .4$), and all analyses are consistent when income is excluded.

Results

Consideration was regressed on standardized Income, Pay Cycle (Short = 1, Long = -1), standardized Propensity to Plan, and all interactions. The main effect of Income was significant ($B = -0.49$, $F(1, 208) = 36.72$, $p < .01$) such that Consideration decreased with Income; no interactions with Income were significant (p 's $> .5$). Main effects of Pay Cycle ($B = 0.17$, $F(1, 208) = 4.48$, $p < .05$) and Propensity to Plan ($B = 0.36$, $F(1, 208) = 18.19$, $p < .01$) were qualified by a significant interaction ($B = -.24$, $F(1, 208) = 7.86$, $p < .01$). In support of H3a, the association between planning and consideration was positive and significant for respondents with long pay cycles ($B = .60$, $F(1, 208) = 18.41$, $p < .01$), but it was trivial and non-significant for those with short pay cycles ($B = .12$, $F(1, 208) = 1.66$, $p = .20$).

To assess the effect of Pay Cycle for planners and non-planners (H3b), I used spotlight analysis to examine the effects of Pay Cycle at one standard deviation above and below the mean Propensity to Plan. Non-planners with short pay cycles reported considering opportunity costs more than those with long pay cycles ($B = .41, F(1, 208) = 12.18, p < .01$). Planners with short pay cycles reported considering opportunity costs as much as those with long pay cycles ($B = -.06, F(1, 208) = 0.31, ns$). See figure 2.

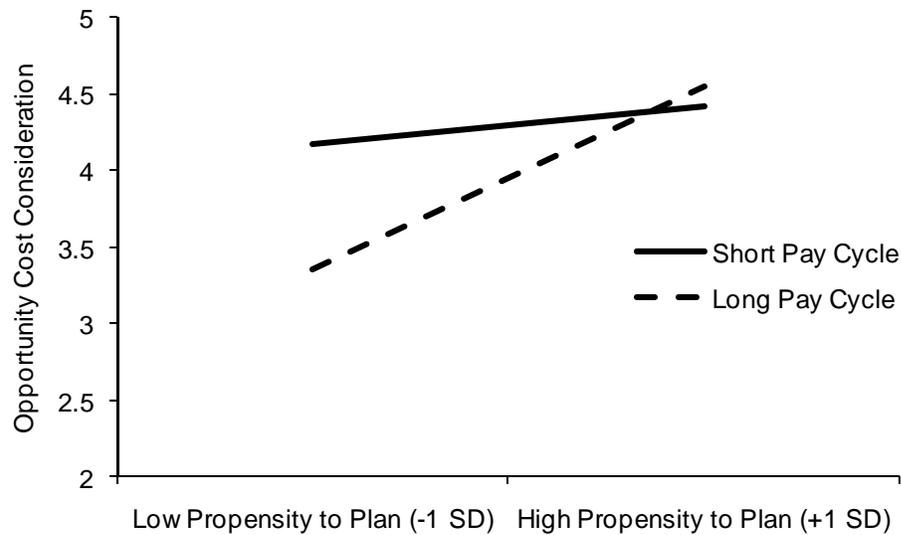


Figure 2: Study 2 opportunity cost consideration as a function of pay cycle and propensity to plan.

These results replicate the primary results from Study 1 and extend them to demonstrate the role of dispositional planning. As in Study 1, respondents with long pay cycles considered opportunity costs less than those with short pay cycles. Furthermore, this effect was exacerbated for non-planners but eliminated for planners. Although those with lower incomes (and thus greater constraint) considered opportunity costs more than

those with higher incomes, this did not interact with pay cycle or planning, providing no additional support for H2, H3a, or H3b. I consider this issue in the discussion section.

Study 3A: Spontaneous Consideration of Opportunity Costs

Frederick et al. (2009) propose that merely reminding consumers that opportunity costs exist might lead consumers to consider them. Though the paradigms used in Studies 1 and 2 had many benefits, they conceivably could have cued participants to consider opportunity costs when they may not have otherwise. In Studies 3A, 3B, and 3C, 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 in Study 3C and show that planning increases consideration among consumers not facing immediate constraints (H3a) and the effect of constraint on consideration is most pronounced among non-planners (H3b). Studies 3B and 3C also examine the moderating role of chronic constraint (H2).

Method

Undergraduate students ($N = 124$) participated in this study for credit towards fulfillment of a research requirement. All participants were presented with one of two versions of the scenario below:

“Imagine that you are spending all day in Charlotte interviewing for summer internships. One interview session is scheduled from 9:00 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 their choices, participants described how they made their decisions:

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

Two independent coders, blind to hypotheses and condition, coded these responses according to whether participants considered using their money for something else instead of breakfast. Coders agreed on 94% of codes; discrepancies were reconciled by the author.

Lunch and dinner were the opportunity costs most likely to be considered, so nine weeks later, participants responded to a question designed to measure the actual value of foregoing a lunch or dinner: “How much do you typically enjoy each meal of the day (breakfast, lunch, dinner)?” on an unnumbered 7-point scale anchored by “Not at all” and “A great deal.” Opportunity cost value was taken as the average of lunch and dinner. Of the original 124 participants, 108 completed this measure of opportunity cost value.

Results

The primary dependent variable was whether or not participants referenced opportunity costs in their description of how they chose (Consideration). In support of H1, Constraint was a significant predictor ($\chi^2(1) = 18.41, p < .01$). Of 71 participants facing tight constraints, 45% referenced considering opportunity costs, whereas of 53 participants facing loose constraints, only 9% referenced considering opportunity costs.

An important question is whether participants merely claimed to have considered their opportunity costs or actually did consider them. I expected that: 1) participants who reported considering opportunity costs actually did consider opportunity costs, and 2) participants who considered their opportunity costs were more sensitive to the value of those opportunity costs than participants who did not consider their opportunity costs (H4). More than two months after the initial measurement, 108 of the original 124 participants reported how much they valued their implied opportunity costs (calculated as the average of enjoyment of lunch and dinner). Amount spent on breakfast (in dollars) was regressed on Consideration (Yes = 1, No = -1), standardized Opportunity Cost Value

(i.e., average enjoyment of lunch and dinner), and their interaction. Participants who considered their opportunity costs spent less than those who did not consider their opportunity costs ($B = -0.48$, $F(1, 104) = 9.01$, $p < .01$). There was no main effect of opportunity cost value ($B = -.17$, $F(1, 104) = 0.81$, $p = .37$), but these effects were qualified by a significant interaction ($B = -0.40$, $F(1, 104) = 4.71$, $p = .03$). This interaction revealed that spending on breakfast marginally decreased as opportunity cost value increased among participants who reported considering opportunity costs ($B = -0.57$, $F(1, 104) = 2.86$, $p = .09$) but non-significantly increased as opportunity cost value increased among participants who did not report considering opportunity costs ($B = 0.24$, $F(1, 104) = 2.31$, $p = .13$). Opportunity cost consideration reduced spending among participants with valuable opportunity costs (one standard deviation above the mean; $B = -0.88$, $F(1, 104) = 17.27$, $p < .01$) but had no effect among participants with less valuable opportunity costs (one standard deviation below the mean; $B = -0.07$, $F(1, 104) = 0.07$, $p = .79$). The results of this interaction are shown in figure 3.

Study 3B: Chronic Constraint

In Studies 1, 2, and 3A, I established the basic main effect: greater constraint leads to a higher likelihood of opportunity cost consideration. In Study 3B, I build on this finding in three important ways. First, I show that the effect of salient resource constraints on spontaneous opportunity cost consideration is moderated by chronic constraint, operationalized by self-reported income. Second, I consider resource constraints that are not real liquidity constraints. Third, I consider opportunity cost

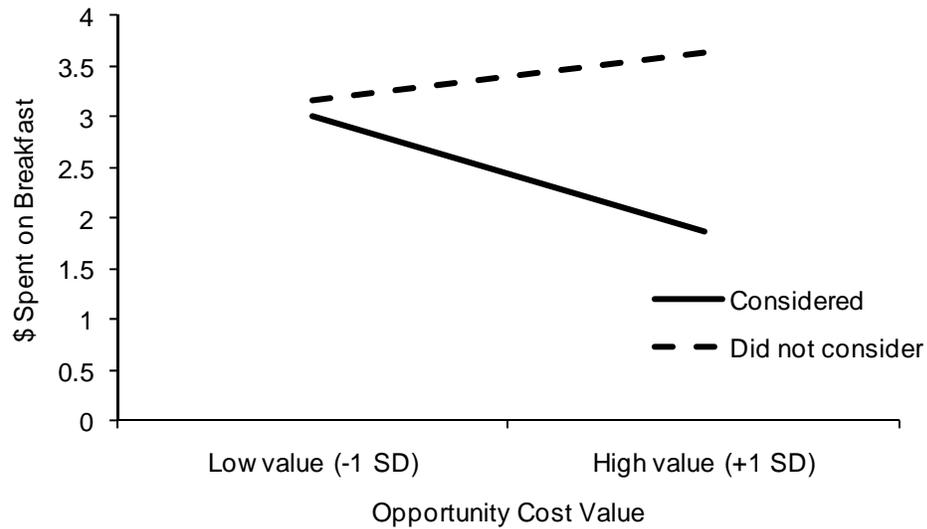


Figure 3: Study 3A breakfast expenditures as a function of consideration and opportunity cost value.

consideration in a scenario in which opportunity costs are less strongly suggested. In Study 3A, the scenario provided a meaningful context like that in which many decisions occur. Nonetheless, Study 3B tests a stronger version in which the context may be less salient.

Method

Two-hundred ninety participants (44% male; median income = \$50,000) completed this study online. Participants were assigned to one of four conditions in a 2 (Constraint: Constrained, Unconstrained) x 2 (Salience of Opportunity Costs: High, Low) design. The scenario text was based on Frederick et al.’s (2009) Study 1 and read:

“Imagine that you have been saving some extra money on the side to make some purchases; so far you've put away [\$20 / \$70]. On your most recent visit to the video store you come across a special sale on a new video. This video is one with your favorite actor or actress, and your favorite type of

movie (such as a comedy, drama, thriller, etc.). This particular video that you are considering is one you have been thinking about buying a long time. It is available at a special sale price of \$14.99.

What would you do in this situation? Please select one of the options below.”

Constraint was manipulated by noting a mental budget of savings of \$20 (constrained) or \$70 (unconstrained). As in Frederick et al. (2009), opportunity cost salience was varied by altering the description of the no-purchase option. In all conditions, the “Buy” option was phrased “Buy this entertaining video.” In the low salience condition, the “No Buy” option was phrased “Not buy this entertaining video” whereas in the high salience condition, the “No Buy” option was phrased “Keep the \$14.99 for other purchases.” This factor was included to replicate Frederick et al.’s (2009) design but was not of theoretical interest. At the beginning of the subject experience, before an unrelated study, participants reported their income. Income was assessed on a 7-point scale: Under \$15,000; \$15,000 to under \$35,000; \$35,000 to under \$50,000; \$50,000 to under \$75,000; \$75,000 to \$100,000; More than \$100,000; or Prefer not to answer.

As in Study 3A, after making their purchase decisions, participants described how they decided whether or not to buy the video. The same two coders from Study 3A, blind to hypotheses and condition, coded these participants’ descriptions using the same guidelines as in Study 3A. Four participants had written responses that could not be coded and were thus excluded from all analyses. Coders agreed on 87% of codes; discrepancies were resolved by the author.

Results

Participants with codeable responses and who reported an income range (i.e. gave a response other than “prefer not to answer”) were included in all analyses ($N = 267$). Again, I analyzed Consideration as a function of Constraint (\$20 = 1, \$70 = -1), Saliency (High = 1, Low = -1), Income (standardized), and all interactions using a logistic regression. No terms involving Saliency approached significance (all p 's > .35). Neither the main effect of Constraint ($B = 0.17$, Wald $\chi^2(1) = 1.65$, $p = .20$) nor the main effect of Income ($B = -0.07$, Wald $\chi^2(1) = 0.31$, $p = .58$) was a significant predictor of opportunity cost consideration, but their interaction was ($B = -0.31$, Wald $\chi^2(1) = 5.07$, $p = .02$). In support of H2 and as shown in figure 4, constraint led to opportunity cost consideration for low-income individuals (one standard deviation below the mean, or approximately \$25,000; $B = 0.47$, Wald $\chi^2(1) = 6.23$, $p < .02$), but not for high-income individuals (one standard deviation above the mean, or approximately \$85,000; $B = -0.13$, Wald $\chi^2(1) = 0.49$, $p = .49$). Income was negatively associated with consideration for individuals facing a \$20 mental budget ($B = -0.38$, Wald $\chi^2(1) = 4.05$, $p = .04$), but not for those facing an \$80 mental budget ($B = 0.23$, Wald $\chi^2(1) = 1.40$, $p = .24$).

Study 3C: Propensity to Plan

In Study 3B, I replicated the results of Study 3A for low-income participants but not for high-income participants. Moreover, these results were robust to a different scenario with constraints that were not real liquidity constraints and that was less suggestive of opportunity costs than the context-rich scenario used in Study 3A. In Study

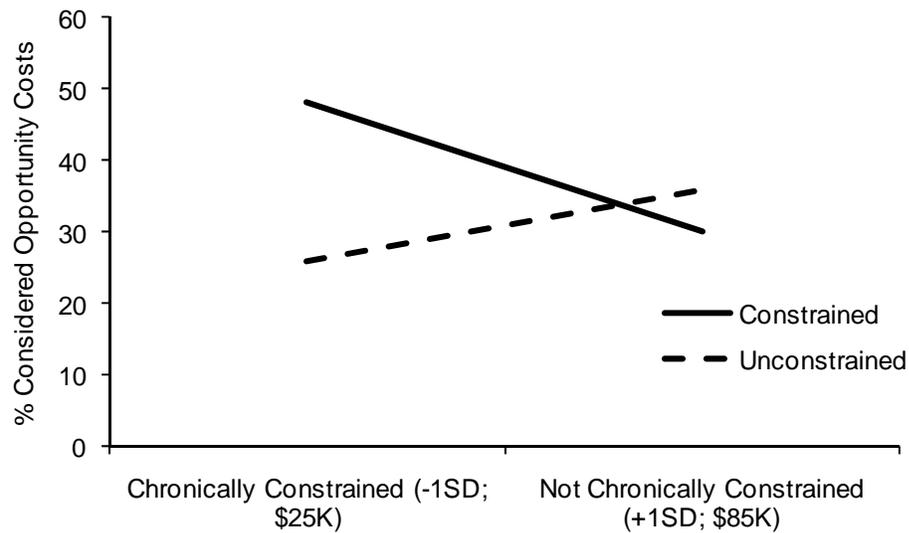


Figure 4: Study 3B opportunity cost consideration as a function of temporary constraint and chronic constraint.

3C, I again consider the moderating role of chronic constraints, operationalized in a different manner, as well as the moderating role of propensity to plan.

Method

Undergraduate students ($N = 194$) participated in this study for credit towards a research requirement. All participants were presented with the scenario from Study 1 in either the constrained (\$10) or unconstrained (\$40) version and then described how they made their decisions. Some participants faced a very slightly modified wording, but as this did not lead to any significant main or interactive effects (all p 's $> .3$), it is dropped from analysis. After describing how they made their decisions, participants specified what their opportunity costs were ("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 how much they valued them (“All else equal, would you be better off using that money for breakfast or “[opportunity cost]”?”) on an unnumbered 7-point scale anchored with “Breakfast” on the low end, “About equal” in the middle, and “[opportunity cost]” on the high end. The same two coders from Studies 3A and 3B, blind to hypotheses and condition, coded these participants’ descriptions according to the guidelines used in Studies 3A and 3B. Coders agreed on 94% of codes; discrepancies were reconciled by the author.

In this study, I consider two important moderators: chronic constraints (measured at the end of the initial session) and propensity to plan (measured 8 weeks later). Chronic constraint was operationalized as the four-item Financial Resources subscale of Rowland, Dodder, and Nickols (1985) Perceived Resource Adequacy scale; higher numbers indicated less constraint. Propensity to plan was measured as the short-run money adaptation of Lynch et al.’s (2010) propensity to plan scale. Of the 194 participants, 163 participants had complete data and are included in the analyses reported below.

Results

Consideration was analyzed as a function of Constraint (\$10 = 1, \$40 = -1), standardized Propensity to Plan, standardized Chronic Constraint, and all interactions using a logistic regression. As expected, this analysis revealed a main effect of Constraint ($B = 0.65$, Wald $\chi^2(1) = 4.77$, $p = .03$) that was qualified by an interaction with Chronic Constraint ($B = -0.59$, Wald $\chi^2(1) = 4.81$, $p = .03$) and an interaction with Propensity to

Plan ($B = -0.60$, Wald $\chi^2(1) = 4.96$, $p = .03$). No other effects were significant or marginally significant (all p 's $> .10$).

In support of H1, individuals facing constraint were more likely to consider their opportunity costs than those not facing constraint. In support of H2 and H3B, the chronically constrained (one standard deviation below the mean; $B = 1.24$, Wald $\chi^2(1) = 7.17$, $p < .01$) and individuals with low propensities to plan (one standard deviation below the mean; $B = 1.24$, Wald $\chi^2(1) = 6.80$, $p < .01$) were more likely to consider opportunity costs when constrained than when unconstrained, but neither those not facing chronic constraints (one standard deviation above the mean; $B = 0.05$, Wald $\chi^2(1) = .03$, $p = .87$) nor those with high propensities to plan (one standard deviation above the mean; $B = 0.05$, Wald $\chi^2(1) = .03$, $p = .87$) were more likely to consider opportunity costs when constrained than when unconstrained.

Unlike in Study 3B, chronic constraint was associated with *less* consideration when individuals were not situationally constrained ($B = 0.75$, Wald $\chi^2(1) = 3.22$, $p = .07$) but not when they were ($B = -0.43$, Wald $\chi^2(1) = 1.61$, $p = .20$). In support of H3A, propensity to plan was not associated with consideration for consumers facing temporary constraints ($B = -0.28$, Wald $\chi^2(1) = 0.84$, $p = .36$), but it was positively associated with consideration for consumers not facing temporary constraints ($B = 0.91$, Wald $\chi^2(1) = 4.30$, $p < .04$). These two-way interactions are plotted in figures 5 (chronic constraint) and 6 (propensity to plan), in each case holding the third factor at its sample mean.

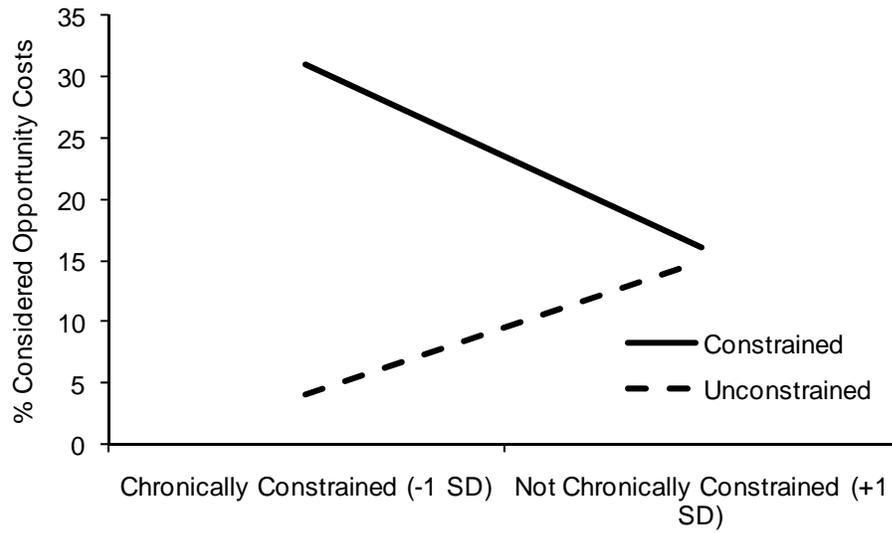


Figure 5: Study 3C opportunity cost consideration as a function of temporary constraint and chronic constraint, holding propensity to plan constant at its mean.

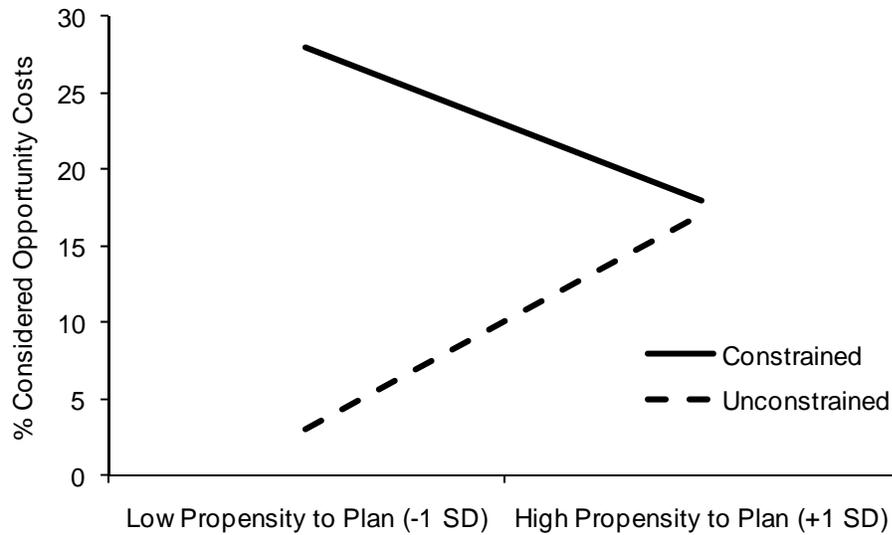


Figure 6: Study 3C opportunity cost consideration as a function of temporary constraint and propensity to plan, holding chronic constraint constant at its mean.

As in Study 3A, I also considered whether reported opportunity cost consideration was reflected in differential spending as a function of opportunity cost value. Amount spent on breakfast (in dollars) was regressed on Consideration (Yes = 1, No = -1), Relative Value of the opportunity cost (standardized), and their interaction. One participant had missing data on relative value and was excluded. There were significant main effects of both Consideration ($B = -0.52$, $F(1, 158) = 11.35$, $p < .01$) and Relative Value ($B = -0.44$, $F(1, 158) = 9.03$, $p < .01$) such that those who considered opportunity costs spent less than those who did not and those who highly valued their opportunity costs spent less than those who did not. The interaction of these two factors was marginally significant ($B = -0.23$, $F(1, 158) = 2.59$, $p < .11$). As shown in figure 7, opportunity cost value was associated with less spending among those who reported considering their opportunity costs ($B = -0.67$, $F(1, 158) = 6.74$, $p = .01$) but not among those who did not report considering their opportunity costs ($B = -0.20$, $F(1, 158) = 2.31$, $p = .13$). Also as in Study 3A, consideration was associated with less spending when opportunity costs were valuable (one standard deviation above the mean; $B = -0.76$, $F(1, 158) = 14.41$, $p < .01$), but not when opportunity costs were less valuable (one standard deviation below the mean; $B = -0.29$, $F(1, 158) = 1.65$, $p = .20$). This pattern of results indicates that self-reported consideration is an indication of actual opportunity cost consideration, not merely a reported rationale constructed after the decision has already been made.

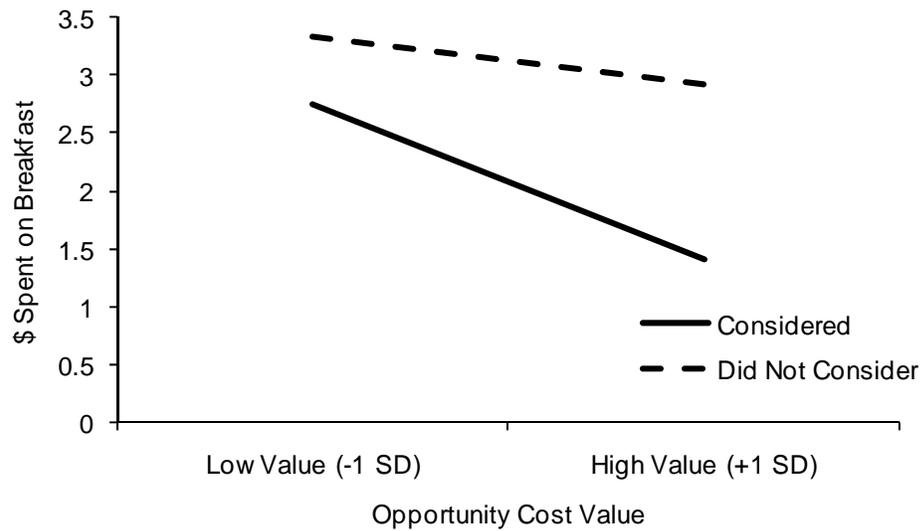


Figure 7: Study 3C breakfast expenditures as a function of consideration and opportunity cost value.

Study 4: Perceived Tradeoffs

In Studies 1, 2, 3A, 3B, and 3C, I considered explicit resource constraints and explicit consideration of opportunity costs. In Study 4, I consider the increased sensitivity to tradeoffs in one’s environment that is implied by opportunity cost consideration. As in Studies 1 and 2, I compare individuals faced with one large frame against those faced with a series of smaller frames, although both face the same actual resource budgets. In this study, there are no real differences in constraint; merely the frame was manipulated.

Method

Undergraduate students ($N = 153$) participated in Study 4 for credit towards fulfillment of a research requirement. Participants read a cover story describing a trip to Las Vegas including a weekend at a casino with a friend. Participants were given 12

vouchers that could be exchanged for hypothetical lottery tickets; each ticket cost 1 voucher. Over the course of four simulated days, participants were sequentially presented with 40 different opportunities to spend their 12 vouchers. Participants were assigned to one of four conditions in a 2 (Tradeoff: High Tradeoffs, Low Tradeoffs) x 2 (Constraint: Constrained, Unconstrained) design. In the High Tradeoffs condition, participants faced lotteries that generally paid off well to them but poorly to their friends; relatively poorly to both; or poorly to them but well to their friends. In other words, they had to trade off their own potential winnings against their friends' potential winnings. In the Low Tradeoffs condition, participants faced lotteries that generally paid off well to them but poorly to their friends; relatively well to both; or poorly to them but well to their friends. In other words, they could avoid high tradeoffs by choosing compromise options, as specified in Wang et al. (2010).

Constraint was operationalized by framing the available resources differently, holding constant the number of available resources. After viewing a sequence of 40 sample lotteries that provided preliminary information about attribute tradeoffs, unconstrained participants read:

“Now that you have an idea of the type of lotteries the casino offers, imagine that you have been given 12 vouchers that may be used to purchase lottery tickets. Each voucher may be exchanged for one lottery ticket. Tickets may only be purchased using vouchers, and you cannot buy additional tickets.”

Constrained participants read:

“Now that you have an idea of the type of lotteries the casino offers, imagine that you have been given only 12 vouchers that may be used to

purchase lottery tickets. In other words, you only have enough vouchers to use 3 per day. Each voucher may be exchanged for one lottery ticket. Tickets may only be purchased using vouchers, and you cannot buy additional tickets.”

In the constrained condition, the scarcity of vouchers was emphasized, and the set of vouchers was broken down into smaller units. This is analogous to the Weekly condition in Study 1. Note that constraint was not imposed until after participants learned the distribution of possible outcomes. Thus, differential encoding of opportunity costs during the learning phase was not possible. Prior to this study, participants completed the short-run use of money adaptation of Lynch et al’s (2010) propensity to plan scale.

The dependent variable of interest is the degree to which consumers were sensitive to tradeoffs in the environment around them (Perceived Tradeoffs). This was measured as the average of two items measured on 7-point scales from Strongly disagree to Strongly agree: “I had to choose between winning money for myself or winning money for my friend” and “In order for me to win more money, my friend had to win less money.” These items were highly correlated ($r = .52$). I initially included a third item, “It would be difficult for both my friend and me to come away feeling like winners.” This item was much more weakly correlated with the first two items (r ’s = .24 and .34, respectively) and adding this item to the set reduced Cronbach’s alpha from .68 to .63. This item appears to have measured absolute winnings across the participant and the participant’s friend, whereas the first two items were measuring the construct of interest, relative winnings for the participant versus the participant’s friend. Results were

generally consistent when this item was included; the sole simple effect difference is noted below.

Results

Because constrained individuals are more likely to consider their opportunity costs, they should be more sensitive to tradeoffs than unconstrained individuals (H5). Moreover, planners act as though they are constrained even when they are less constrained, because they plan out their future use of resources.

Perceived Tradeoffs was analyzed as a function of Tradeoff (manipulated high = 1, low = -1), Constraint (manipulated high = 1, low = -1), Propensity to Plan (measured, continuous, and standardized), and all interactions.

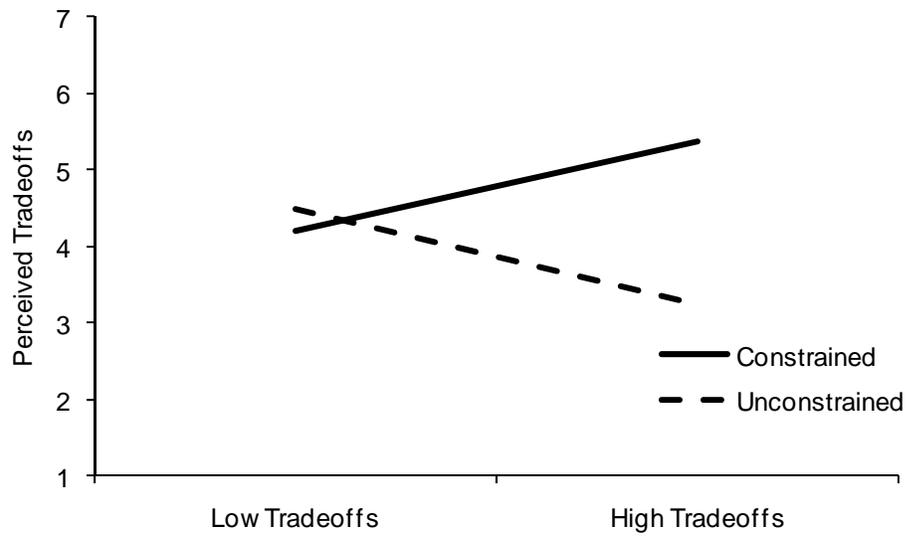
The three-way ANOVA revealed main effects of Tradeoff ($F(1, 145) = 4.82, p = .03$) and Constraint ($F(1, 145) = 7.09, p < .01$) that were qualified by a Tradeoff x Constraint interaction ($F(1, 145) = 7.38, p < .01$). In support of H5, unconstrained participants were completely insensitive to tradeoffs ($M_{High} = 4.41, SD_{High} = 1.68; M_{Low} = 4.39, SD_{Low} = 1.50$), whereas constrained participants were highly sensitive to tradeoffs ($M_{High} = 5.55, SD_{High} = 1.03; M_{Low} = 4.33, SD_{Low} = 1.58$).

This analysis also revealed a significant main effect of propensity to plan ($B = 0.30, F(1, 145) = 6.12, p = .01$) and an interaction of propensity to plan with tradeoff ($B = 0.28, F(1, 145) = 5.30, p = .02$), but no interaction of propensity to plan with constraint ($B = -0.15, F(1, 145) = 1.47, p = .23$). Most importantly, however, all of these effects were qualified by a three-way interaction of Tradeoff, Constraint, and Propensity to Plan

($B = -0.28$, $F(1, 145) = 5.34$, $p = .02$). This interaction remained significant when the bad third item was included in the analysis. To consider this three-way interaction, I conducted a spotlight analysis and considered simple effects one standard deviation above and below the mean planning score (e.g., Cohen et al. 2003; Irwin and McClelland 2001; Fitzsimons, 2008).

In support of H3B, participants with low propensities to plan (one standard deviation below the mean) showed a significant simple Tradeoff x Constraint interaction ($B = 0.60$, $F(1,145) = 12.00$, $p < .01$). Participants with high propensities to plan (one standard deviation above the mean) did not show a significant simple Tradeoff x Constraint interaction ($B = 0.04$, $F(1,145) = 0.05$, $p = .82$), but did show a significant simple main effect of Tradeoff ($B = 0.54$, $F(1,145) = 10.64$, $p < .01$) such that they perceived higher tradeoffs in the high tradeoff environment than in the low tradeoff environment. These effects are shown in figure 8. Among participants with low propensities to plan, constrained participants perceived greater tradeoffs in the high tradeoff environment ($B = 0.57$, $F(1,145) = 5.64$, $p = .02$), whereas unconstrained participants unexpectedly perceived greater tradeoffs in the low tradeoff environment ($B = -0.62$, $F(1,145) = 6.37$, $p = .01$). When the bad third item was included, the simple effect for constrained participants with low propensity to plan was reduced to a non-significant trend ($B = 0.35$, $F(1,145) = 2.41$, $p = .12$).

A. Low propensity to plan (-1 SD)



B. High propensity to plan (+1 SD)

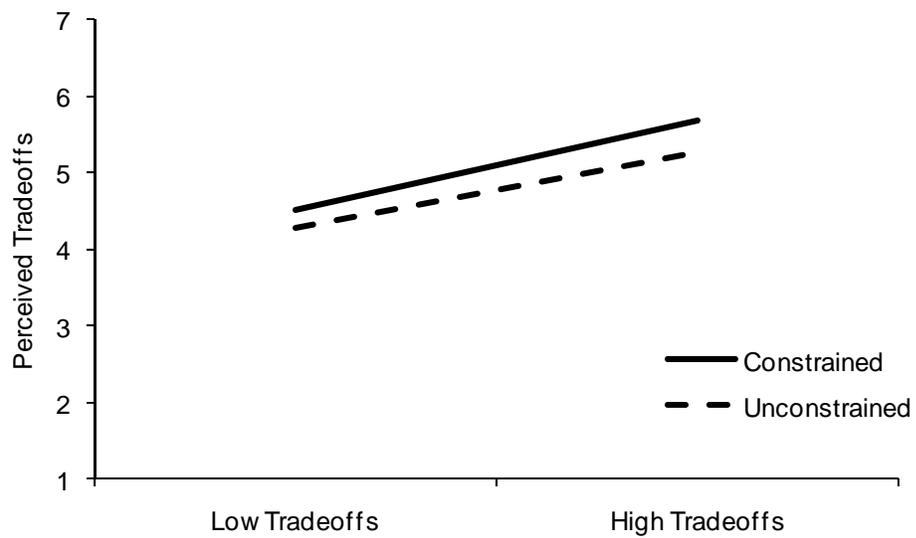


Figure 8: Study 4 sensitivity to tradeoffs in the environment as a function of constraint, tradeoffs, and propensity to plan.

General Discussion

In six studies, I showed that opportunity cost consideration increases with resource constraint and that this effect is moderated by chronic constraints and propensity to plan. Propensity to plan (operationalized in Studies 2, 3C, and 4 using the money versions of the scale by Lynch et al. 2010) leads individuals to consider opportunity costs at higher resource levels. Moreover, because they are more likely to consider their opportunity costs, individuals facing resource constraints are more sensitive to their environments, as reflected by perceiving differences in tradeoffs (Study 4). In Studies 3B, and 4, I show that real liquidity constraints are not necessary to instantiate perceived constraint. In Study 3B, an apparent mental budget was able to instantiate a feeling of constraint, and in Study 4, dividing one large budget into several smaller budgets was able to instantiate the same feeling. Chronic constraint led to greater consideration in Study 2 but greater sensitivity to salient resource constraints in Studies 3B and 3C. I now consider several extensions of the proposed model and implications of these findings.

Extensions of the Proposed Model

Distinguishing Alternative Resource Uses from Opportunity Costs

In defining opportunity cost consideration, I suggested that it might be possible to distinguish considering alternative resource uses that are not opportunity costs from considering alternative resources uses that are opportunity costs. For example, if a consumer with \$20 is considering the purchase of a \$10 lunch and considers a \$4 coffee as another possible purchase, she has considered an alternative resource use, though not

technically an opportunity cost because she is considering \$14 worth of purchases with \$20 worth of resources, so nothing from that set must be foregone. To the extent that constraint induces opportunity cost consideration, considering alternative resource uses leads to greater allocation of future resources, less slack, and therefore greater constraint, culminating in a positive feedback loop. This positive feedback loop, combined with the increasing effect of constraint as constraint increases, makes consideration of alternative resource uses without opportunity cost consideration a highly unstable state. Nonetheless, it is possible that individuals who generate alternative resource uses but not opportunity costs may actually be more likely to spend on a focal purchase because of the effort and failure to generate good reasons not to buy (Fernbach, Darlow, and Sloman 2011; Wänke, Bohner, and Jurkowitsch 1997).

Sufficiency Threshold to Consider an Additional Alternative

I proposed that resource constraints increase opportunity cost consideration by increasing the sufficiency threshold. Constraints increase the cost of making a poor decision, so they necessitate the use of more information to attain sufficient confidence in a decision. Though I demonstrated across a variety of operationalizations of constraint and opportunity cost consideration that perceived constraints do in fact increase opportunity cost consideration, I have not provided direct evidence for the mechanism of increasing the sufficiency threshold. As a result, this particular mechanism is open to dispute. Frederick et al. (2009) found that opportunity cost neglect persisted when choices were real, when involvement was experimentally enhanced by listing advantages

and disadvantages, and the effect of their manipulation was not affected by a cognitive load manipulation. This suggests that perhaps the role of resources is special: increasing importance or involvement in a manner that does not relate to the resources being spent may not increase generation of alternative uses for those resources. To test this, one could examine whether a cognitive load manipulation eliminates the effect of constraint using a paradigm like in Studies 1, 3A, 3B, 3C, or 4. I predict that it would eliminate the effect of resource constraint, indicating that the sufficiency threshold was not increased. I also proposed four plausible reasons why constraint would increase the sufficiency threshold: it increases the conceivability, immediacy, identifiability, and value of opportunity costs. One or more of these factors may be the primary drivers; understanding which one(s) enables more detailed predictions regarding the role of constraint.

Defining Constraint and Formalizing the Model

The present work has considered relative extremes with respect to the level of constraint, but it is clear that the perception of constraint must be context-dependent. \$10,000 is a meaningful constraint when buying a car but not when buying a hamburger, suggesting that price of the focal option is an important determinant of perceived constraint. Determining the drivers of perceived constraint will help to more precisely specify when opportunity costs will be considered. A plausible starting point is quantifying constraint as the ratio of the price of the focal goods (or the price of the class of focal goods) divided by the resources available.

Furthermore, the effect of chronic constraint varied from study to study and is in need of further study. In Study 2, individuals with lower incomes were more likely to consider opportunity costs whether they were paid weekly or monthly. In Study 3B, individuals with lower incomes were more likely to consider opportunity costs, but only when constrained. In Study 3C, individuals reporting chronic constraints were actually less likely to consider opportunity costs when they were not immediately constrained. In Studies 3B and 3C, the effect of situational constraint was greater for those facing greater chronic constraint, but this was not the case in Study 2. Understanding more precisely the situational impact of chronic constraint may help to resolve these conflicting results. I proposed that those facing chronic constraints are more sensitive to temporary variations in constraint. If they perceive temporary constraint as more constraining and temporary lack of constraint as less constraining than individuals not chronically constrained, this could help reconcile the findings from Study 3B and 3C, though not Study 2. Clearly defining how chronic and contextual objective constraints interact to impact perceived constraints (which in turn impacts opportunity cost consideration) will help to resolve these remaining questions.

Once the impact of situational and chronic constraints on perceived constraint is more precisely defined, the present qualitative behavioral model may be extended to a formalized mathematical form. A useful starting point might be to consider the probability of choosing the focal option as a function of the value of the focal option value and the outside option value. Given the evidence in the current essay, the weight on

the value of the outside option should be an increasing function of constraint (itself operationalized as a non-linear function that increases at an increasing rate as available resources decrease). Formalizing the model in this way will provide insight into when opportunity cost consideration will lead to a lower likelihood of purchase and when it will lead to a greater likelihood of purchase.

Propensity to Plan's Dual Roles

I briefly proposed two distinct but non-exclusive mechanisms by which propensity to plan might lead to increased consideration of opportunity costs: accessibility and constraint. First, propensity to plan may directly increase consideration because alternative resource uses are chronically accessible in memory. This implies that even when participants are totally unconstrained, they are more likely to consider opportunity costs because alternative resource uses chronically influence most of their decisions. Second, propensity to plan may indirectly increase consideration because planners may feel greater constraint than non-planners. That is, a non-planner with \$1,000 may feel unconstrained, whereas a planner with \$1,000 has already mentally allocated some of that to future purchases, and may feel as though they only have \$100 that is available to be spent.

These two effects may coexist, but they are distinct and in certain circumstances make distinct predictions. In particular, the constraint process implies a non-linear interaction. More precisely, the threshold for perceived constraint increases with propensity to plan: at very high levels of constraint, consumers with high and low

propensities to plan both consider their opportunity costs; at more modest levels of constraint, consumers with high propensities to plan consider their opportunity costs but those with low propensities to plan do not; and at low levels of constraint, neither consumers with high propensities to plan nor those with low propensities to plan consider their opportunity costs. Using the example above, \$900 worth of planned expenses may be the difference between constraint and no constraint when \$1,000 are available, but not when \$10,000 are available. The present data do not speak to these distinctions, but they pose an important question for future research.

Beyond Money

I have discussed and tested the effects of constraint on opportunity cost consideration with respect to money, but it has concrete implications for how we consider opportunity costs of other resources as well. Frederick et al. (2009) suggest that we may neglect opportunity costs of time to a greater extent than we neglect opportunity costs of money because the value of time may be more flexibly interpreted. Legrenzi et al. (1993) found in their studies that individuals were completely oblivious to opportunity costs of their time when given an opportunity with no context. To the extent that individuals feel more constrained with respect to their use of time than their use of money (Lynch et al. 2010; Zauberger and Lynch 2005), they may actually be more likely to consider their opportunity costs for uses of their time.

Money is also fungible in a way that time is not: the first dollar in one's wallet is perfectly exchangeable for the second, but the first hour after lunch is not perfectly

exchangeable for the second. Fungibility makes it more difficult to pin down opportunity costs. That is, opportunity costs for “2 o’clock” are more concrete than opportunity costs for “\$2” because 2 o’clock is not exchangeable with 3 o’clock but \$2 is exchangeable with any other \$2. Reducing the fungibility of time or money (e.g., via mental accounting or earmarking), may increase the consideration of opportunity costs.

Moreover, these findings may extend not just to the use of resources, be they time or money, but to the consumption of goods as well. Household stockpiling is an important consumer behavior, and it has implications for how consumers use their goods and consider their usage decisions, both across consumers with different propensities to stockpile and within consumers who stockpile over time (e.g., Ailawadi and Neslin 1998; Folkes, Martin, and Gupta 1993; Wansink and Deshpande 1994). A consumer deciding whether to drink a beer when there are 24 beers available merely asks himself “do I want a beer now?” whereas a consumer deciding whether to drink a beer when there are 2 beers available asks himself “do I want a beer now or later?” This integrates with Cheema and Soman’s (2008) work on the effects of partitions: not only are consumers more likely to stop and reevaluate a decision upon reaching a partition, but I propose they are also more likely to stop and reevaluate a decision as they approach a partition.

Implications

Memory for Opportunity Costs

Opportunity costs typically must be retrieved or generated from memory because they are absent from the stimulus environment. Because retrieval enhances memory

(Slamecka and Graf 1986; Jacoby 1978; Roediger and Karpicke 2006), decision inputs that are retrieved during a choice are more likely to be remembered and available for use in subsequent choices (Lichtenstein and Srull 1987; Lynch et al. 1988). This paradigm has typically been used to help reconcile apparent discrepancies between memory for decision inputs and use of those inputs in memory-based choice. However, the same principle should apply to the set of remembered alternatives: alternatives may or may not be retrieved from memory for a given choice. To the extent alternatives are retrieved or generated from memory at the time of one choice, they are more likely to be remembered and accessible for a later choice. As opportunity cost consideration increases with constraint, memory for the identity of opportunity costs should also increase with constraint.

While overall memory for the identity of opportunity costs will increase with constraint, memory for information about those opportunity costs may be selectively affected by constraint. Chosen options are remembered in a more positive light than unchosen options: more positive attributes and fewer negative attributes are remembered about chosen than unchosen options (Mather, Shafir, and Johnson 2000, 2003). If a focal option is chosen and an outside option is considered but rejected (as is the case under constraint), that outside option will be remembered as having fewer positive attributes and more negative attributes than it would be if it were neglected (as would be the case under no constraint). If a focal option is rejected in favor of an outside option that is considered and implicitly chosen, that outside option will be remembered as having more

positive attributes and fewer negative attributes than it would be if it were neglected.

Such selective memory for outside options should increase with constraint.

Opportunity Cost Categorization

Each time consumers generate opportunity costs, they are generating instances of ad-hoc categories (Barsalou 1983). Ad-hoc categories are categories that may be constructed for particular contexts but are not well-established in memory. For example, “things to take from one’s home during a fire” is not a category most consumers have spent a great deal of time considering, yet they agree that some category members (e.g., children; important documents) are better examples of the category than others (e.g., TV, food; Barsalou 1985). Weber and Johnson (2006) propose that it is difficult to consider the ad-hoc category of “things to buy with \$400”. However, Barsalou (1983) notes that “[s]ome ad hoc categories may be processed so frequently that their category concepts, concept-to-instance associations, and instance-to-concept associations all become well established in memory” (224); a disaster preparedness expert may have “things to take from one’s home during a fire” stored in memory as a well-established concept.

Consumers practiced at opportunity cost consideration and retrieval, such as those facing chronic constraint, may be more likely to have a well-established category of “things to buy with \$5” and be able to retrieve instances of that established category of opportunity costs rather than trying to generate instances of an ad-hoc category of opportunity costs.

Preference Stability

Preferences are often constructed rather than retrieved (e.g., Ariely, Loewenstein, and Prelec 2003, 2006; Lynch, Chakravarti, and Mitra 1991; Payne, Bettman, and Schkade 1999; Simmons, Bickart, and Lynch 1993; see Lichtenstein and Slovic, 2006, for a review). Making choices among options, as consumers do when they consider their opportunity costs, necessitates rejecting outside options in a way that deciding to accept or reject a target option does not, thereby establishing preferences among options that may not exist otherwise (e.g., Carmon, Wertenbroch, and Zeelenberg 2003). As a result, preferences should be more readily accessible following opportunity cost consideration and possibly more stable in the long-run if they are rehearsed frequently. This suggests that planners and individuals facing constraint are more likely to have established and stable preferences than non-planners who do not face immediate constraints.

Constraint and Depletion

Making choices depletes self-regulatory resources. Vohs et al. (2008) found that consumers who made choices among alternatives (compared to those who merely evaluated alternatives) exhibited lower self-control on subsequent tasks, indicating that choices depleted self-regulatory resources that were then unavailable for use on the subsequent tasks. Wang et al. (2010) find that difficult tradeoffs drive depletion resulting from choice. Neither choices in general, nor merely difficult choices (e.g., choices among similar options, or choices among disfluent options), deplete self-control resources unless they necessitate making difficult tradeoffs. To the extent that individuals facing constraint

consider their opportunity costs, they consider tradeoffs that individuals not facing constraint do not. In high-tradeoff environments, purchasing the same items for the same prices may lead to greater depletion for constrained consumers than for unconstrained consumers merely because they consider their tradeoffs. Depleted self-control can subsequently lead to greater spending (Baumeister 2002; Vohs and Faber 2007), further reducing available resources and leading to a downward spiral of constraint and depletion. It is possible that over time, repeated consideration of tradeoffs strengthens the “self-control muscle” (Muraven and Baumeister 2000), leading to heightened capacity for self-control in the long run but depleted resources in the short run.

Linking Money and Consumption

When consumers consider their opportunity costs, they are more likely to link money to its end use rather than view it as an end itself. Linking money to its end use implies that it will be treated more like its intended use and less like fungible money (Shafir and Thaler 2006; Zelizer 1997). Such earmarks may be affectively tagged (Levav and McGraw 2009) or lead to loss aversion for money (Novemsky and Kahneman 2005). This suggests that when they consider specific opportunity costs, consumers may be more likely to assess money in terms of its real value and how much consumption it can purchase rather than its nominal value and how many dollars there are. Consequently, considering specific opportunity costs may make consumers less susceptible to the money illusion (Fisher 1928; Shafir et al. 1997), medium maximization (Hsee et al. 2003;

van Osselaer et al. 2004), and various currency effects (Raghubir and Srivastava 2002; Wertenbroch et al. 2007).

Cross-Category Competition

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

Consumer Welfare

Consumers who consider their opportunity costs are likely to be better off financially than those who do not (Ameriks et al. 2003; Larrick et al. 1993; Lynch et al. 2010), so consumers who use short budget frames, have high propensities to plan, or use self-imposed constraints are more likely to consider their tradeoffs and may be objectively better off than those who use long budget frames, have low propensities to plan, or do not use self-imposed constraints. Yet although constraint increases

opportunity cost consideration, it may not necessarily increase optimal opportunity cost consideration. A consumer using tight mental budgets may make better within-account tradeoffs, but may make worse between-account tradeoffs because the decisions have been artificially partitioned (Heath and Soll 1996; Thaler 1985, 1999). A consumer using weekly (vs. monthly) budgets may make better within-week tradeoffs but worse between-week tradeoffs. Much of the mental accounting literature has focused on these latter decrements to performance rather than the former benefits.

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

A complete understanding of the welfare implications of opportunity cost consideration requires understanding not only when consumers consider opportunity costs but also whether they consider the right ones, whether considering alternatives

makes them feel more or less happy in the short run, and whether happy neglecters face unpleasant downstream changes in consumption. Policy makers might then ask: what are interventions that one could implement to improve objective or subjective decision outcomes? The present research gives some initial directions, conditional on considering the “right” opportunity costs. If consumers ignore their opportunity costs too much, breaking budgets down into smaller periods, purchase categories, or both will increase the extent to which tradeoffs against foregone purchases are included in present decisions. If consumers fixate on opportunity costs too much, combining budgets into longer periods and broader categories may reduce consideration, perhaps enabling more satisfactory consumption—at least in the short run.

Conclusion

Opportunity costs are fundamental to consumer behavior and parts of everyday life. I present a model of when and why consumers consider their opportunity costs, indicating why they may often neglect them, common conditions under which they may be considered, and implications for sensitivity to their environment. This model has important implications for marketing practice (e.g., understanding consideration set composition; manipulating constraint salience to alter the consideration set; understanding changes in cross-elasticities), public policy (e.g., understanding the implications of opportunity cost consideration among the chronically constrained; understanding the impact of opportunity cost consideration on retirement savings), and consumer welfare (e.g., choosing better purchase allocations by considering opportunity

costs; depleting self-control resources by making difficult tradeoffs, leading to a cycle of constraint). These practical implications underscore the importance of understanding the theoretical underpinnings of opportunity cost consideration.

Essay 2: Resource Use Accessibility Drives Opportunity Cost Consideration

In Essay 1, I discussed the impact of resource constraints on opportunity cost consideration. Constraints qualitatively change the nature of expenditure decisions by driving consumers to incorporate alternative resource uses into their focal decisions. In Essay 2, I consider a distinct, theoretically and substantively important cause of opportunity cost consideration: resource use accessibility. In particular, I focus on accessibility that results from the type of resource in use.

Consumers use a variety of different resources to make purchases. They use airline miles to purchase flights and seat upgrades; they use food stamps to purchase foods and beverages; they use gift cards to purchase movie and concert tickets; and they use money to purchase all of the above. Even money, which has few economically imposed constraints on its usage, is used as if it were imperfectly fungible. Dollars from different sources are used for different purposes (Fogel 2009; Shefrin and Thaler 1988; Thaler 1980, 1999; Zelizer 1997) and dollars in different mental budgets are used for different categories of purchases (Cheema and Soman 2006; Heath and Soll 1996).

In this essay I propose that the type of resource being spent influences which opportunity costs are considered, and whether any opportunity costs are considered at all, because certain types of resources make certain alternative resource uses more accessible in memory. First, more typical resource uses are made more accessible than less typical resource uses and are thus more likely to be considered as opportunity costs. Second,

resources with narrow usage constraints make resource uses more accessible than resources with broad usage constraints. Third, this leads to the counterintuitive finding that, compared to resources with unlimited resource uses, resources with limited resource uses can evoke greater opportunity cost consideration, even though they necessarily have less valuable opportunity costs.

Proposed Model

I propose that the type of resource being spent can increase the accessibility of particular alternative resource uses. As a result of their greater accessibility, these alternative resource uses are more likely to be considered as opportunity costs when making a focal purchase decision with limited use resources. I define each construct below before explaining the proposed links and six studies that test the proposed links.

Construct Definitions

Resource Use Accessibility

Resource use accessibility refers to the ease with which resource uses come to mind or can be retrieved from memory. Not all information that is available in memory is accessible at any given point in time (e.g., Feldman and Lynch 1988; Lynch and Srull 1982; Tulving and Pearlstone 1966). Feldman and Lynch (1988) consider several drivers of accessibility, the most relevant of which for the current model is the role of retrieval cues. A retrieval cue (e.g., a type of resource) that is highly associated with a target construct (e.g., a resource use) will lead to greater accessibility of that construct (e.g., Loftus 1973; Collins and Loftus 1975; Anderson 1983).

Resource Use Limitations

Resources that may be exchanged for fewer items or fewer types of items have more resource use limitations than those that may be exchanged for more items or more types of items. In other words, if one type of resource may be used to purchase any item from set A and a second type of resource may be used to purchase any item from set A' , where A' is a subset of A , the second type of resource has more resource use limitations than the first. Such limitations may broadly be separated into two types: inherent and imposed.

Inherent limitations are properties of a resource that limit its own uses. For example, a Starbucks gift card cannot be used to purchase a handsaw because handsaws are not sold at Starbucks coffee shops. Imposed limitations are properties of the user that limit uses of the resource. Consider an extreme example from Zelizer (1997): drug dealers are unwilling to donate drug money to the church because it is psychologically tainted. To take more mundane examples, gift money is typically restricted to be used on hedonic experiences or luxuries rather than everyday expenses such as bills or gasoline, where inheritance money is typically considered inappropriate to use on hedonic purchases and must instead be “mentally laundered” through use on utilitarian purchases (Belk and Wallendorf 1990; Fogel 2009; Henderson and Peterson 1992; Levav and McGraw 2009). In each of these examples, there is nothing inherent about drug money, gift money, or inheritance money that prevents it from being used in one way versus another; rather, it is a property imposed by the user. In this essay I focus on inherent

limitations: their greater consistency and predictability across individuals makes for stronger experimental manipulations. I predict that similar results should obtain given imposed limitations.

Note an important distinction between resource use limitations and inaccessibility: resource use limitations prevent certain resource uses if they are present in the stimulus environment; inaccessibility does not. Consider money that a college student inherits from a deceased family member. A spring break trip to Mexico may be an attractive expenditure and present in the stimulus environment, yet (imposed) resource use limitations on inheritance money prevent it from being used in that way. Conversely, a donation to a college fund for inner city youth may be an attractive expenditure and a permitted use of inheritance money, yet inaccessibility in memory may prevent it from being used in that way.

Opportunity Cost Consideration

As in Essay 1, opportunity cost consideration is the consideration of alternative uses for one's resources when deciding whether to spend resources on a focal option.

Resource Use Typicality

Resource use typicality refers to how good of an example a given resource use is of the category of all possible uses of that resource. Category membership is not an all-or-none property; rather, categories have graded structures. A robin is a more typical bird (it is "birdier") than is a penguin, a shirt is a more typical clothing expenditure than is a pair of gloves, and a coffee is a more typical use of a Starbucks' gift card than is a CD

(e.g., Barsalou 1985; Boush and Loken 1991; Heath and Soll 1996; Nedungadi and Hutchinson 1985; Rosch and Mervis 1975). Atypical category members are less likely to be posted to mental budgets (Heath and Soll 1996), and may be strategically posted to categories with more available slack (Cheema and Soman 2006).

Proposed Links

Resource Use Accessibility Leads to Opportunity Cost Consideration

In order for an alternative to be chosen, it must first be considered. Hauser (1978) finds that specifying which alternatives are considered accounts for 78% of the explainable variation in choice. Although consideration sets sometimes consist only of options present in one's environment, they often necessitate retrieving options from memory (Alba, Hutchinson, and Lynch 1993; Mitra and Lynch 1995; Nedungadi 1990). Information in memory can be and often is available without being accessible (Lynch and Srull 1982; Alba et al. 1993; Tulving and Pearlstone 1966), so increasing the accessibility of an alternative can increase its consideration without influencing liking or preference for that brand (Nedungadi 1990). Brand attitude strength can similarly influence choice through mere consideration resulting from accessibility, not just through choice evaluation (Posavac, Sanbonmatsu, and Fazio 1997; Priester et al. 2004). This previous work has largely been concerned with well-defined choices among alternatives within a particular 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. More

directly, Frederick et al. (2009) found that participants who listed various ways to spend \$20 in one study, and thereby increased the accessibility of alternative resource uses, were more likely to choose a cheaper option in a subsequent study. Increasing the accessibility of alternative resource uses apparently increased their consideration as opportunity costs.

Resource Use Typicality Increases Resource Use Accessibility

Activation of a category concept makes its typical instances more accessible than its atypical instances (e.g., Barsalou 1983, 1985, 1987; Hutchinson et al. 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, bat, or kumquat because robin is a particularly typical example of a bird (i.e., it is a very “birdy” bird) whereas ostrich, bat, and kumquat are an atypical instance, a typical non-instance, and an atypical non-instance, respectively. These principles apply to other sorts of constructs as well, so considering a mental account for clothing will make thoughts of shirts more accessible than thoughts of gloves and considering a Starbucks’ gift card will make thoughts of coffee more accessible than thoughts of CDs. Thus, considering a particular resource will make typical uses of that resource more accessible and more likely to be considered as opportunity costs than atypical uses.

H1: 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 Lead to Greater Resource Use Accessibility

Resource use limitations lead to greater resource use accessibility as a result of 1) fewer possible uses, and 2) specific categories of uses.

Because limited use resources are associated with fewer possible purchases, they are more likely to activate each of them. This is a direct implication of the fan effect: constructs in memory with more associations activate each association less strongly than do constructs in memory with fewer associations (Anderson 1974; Anderson and Reder 1999). A gift card that may only be used on two random items from Amazon.com will activate each of those items more strongly than a gift card that may be used on ten random items. Recent work on the cognitive connections among means and goals shows that although means prime their associated goals (Shah and Kruglanski 2003), means that may be used to advance many goals are considered less efficacious for each of them than are means that may be used to advance only a few goals (Zhang, Fishbach, and Kruglanski 2007). In many respects, money is the ultimate means, usable for many different goals. Imposing use limitations on a resource makes it usable on fewer goals, and thus more efficacious for each.

H2A: Resources associated with a smaller set of possible purchases activate their resource uses more than resources associated with a larger set of possible purchases.

Separate from the issue of association set size is the issue of category organization and the informativeness of that category (e.g., Anderson and Schooler 1991; Rosch

1973). Gift cards that are usable at a given store have their uses limited to the categories of products available at that store; these products are usually not random subsets but rather are aligned with natural product categories. Similarly, mental accounts are often organized around categories of purchases or sources of income and are types of categories themselves (Fogel 2009; Heath and Soll 1996; Henderson and Peterson 1992; Shefrin and Thaler 1988; Thaler 1980; Zelizer 1997). Any given use of a limited use resource is likely a more typical instance (i.e., a better example) of that category than it is of the broader category defined by an unlimited use resource (Boush and Loken 1991). That is, any given use of a Starbucks gift card is more typical of the category “things to buy with a \$20 Starbucks gift card” than “things to buy with \$20.” Narrow categories activate category instances more than broad categories do (Alba and Chattopadhyay 1985; Landauer and Meyer 1972; Meyvis and Janiszewski 2004). Resources that are associated with categories of purchases (particularly narrow categories) activate those purchases (particularly typical purchases) more than resources that are unassociated with categories of purchases. This typicality advantage gives a further boost to the accessibility of opportunity costs when resources are limited in use rather than unlimited in use.

H2B: Resources associated with a narrower category of possible purchases activate their resource uses more than resources associated with a broader category of possible purchases.

Combined with the evidence that resource use accessibility increases opportunity cost consideration, and that when opportunity costs are attractive, opportunity cost consideration decreases purchase, H2A and H2B lead to a surprising deduction. Given attractive opportunity costs, consumers may be less likely to spend limited use resources than unlimited use resources because limited use resources increase consideration more than unlimited use resources. Note that this is a counter-normative effect: A Starbucks coffee lover may be more likely to spend an unlimited use Visa gift card than a limited use Starbucks gift card even though the Visa gift card's best use must be at least as good as, if not better than, that of the Starbucks gift card!

H3: Restricting the uses of a resource can increase consideration of opportunity costs while (weakly) decreasing the value of opportunity costs.

Overview of Studies

Table 2 summarizes the hypotheses and specifies in which study each hypothesis is tested. In Studies 1 and 2, I consider the extent to which the accessibility of different resource uses, as driven by their typicality, impacts their consideration as opportunity costs (H1). In Studies 3A and 3B, I consider the effect of use limitations on resource use accessibility (H2a, H2b). In Study 3A, I manipulate the number of ways that a resource can be used (H2a) and in Study 3B, I measure the perceived specificity of different gift cards (H2b). In Studies 4A and 4B, I demonstrate that limited use resources can lead to greater consideration of opportunity costs than unlimited use resources (H3).

Table 2: Summary of Essay 2 hypotheses and tests.

Hypothesis	Study
H1 More typical uses of a resource are more likely to be considered as opportunity costs than less typical uses of a resource.	1, 2
H2a Resources associated with a smaller set of possible purchases activate their resource uses more than resources associated with a larger set of possible purchases.	3A
H2b Resources associated with narrower categories of possible purchases activate their resource uses more than resources associated with broader categories of possible purchases.	3B
H3 Restricting the uses of a resource can increase consideration of opportunity costs while (weakly) decreasing the value of opportunity costs.	4A, 4B

Study 1: Differences in Resource Use Typicality Drive Differences in Opportunity Cost Consideration

In Study 1, I consider how resource use accessibility, driven by resource use typicality, impacts opportunity cost consideration (H1). Such differences in category typicality 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), consideration of an opportunity cost will vary as a function of its accessibility.

Method

Participants

Undergraduate students ($N = 177$) participated in Study 1 for credit towards a class research requirement. Some of these participants also participated in Study 4 from Essay 1.

Design

Participants were assigned to one of two replicates, reflecting two possible target uses of a Starbucks gift card (a limited use resource): a tall caffe mocha (a typical use) or an apple fritter (an atypical use). The independent variables of interest were the value of the target purchase, the value of an accessible typical opportunity cost (a beverage from Starbucks), and the value of an inaccessible atypical opportunity cost (a food from Starbucks). The dependent variable was whether or not participants chose to make the target purchase.

Materials

All participants were asked to imagine that their parents mailed them a \$10 Starbucks gift card. They were asked to imagine 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 responded 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 each 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

Opportunity Cost Type

I expected that specifying an atypical target purchase (food) would make participants more likely to specify an opportunity cost from the same atypical category. However, the rates of spontaneously reporting foods as opportunity costs were low and indistinguishable across groups (Beverage target: 84% beverage, 11% food, 4% something else; Food target: 86% beverage, 10% food, 3% something else). Unlike Nedungadi (1990) who found that priming a minor brand in a minor category increased consideration of a major brand in that category, I found that specifying a target purchase from a minor category (food) did not increase consideration of an opportunity cost from that category. This result indicates that specification of an atypical target may not be enough to elicit consideration of atypical opportunity costs. Even among participants who later ranked their food opportunity cost as more enjoyable than their beverage

opportunity cost, 70% reported a beverage opportunity cost, providing additional evidence for its greater accessibility. I collapse across replicates for the results below.

Typicality Ratings

As expected, typicality ratings differed significantly across items. In particular, tall Caffè 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 were Apple Fritters ($M = 3.70$, $SD = 1.66$) and self-generated food opportunity costs ($M = 4.71$, $SD = 1.63$). Each pairwise comparison of a beverage against a food was significant at $p < .01$.

Purchase Decision

The main analysis consists of a logistic regression of the decision to purchase the target item on Target (Food vs. Beverage), Target Value (enjoyment of target purchase), Beverage Value (enjoyment of self-generated beverage opportunity cost), and Food Value (enjoyment of self-generated food opportunity cost). To the extent that beverages or foods are considered as opportunity costs, the greater their values, the less likely one should be to purchase the target option. To the extent that beverages or foods are neglected as opportunity costs, their values should be unrelated to the likelihood of purchasing the target option. If typicality increases accessibility of resource uses and accessibility of resource uses increases opportunity cost consideration, beverages will be more likely to be considered as opportunity costs than foods because beverages are more typical uses of Starbucks gift cards.

Individuals who valued the target purchase more were more likely to purchase it than were those who valued it less ($B = 0.98$, Wald $\chi^2(1) = 38.87$, $p < .01$). Participants faced with a beverage were more likely to purchase it than those faced with a food ($B = 1.02$, Wald $\chi^2(1) = 6.73$, $p < .01$). More important are the roles played by opportunity costs. The more individuals valued their beverage opportunity costs, the less likely they were to make the target purchase ($B = -0.66$, Wald $\chi^2(1) = 11.08$, $p < .01$), indicating that they considered beverages as opportunity costs. How much individuals valued their food opportunity costs, however, was not related to how likely they were to make the target purchase ($B = 0.03$, Wald $\chi^2(1) = 0.04$, ns), indicating that they neglected foods as opportunity costs.

An equivalent analysis was conducted to consider whether the effect of beverage opportunity cost value significantly differed from the effect of food opportunity cost value. This analysis consisted of a logistic regression of the decision to purchase the target item on Target, Target Value, Average Value ($.5 * \text{Beverage Value} + .5 * \text{Food Value}$), and Difference in Value ($\text{Beverage Value} - \text{Food Value}$). As this was an equivalent specification, the roles of Target and Target Value remained exactly the same. The more an individual valued her opportunity costs on average, the less likely she was to make the target purchase ($B = -0.63$, Wald $\chi^2(1) = 7.17$, $p < .01$). More importantly, the greater the difference in value, the less likely she was to make the target purchase ($B = -0.35$, Wald $\chi^2(1) = 5.50$, $p < .02$). Thus, in support of H4, I find that typical (beverage)

opportunity costs impacted the decision whereas atypical (food) opportunity costs did not, and that these effects differed from one another.

Role of Typicality

If typicality (and its effects on accessibility) mediate this differential effect of food and beverage opportunity costs, accounting for the difference in typicality will eliminate the differential effect of food and beverage opportunity costs. In other words, if beverages are considered as opportunity costs and foods are not because beverages are more typical uses of Starbucks gift cards than are foods, the effect should be eliminated for individuals for whom beverages are no more typical than foods. To test the role of typicality, I calculated Difference in Typicality 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 were foods. Interacting this term with Difference in Value reveals the extent to which the effect of Difference in Value is moderated by Difference in Typicality. By not mean-centering Difference in Typicality, the coefficient on Difference in Value may be interpreted as the simple effect of Difference in Value when beverages and foods are considered equally typical uses of a Starbucks gift card.

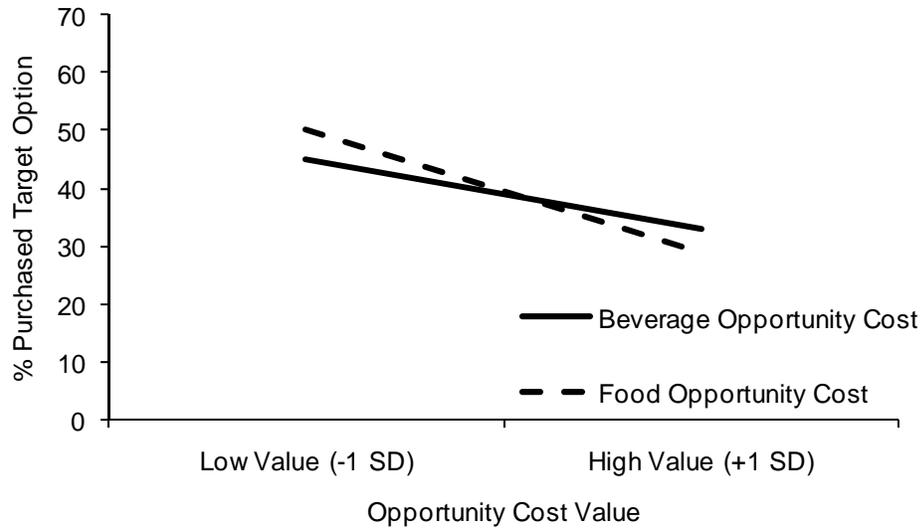
Replicating the previous analyses, there were significant main effects of Target ($B = 1.05$, Wald $\chi^2(1) = 6.77$, $p < .01$), Target Value ($B = 1.03$, Wald $\chi^2(1) = 39.07$, $p < .01$), and Average Value ($B = -0.64$, Wald $\chi^2(1) = 6.92$, $p < .01$). There was no simple effect of Difference in Typicality at the average Difference in Value ($B = 0.01$, Wald $\chi^2(1) < 0.01$,

ns). When there was no Difference in Typicality, there was no simple effect of Difference in Value ($B = 0.06$, Wald $\chi^2(1) = 0.06$, *ns*). The interaction between Difference in Value and Difference in Typicality was significant ($B = -0.15$, Wald $\chi^2(1) = 5.26$, $p = .02$). This combination of results may be interpreted as the following: When beverages and foods are equally typical, they are equally likely to be considered as opportunity costs. When one is more typical than the other, the more typical one is more likely to be considered as an opportunity cost than the less typical one. See figure 9 for a graphical representation of this result. Overall, this study provides support for the hypothesis that opportunity cost accessibility, driven by typicality, leads to opportunity cost consideration (H1). The economic value of considering an opportunity cost is not enough; opportunity costs must also be accessible in memory.

Study 2: Resource Use Typicality and Subcategory Accessibility

In Study 1, I considered the differential effects of: 1) the value of a resource use that is typical of the category of possible resource uses and therefore is made accessible by the resource, and 2) the value of a resource use that is not typical of the category of possible resource uses and therefore is not made accessible by the resource. In Study 2, I build on these results by experimentally manipulating the accessibility of more typical and less typical resource uses. If opportunity cost typicality plays the role proposed in Study 1, manipulating more typical uses to be accessible should have no effect because they are already accessible, whereas manipulating less typical uses to be accessible should increase their consideration as opportunity costs and thus sensitivity to their value.

A. Beverage and Food Opportunity Costs Equally Typical (Mean -0.6 SD)



B. Beverage Opportunity Cost More Typical Than Food Opportunity Cost (Mean $+1$ SD)

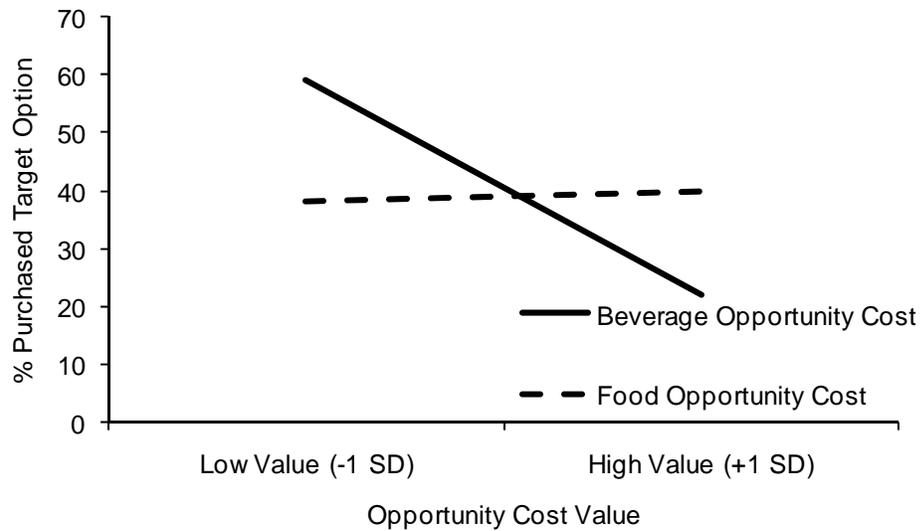


Figure 9: Study 1 purchase likelihood as a function of opportunity cost type, opportunity cost value, and opportunity cost typicality.

If those less typical uses are attractive, increasing their accessibility will decrease one's willingness to spend the resource, whereas if those less typical uses are unattractive, increasing their accessibility will not decrease, and may even increase, one's willingness to spend the resource.

Method

Participants

Undergraduate students ($N = 147$) participated in this study for credit towards a course research requirement.

Design

This study used a 3 (Accessibility: Books, Media, Control) x 2 (Category Preference: Books, Media) x 2 (Planning: Plans, No plans) between-subject design. Accessibility and Planning were manipulated; Category Preference was measured. The dependent variable was the number of different \$25 gift cards (out of 10) that were chosen over a \$25 Barnes & Noble gift card. Choosing more other gift cards was indicative of considering less valuable opportunity costs of using a Barnes & Noble gift card. This was formally equivalent to purchasing a different gift card using the Barnes & Noble gift card, but as this is logically impossible, choice was used instead.

The accessibility manipulation was designed to illustrate the differential effects of increasing the accessibility of more typical resource uses versus less typical resource uses compared to baseline accessibility. Barnes & Noble is known as a bookstore, so I predicted that books are more typical examples of the category and are made readily

accessible when considering a Barnes & Noble gift card. Experimentally increasing their (already high) accessibility should have little effect on their consideration as opportunity costs relative to the control condition. Barnes & Noble also sells music and movies but is not positioned as a music or movie store, so I predicted that media are less typical examples of the category and are not made readily accessible when considering a Barnes & Noble gift card. Experimentally increasing their (otherwise low) accessibility should increase their consideration as opportunity costs relative to the control condition.

The planning manipulation was designed to illustrate the effect of planning on opportunity cost consideration. I predicted that planning would reduce the effect of accessibility, such that the effect would be stronger among individuals who did not explicitly make plans for how they would use the gift card compared to those who did (after being prompted with: “If you were to receive a \$25 Barnes & Noble gift card, what would you use it to buy? Please be specific.”). There was no such effect, so although I include Planning as a factor in all analyses, I defer discussion of the role of planning to the discussion section.

Category Preference was measured as participants’ preference to use a \$25 Barnes & Noble gift card to buy books and textbooks or music and movies.

Materials and Procedure

Participants in the Books Accessible condition and Media Accessible condition were first told: “Among other things, Barnes & Noble sells [books and textbooks / music and movies]. What types of [books and textbooks / music and movies] would you be

interested in buying from Barnes & Noble? Please list a few examples below.”

Participants in the Control condition did not generate any examples. Whereas in Study 1 typicality defined opportunity cost accessibility and thus consideration, in Study 2, accessibility was manipulated directly by having participants list examples. In the control condition, typicality should still affect accessibility, thereby making books more accessible than media.

They were then asked to make choices among ten pairs of gift cards, one pair at a time. The first item in each pair was a \$25 Barnes & Noble gift card; the second was a \$25 gift card to some other retailer (Apple, Banana Republic, Buy.com, iTunes, J.Crew, Macy's, Nordstrom, Pizza Hut, Sears, Staples). The true opportunity cost of choosing the second gift card was whatever could have been purchased using a Barnes & Noble gift card. Although the choice was more explicit than in Study 1, the outside use of the target resource (Barnes & Noble gift card) remained implicit in Study 2. Rather than a dichotomous choice, the dependent variable of interest in Study 2 was the number of times the other gift card was chosen, analogous to purchase incidence in Study 1.

After making their choices, participants also reported willingness to pay for all 11 gift cards and subjective value of the Barnes & Noble gift card on a 1-7 scale. For the purposes of opportunity cost consideration I focus on the Choice results, but all results hold using a composite measure averaged across standardized choice, relative willingness to pay, and value dependent variables.

Afterwards, Category Preference was measured. Participants were prompted: “If you had a \$25 gift card to Barnes & Noble, on which category below would you be more likely to use it?” and given response options of “books and textbooks” and “music and movies”. Participants also reported their enjoyment of each category: “Suppose you made one \$25 purchase at Barnes & Noble from each category below. How much would you enjoy each purchase?” They responded with respect to “books and textbooks” and “music and movies” on a 1 (Not at all) to 7 (Very much) scale. Finally, participants reported the perceived typicality of each sub-category: “Some purchases are better examples than others of the types of things you could buy at a store. For example, a coffee is a better example than a CD of things you could buy at Starbucks. How good of an example is each type of purchase below of things you could buy at Barnes & Noble?” They responded with respect to “books and textbooks” and “music and movies” on a 1 (Not a good example at all) to 7 (A very good example) scale.

Results

Category Preference

A logistic regression of category preference on accessibility and planning showed that neither main effect nor the interaction affected category preferences (p 's > .7). This provides reassurance that category preference is exogenously determined and was independent of the experimental manipulations.

Typicality Results

As expected, books and textbooks ($M = 5.74$, $SD = 1.42$) were rated as significantly more typical of the category of things you could buy at Barnes & Noble than were music and movies ($M = 4.79$, $SD = 1.50$; $t(146) = 6.60$, $p < .01$). Moreover, 50% of the sample rated books as more typical, 41% rated books and media as equally typical, and only 10% rated media as more typical.

Choice Results

A 2 (Planning) x 3 (Accessibility) x 2 (Category Preference) ANOVA revealed a main effect of Category Preference ($F(1, 135) = 22.94$, $p < .01$) that was qualified by an Accessibility x Category Preference interaction ($F(2, 135) = 7.88$, $p < .01$). No other effects approached significance (all p 's $> .18$).

Just as in Study 1, opportunity cost accessibility mattered. First, consider the simple 2 x 2 interaction involving the books accessible and media accessible conditions. Participants were more likely to incorporate attractive (i.e., more preferred) opportunity costs when they were made more accessible in memory; $F(1, 135) = 14.43$, $p < .01$. That is, participants who preferred books were more likely to give up the Barnes & Noble gift card if media were made accessible than if books were made accessible ($M_{media} = 5.34$, $SD_{media} = 2.14$; $M_{books} = 3.56$, $SD_{books} = 2.21$), and participants who preferred media were more likely to give up the Barnes & Noble gift card if books were made accessible than if media were made accessible ($M_{books} = 7.20$, $SD_{books} = 1.70$; $M_{media} = 5.06$, $SD_{media} = 2.73$). The accessibility of underlying uses matters. See figure 10.

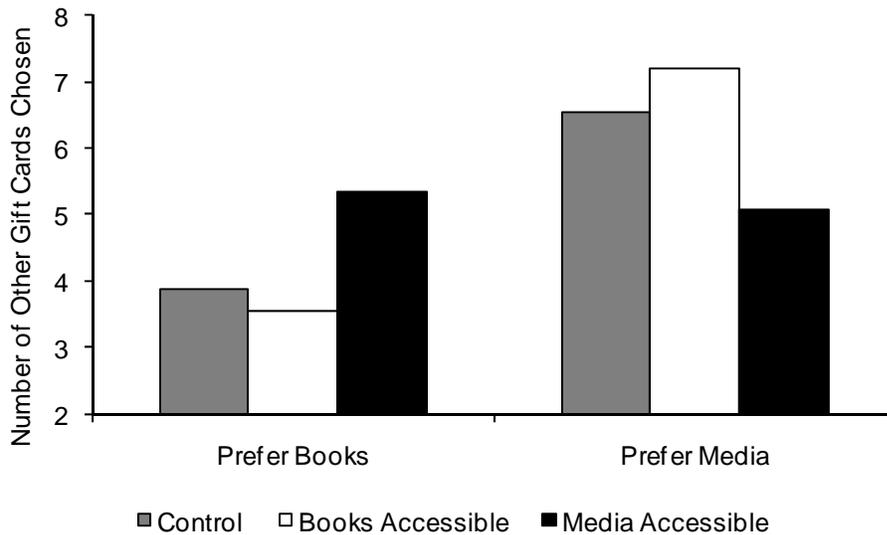


Figure 10: Study 2 number of other gift cards chosen as a function of type of accessible opportunity cost and category preference.

Moreover, baseline accessibility matters when not experimentally manipulated.

Individuals in the control condition did not differ from those in the books accessible condition ($F(1, 135) = 1.09, p = .30$). Individuals in the control condition did differ from those in the media accessible condition ($F(1, 135) = 8.36, p < .01$). Participants who preferred media were marginally less likely to give up the Barnes & Noble gift card if media were made accessible compared to control ($M_{media} = 5.06, SD_{media} = 2.73; M_{control} = 6.53, SD_{control} = 2.91; F(1, 135) = 3.19, p < .08$), but participants who preferred books were significantly more likely to give up the Barnes & Noble gift card if media were made accessible compared to control ($M_{media} = 5.34, SD_{media} = 2.14; M_{control} = 3.88, SD_{control} = 2.21; F(1, 135) = 5.88, p < .05$). As in Study 1, more typical resource uses had a greater effect on choice than less typical resource uses; new to Study 2, increasing the

accessibility of more typical resource uses has little effect whereas increasing the accessibility of less typical resource uses increases their consideration as opportunity costs.

Discussion

Using a different paradigm in which choices were explicit but underlying opportunity costs remained implicit, manipulating the accessibility of those underlying opportunity costs affected choice and willingness to choose other gift cards. More typical opportunity costs had a greater impact on choice than less typical opportunity costs. Making less typical opportunity costs more accessible increased their consideration and decreased choice of other gift cards when those opportunity costs were attractive (e.g., making media accessible for individuals who preferred media) but increased choice of other gift cards when those opportunity costs were unattractive (e.g., making media accessible for individuals who preferred books). Study 2 adds experimental evidence to the findings in Study 1, though it also raises two additional questions that I discuss briefly.

First, why did planning have no effect? I hypothesized that the effect would be stronger among those who did not explicitly report what they might buy than among those who did explicitly report what they might buy. The most likely explanation may be that those who formed plans were more likely to form plans based on what was more accessible in memory. Planning might increase consideration when no opportunity costs would be considered otherwise, but whatever is already accessible is more likely to be

considered as a plan, reducing planning's effect on opportunity cost consideration.

Second, compared to the control condition, why did increasing the accessibility of media increase the likelihood of choosing other gift cards among those who prefer books? If more attractive uses are already more accessible in memory, the addition of unattractive uses to a choice set is normatively irrelevant. Other alternatives may have been chosen more because either: 1) increasing the accessibility of alternative resource uses may have inhibited the accessibility of books, or 2) consumers may have inappropriately included the value of accessible but less valuable uses into their assessments of opportunity costs. These questions offer interesting directions for future research.

Study 3A: Resource Fan Effect

In Study 3A, I test whether use limitations make resource uses more accessible (H2a). In this study, I use a variation on Anderson's (1974) fan effect paradigm to manipulate the number of uses of a resource without respect to how they are categorized. Accessibility is measured as the speed with which participants confirm or refute the feasibility of various resource uses. The more that resource uses are made accessible by the resource, the faster participants should be to confirm feasible uses and refute infeasible uses. To the extent that resource uses are more accessible, they are more likely to come to mind and be considered as opportunity costs. In this study, I focus on the effect of use limitations on accessibility.

Method

Participants

Twenty-eight undergraduate participants began this study in exchange for credit towards a course research requirement. Eight participants did not complete the study in the allotted time; analyses are based on the twenty participants who did. Though this is a high rate of attrition, the within-subject design means that there was no differential attrition across conditions, so it is not clear how this attrition could account for the results.

Design

This study used a 2 (Products Per Resource: 1, 3) x 2 (Resources Per Product: 1, 3) x 2 (Use Feasibility: Feasible, Infeasible) completely within-subject design and was a conceptual replication of Anderson's (1974) Study 1. The only factor of interest is Products Per Resource; the others were included for methodological convenience to model Anderson's (1974) design. Participants learned the different products that could be purchased using different gift certificates and the different gift certificates that could be used to purchase different products. Some gift certificates could be used to purchase one product whereas others could be used to purchase any one of three different products ("Products Per Resource"). Some products could be purchased using one gift certificate, whereas others could be purchased using any one of three different certificates ("Resources Per Product"). After learning these associations, participants were given statements about uses of different resources to confirm or refute. Some of these uses were

feasible, whereas others were infeasible (“Use Feasibility”). The dependent variable of interest was how quickly participants confirmed feasible uses or refuted infeasible uses; faster response times indicate greater accessibility of resource uses. I expect to find that uses of resources with one associated product are made more accessible by the resource than uses of resources with three associated products. The learning and test phases are described in greater detail below.

Learning Phase

Participants first saw a list of 11 gift certificates and 11 products. Each certificate was identified by a color name (e.g., “green certificate”). Of the 11 certificates, 6 were usable on 1 product, 3 were usable on 2 products, and 2 were usable on 3 products; 11 color names were randomized across the 11 certificate positions for each participant. Each product was initially identified by a picture and a short label (e.g., “flashlight”). During the rest of the study, only the label was used. Of the 11 products, 6 were purchasable with 1 certificate, 3 were purchasable with 2 certificates, and 2 were purchasable with 3 certificates; 11 product labels were randomized across the 11 product positions for each participant. Four certificates (1, 5, 9 and 10) and four products (1, 5, 6, and 9) were critical items used in later analyses; the rest were filler items. Table 3 presents the complete set of 18 uses of the 11 certificates on the 11 products. Each certificate number was represented by a color, and each product number was represented by a product name. Colors and product names were randomized across certificate and product numbers for each participant. Test items are bolded and noted with asterisks.

Table 3: Possible uses of each certificate in Study 3A.

Certificate #	Product A #	Product B #	Product C #
1*	1*		
2	2		
3	3		
4	4		
5*	5*		
6	6		
7	7	3	
8	8	6	
9*	9*	4	5
10*	10	11	6*
11	11	5	

Feasible test uses:

- Certificate 1, Product 1
- Certificate 5, Product 5
- Certificate 9, Product 9
- Certificate 10, Product 6

Infeasible test uses:

- Certificate 1, Product 9
- Certificate 5, Product 6
- Certificate 9, Product 1
- Certificate 10, Product 5
- Certificate 5, Product 1
- Certificate 1, Product 5
- Certificate 10, Product 9
- Certificate 9, Product 6

After viewing the lists of all 11 certificates and 11 products, participants saw the 18 possible certificate uses, self-paced, one at a time. Once participants were exposed to the entire set of 18 uses once, participants began actively learning the 18 uses. During this portion of the study, participants were shown all 11 certificates and all 11 products one at a time in random order. When presented with a certificate, they had to select each product that could be purchased using that certificate from a list of all 11 products. For example, participants were asked which product(s) certificate 7 could be used to

purchase, and they would have to select products 7 and 3 from a list of all 11 products. Similarly, when presented with a product, they had to select each certificate that could be used to purchase that product. For example, participants were asked which certificate(s) could be used to purchase product 5, and they had to select certificates 5, 9, and 11 from a list of all 11 certificates. After responding to each item, participants were informed whether they were right or wrong and given the correct answer.

After responding to all 22 items once, the subset of items that they got wrong from the complete set of 22 items was randomized and presented again. This sequence of presenting incorrectly answered items proceeded until participants responded correctly to all 22 items once. All 22 items were then re-randomized and the entire process was repeated until participants could respond correctly to all 22 items in a row without making any mistakes. This learning procedure, adapted from Anderson (1974), ensured that participants fully learned all of the uses of each certificate and all of the ways to purchase each product. The 20 participants who completed the study required an average of 5 cycles and took an average of 24 minutes to complete this learning phase.

Test Phase

Once participants completed the learning phase, they were tested on their knowledge under the cover story of helping a friend who was unsure of how to use the certificates. During this phase, participants were presented with feasible and infeasible claims of how certificates might be used (e.g., “The green certificate can be redeemed for a flashlight.”) and had to confirm or refute each claim as quickly and accurately as

possible. To equate presentation frequency during the test phase, a selected subset of feasible and infeasible certificate uses was tested. Four feasible uses were selected, one from each cell of a 2 (Products Per Resource: 1, 3) x 2 (Resources Per Product: 1, 3) design. These four feasible uses were presented twice in each test block. The 4 certificates and 4 products from the 4 feasible uses were rearranged into 8 infeasible uses, including two from each of the same four types. These 16 target items (4 feasible uses, presented twice each, and 8 infeasible uses, presented once each) were presented along with 14 filler items, constructed from random repairings of the 7 non-target certificates with the 7 non-target products. Target certificates and products are bolded in Table 3. All 30 items (16 target items and 14 filler items) were presented in random order three times; filler items were re-paired across blocks. Thus, each subject had six observations in each of eight cells in a 2 (Products Per Resource: 1, 3) x 2 (Resources Per Product: 1, 3) x 2 (Use Feasibility: Feasible, Infeasible) design.

Results

Accuracy was high across all 8 cells. The main results concern response times, though I report results for accuracy as well. Response times were positively skewed, so I focus on log response times rather than raw response times; results are completely consistent across both analyses. Any response that was either incorrect or more than 3 standard deviations away from the individual-specific mean of all 90 target and filler items was excluded from all analyses. Log response times across correct responses within three standard deviations of the mean (a maximum of six items) were averaged to result

in one number per cell per individual. Average log response times were analyzed using a 2 (Products Per Resource) x 2 (Resources Per Product) x 2 (Use Feasibility) within-subject ANOVA.

In the learning phase, all participants were required to learn all responses to perfection. Nonetheless, individuals made marginally fewer errors when judging items including certificates that had one use relative to those that had three uses ($F(1,19) = 3.73, p < .07; M_1 = 98.3\%, SD_1 = 5.7\%; M_3 = 95.5\%, SD_3 = 9.9\%$); no other effects on accuracy were significant (p 's $\geq .18$). On correct responses, in support of H2a, individuals were significantly faster when judging items including certificates that had one use relative to those that had three uses ($F(1,19) = 7.17, p < .02; M_1 = 0.54, SD_1 = 0.23; M_3 = 0.67, SD_3 = 0.29$). There was a similar trend such that participants were (non-significantly) faster when judging items including products that could be purchased using one certificate relative to those that could be purchased using three certificates ($F(1, 19) = 2.78, p = .11; M_1 = 0.57, SD_1 = 0.24; M_3 = 0.64, SD_3 = 0.29$), and there was a marginal three-way interaction on log response times among Products Per Resource, Resources Per Product, and Use Feasibility ($F(1, 19) = 3.31, p < .09$), but in every case increasing the products per resource from 1 to 3 directionally increased response time. No other effects on log response time were significant (p 's $> .30$). The pattern and significance tests for raw response times were consistent. These results regarding the effect of Products Per Resource support H2a and indicate that use limitations increase the accessibility of possible resources uses.

Study 3B: Gift Card Specificity

In Study 3A, I demonstrated that resources with few uses make their uses more accessible compared to resources with many uses. Although it provides a very clean test, Study 3A had several limitations to extending its results to everyday consumer interactions. First, resources in Study 3A were usable on random subsets of products, whereas those in the real world are typically usable on categorized subsets of products. Second, participants in Study 3A were not familiar with those resources before entering the lab, whereas resources in everyday life are familiar and learned through experience. Third, opportunity costs are usually generated or retrieved from memory (reflecting successful recall) rather than confirmed or refuted when proposed (reflecting successful recognition) as in Study 3A.

I address these concerns and test H2b in Study 3B by considering categorized use limitations; by considering resources that are well known before entering the experiment; and by considering the recall of resource uses rather than the recognition of resource uses. Participants considered possible uses of different gift cards and rated the specificity of each gift card. To the extent that limited use resources increase the accessibility of their uses more than unlimited use resources, participants should be faster to generate possible uses for gift cards that are more limited than those that are less limited.

Method

Participants

Participants in Study 3B were recruited from a popular online science blog. 187 participants consented to participate; 120 participants completed the study. This study's low completion rate is presumably because it was uncompensated, but because of the within-subject design, as in Study 3A, it is difficult to conceive how this attrition could explain the pattern of results.

Design and Materials

Participants completed one of two replicates that did not differ from one another (p 's > .5), so I combine the results from each. The stimuli for replicate 1 were 11 different gift cards, and the stimuli for replicate 2 were 10 different gift cards. Participants were presented with pictures of gift cards from different merchants and asked, "What could you purchase with the \$25 gift card pictured below?" Once they had mentally formed an answer, they proceeded to the next page; they did not actually report the possible use, as this was tangential to the study goal and would have added noise to the response time measure. All gift cards were presented in random order.

After generating possible uses for all gift cards, participants reported familiarity with each merchant (defined by recognition of the merchant's name and knowledge of the merchant's product offering). Only merchants with which participants were familiar were included in the analyses below. For the set of merchants with which participants were familiar, participants were instructed:

“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 were given a 7-point scale anchored with “Very general (like cash)” and “Very limited (like a coupon)”.

Results

In Study 3B, unlike Study 3A, specificity was measured rather than manipulated. Thus, the analysis concerned the correlation between measured specificity and measured accessibility. Gift card specificity was assessed as the response to the question “How general or limited is each gift card below?” Accessibility was measured as the amount of time participants stayed on a particular page before moving on to the next. As in Study 3A, faster response times represent greater accessibility.

First, I calculated the correlation between specificity and response time for each participant; the number of observations varied per participant as a result of unfamiliarity with some of the merchants. Second, I transformed each participant’s correlation to a z score using Fisher’s r -to- z transform and then analyzed the z scores across participants. Across participants, the average transformed correlation was significantly less than 0: $z = -.12, p < .01$. The more limited the gift card, the faster participants were to generate possible uses. This result was robust to weighting correlations by the inverses of their variances (to account for different numbers of observations per participant) and to use of

Spearman's rank-order correlations (weighted or unweighted) to minimize any effect of extreme outliers or non-linear relationships. This result, using a different paradigm with a different population and familiar stimuli, is broadly consistent with Study 3A and provides support for H2b: Resources with more limited uses make their uses more accessible than resources with less limited uses.

Study 4A: Using Limited Use Resources

Studies 1 and 2 indicated that opportunity costs are more likely to be considered when alternative resource uses are made accessible. Studies 3A and 3B indicated that limited use resources make their uses more accessible than unlimited use resources. Together, these results indicate that limited use resources may evoke greater opportunity cost consideration than unlimited use resources, so consumers may be less likely to spend them! Consider the case of a Starbucks gift card compared to a Visa gift card. The category of things that can be purchased using a Starbucks gift card is a small subset of the category of things that can be purchased using a Visa gift card. The best use of a Visa gift card therefore has to be (weakly) better than the best use of a Starbucks gift card. Normatively, the Visa gift card should therefore be no more likely to be spent than the Starbucks gift card. Given the analysis above, I propose that among individuals who like Starbucks coffee, the Visa gift card may be more likely to be spent because attractive alternative uses simply do not come to mind as easily for the Visa gift card as for the Starbucks gift card. This surprising implication captured by H3 is tested in Studies 4A and 4B.

Method

Participants ($N = 412$) were recruited from Amazon Mechanical Turk (an online labor market for small piece work tasks). Participants were first shown a selection of nine music CDs and specified their favorite. This ensured that the focal option was attractive. Next, participants imagined that they were given either a \$10 Starbucks gift card (limited use resource) or a \$10 Visa gift card (unlimited use resource); note that the Visa gift card can be used to buy anything that could be purchased using the Starbucks gift card, plus many other alternatives. Participants imagined the option to buy the specified CD for \$9.95 using their gift card, on sale from \$12.95, and indicated their decision to buy or not. After making their decisions, participants reported what else they would have purchased instead (i.e., their opportunity cost), the degree to which they thought about it, how much they would enjoy the opportunity cost, and how much they would enjoy the CD. They were then asked whether or not they considered themselves “someone who loves Starbucks coffee.” Because these measures were taken after the purchase decision, they could not have cued opportunity cost consideration during the purchase decision. The Starbucks coffee lover measure could not have been taken before the measure of choice, as it could have cued participants to consider coffee as an opportunity cost.

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. Those with a Visa gift card are less likely to consider their opportunity costs, even though they necessarily have more valuable opportunity costs.

Results

Neither having a better use for their resources ($n = 253$, $\chi^2(1) = .21$, *ns*) nor self-identification as a Starbucks coffee lover ($n = 240$, $\chi^2(1) = 2.45$, $p = .12$) varied as a function of gift card condition. 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, those given a Starbucks gift card were significantly less likely to buy the CD (63%) than those given a Visa gift card (85%; $\chi^2(1) = 9.44$, $p < .01$). Although consumers given a Starbucks gift card necessarily had lower (or at least no higher) opportunity costs than those given a Visa gift card, they were less likely to spend their gift card because they readily considered what that entailed giving up.

Study 4B: Replication and Extension

Study 4A is an important demonstration of the non-normative impact that opportunity cost accessibility can have, but it leaves open alternative explanations. First, one might argue that participants considering Starbucks gift cards earmarked them to buy coffee whereas those considering Visa gift cards did not (Prelec and Loewenstein 1998; Zelizer 1997). If this were the case, choice of the CD would be lower for those using Visa

gift cards even if given the explicit choice and the effect should go away conditional on choosing coffee when given the explicit choice. Second, the Starbucks gift card may have allowed participants to justify coffee as a hedonic purchase in a way that the Visa gift card may not have (Kivetz and Simonson 2002). Study 4B rules out these alternative explanations. In Study 4B, participants reported their explicit preference after making their purchase decision; I analyze the explicit choice and the implicit choice conditioned on the explicit choice of coffee. Conditioning on participants who preferred the coffee in explicit choices limits the sample to participants who: 1) either earmarked the gift card for use on coffee or would have chosen coffee without the earmark, and 2) either fulfilled their need to justify hedonic purchases or had no need to justify hedonic purchases. These two alternative explanations cannot account for the effect persisting among participants who explicitly preferred to spend the gift card on coffee rather than the CD. Furthermore, relative to those given a Starbucks gift card, I propose that individuals given a Visa gift card are more likely to buy because they are more likely to neglect their opportunity costs. If this is the case, once participants are explicitly reminded of opportunity costs, those given a Visa gift card should be equally unlikely to buy as those given a Starbucks gift card.

Method

Undergraduate students ($N = 203$) participated in Study 4B for credit towards a course research requirement. Study 4B uses the same basic paradigm as Study 4A in a 2 (Gift Card: Starbucks, Visa) x 2 (Opportunity Costs: Implicit, Explicit) design. The

implicit opportunity cost conditions were like those in Study 4A. The explicit opportunity cost conditions adapted Frederick et al.'s (2009) manipulation of opportunity cost salience: rather than facing a “Yes, I would buy the CD / No, I would not buy the CD” choice, participants faced a “Yes, I would buy the CD / No, I would keep the gift card for other purchases” choice. This do not buy option reminds participants that by not spending their gift card now, they can spend it on something else later instead. After selecting their CD and before being assigned to conditions, participants reported liking for the CD on a 7-point scale. Participants who liked the CD (rated it above the midpoint) had an attractive focal option and are used in the analyses below. After making their spending decision, participants were asked explicitly whether they would rather spend the gift card on the CD or on \$10 worth of Starbucks coffee. This allows for a test of whether the effect persists once earmarking and hedonic justification are accounted for.

Results

Among participants who found the focal option attractive (i.e., rated it a 5, 6, or 7 on the 7-point scale), there were no differences across conditions with respect to preference to use the gift card on \$10 worth of Starbucks coffee instead of the CD (all $p > .25$). This suggests that the results cannot be driven by a greater likelihood of earmarking the Starbucks gift card versus the Visa gift card for use on coffee.

Moreover, if the effect was driven by earmarking or a need to justify coffee as a hedonic purchase, it would be eliminated among people who would prefer to spend the gift card on coffee when given the explicit choice. Among these participants, the card

was either already earmarked or would have been used on coffee anyways, and the need to justify coffee as a hedonic purchase is either non-existent or already satisfied. Thus, the remaining analysis focuses just on those who liked the CD but would prefer to spend the gift card on Starbucks coffee ($N = 71$).

Among these participants, the interaction between gift card type (Starbucks = 1, Visa = -1) and opportunity cost framing (Implicit = 1, Explicit = -1) was marginally significant ($B = -.50$, Wald $\chi^2(1) = 3.26$, $p = .07$). Replicating Study 4A, participants using Starbucks gift cards were less likely to purchase (17%) than those using Visa gift cards (71%) when opportunity costs were implicit ($B = -1.24$, Wald $\chi^2(1) = 9.04$, $p < .01$). Consistent with the explanation that this difference was driven by opportunity cost neglect, participants using Starbucks gift cards were no less likely to purchase (24%) than those using Visa gift cards (33%) when opportunity costs were explicit ($B = -.24$, Wald $\chi^2(1) = .39$, *ns*). Making opportunity costs explicit reduced purchase incidence for those using Visa gift cards ($B = .78$, Wald $\chi^2(1) = 4.22$, $p < .05$) but had no effect on those using Starbucks gift cards ($B = -.22$, Wald $\chi^2(1) = .30$, *ns*).

General Discussion

In six studies, I propose and test the role that resource use accessibility, driven by the resource in use, plays in the consideration of opportunity costs. In particular, resource uses that are better examples of the category of possible uses are more likely to be considered as opportunity costs than those that are worse examples. Across different resources, limited use resources can activate resource uses more than unlimited use

resources. Because limited use resources activate resource uses more, under the appropriate conditions individuals are less likely to spend limited use resources even though they have less valuable outside uses. Below, I discuss implications of this work for resources beyond gift cards, tradeoffs within versus across categories, ad hoc categories, earmarking, and prospective mental accounting.

Beyond Gift Cards

Each of the experiments used gift cards (or in Study 3A, artificial limited use media of exchange). This was primarily for operational convenience: gift cards are usable on well-defined sets of goods that will be similarly defined with similar associations across subjects (though not exactly the same associations, as shown in Study 1 where differences in typicality across participants moderated the differential impact of foods and beverages as opportunity costs). Though gift cards are more convenient operationalizations, the theory applies not just to gift cards but also to any other categorized resource.

Weber and Johnson (2006) propose that money does not activate associated purchases because it has no well-defined categorized uses. When money is categorized (e.g., when mental accounts are used; Heath and Soll 1996; Henderson and Peterson 1992), it will likely have similar effects to those discussed above. “Movie ticket” may be a more typical example of the category “entertainment expenditures” whereas “weekend brunch” may be a less typical but more valuable example of that category. When considering an entertainment expenditure on theater tickets, movie tickets may come to

mind as opportunity costs whereas weekend brunches may not. As Heath and Soll (1996) point out, typicality affects the degree to which an expense is posted to a particular mental account; the analysis above indicates that typicality may also affect the degree to which an upcoming expense is booked to any mental account at all.

Finally, this role of accessibility may extend beyond consideration of opportunity costs when spending resources to consideration of opportunity costs when consuming a product. When an alternative use of a product is highly accessible in memory, it is more likely to be considered as an opportunity cost. Shu (2011) considers the case of “Open That Bottle Night,” a night on which individuals are encouraged to splurge and open a special bottle of wine. This night came about because of the tendency to wait for a wine-worthy occasion that never comes, resulting in the bottle going bad. One contributing factor to why people wait too long to drink such a bottle of wine (or to spend a gift card, or to use a special set of golf balls) may be that it is strongly associated with special occasions, making them highly accessible in memory whenever its use is considered. If those alternative occasions were less accessible in memory, they would play less of a role in the decision.

Implications for Between versus Within Category Tradeoffs

Mental budgeting has often been implicated in counter-normative spending patterns (e.g., Heath and Soll 1996; Thaler 1980, 1985, 1999). Resources with no use limitations may be allocated across categories to equate the marginal utility of consumption in each category. Resources with use limitations may not be. As a result,

limited use resources, such as mental budgets, may simultaneously lead to underconsumption in some categories and overconsumption in others (e.g., Heath and Soll 1996; Thaler 1985; Zelizer 1997). The potential of mental budgets to enable better tradeoffs and equate the marginal utility of consumption within categories has largely been neglected.

Mental budgeting can increase the quality of tradeoffs and allocations within a particular account by breaking large sets of resources into smaller sets of resources (see Essay 1). From the present analysis, we see that mental budgeting also increases the accessibility of alternate resource uses within a particular category. As a result, mental budgeting allows individuals to recognize and resolve within-budget tradeoffs more effectively and consistently than an individual without mental budgets, for whom alternate resource uses are relatively inaccessible. These within-category benefits come at the expense of between-category tradeoffs because resources earmarked for one category are not exchangeable with those earmarked for another (e.g., Heath and Soll 1996; Thaler 1985). All else equal, I expect that individuals who use mental accounting to a greater extent make better within-category tradeoffs (i.e., more stable and in-line with long-run stated preferences) when considering isolated expenditure decisions, but also make worse between-category tradeoffs (i.e., less stable and in-line with long-run stated preferences). Within-category tradeoff quality will be particularly strong when the implicit tradeoff is typical of the category but weaker when the implicit tradeoff is atypical of the category.

Cross-Category Competition

Competition is defined by the set of products that coexist in the same consideration sets (Mitra and Lynch 1995; Nedungadi 1990; Ratneshwar and Shocker 1991). Nedungadi (1990) showed that by influencing the mere accessibility of alternative options within a given product category, the competition faced by different brands was altered, sometimes asymmetrically. Mitra and Lynch (1995) showed that in addition to weakening competition by strengthening preferences, advertising can also strengthen competition by increasing the accessibility of alternative options and therefore consideration set size. The present work shows that similar effect can be at play when considering accessibility driven by resources. The competition faced by a particular product is in part a function of what alternative resource uses are made accessible by the resources in use, whether they are in the same nominal category or not. In Studies 4A and 4B, for example, coffee was the effective competition faced by the CD, despite the fact that coffee and CDs provide very different benefits. Studies 1 and 2 show that more typical resource uses are more likely to be considered as opportunity costs than less typical resource uses.

These findings have important implications for cross-elasticities. When two goods are in competition, as the price of one rises, purchase of the other should increase, given a sufficiently small income effect. Normally, such goods provide the same benefit (e.g., coffee and tea both provide warmth and alertness), but they may simply be in competition for the same resources. If so, resource driven accessibility may play an important role. If

one were contemplating buying a CD using a Starbucks gift card, coffee is considered as an opportunity cost whereas a muffin is not. Thus, likelihood of buying the CD will be affected by the price of coffee but unaffected by the price of muffins. Understanding what drives the accessibility of particular opportunity costs helps us to better understand the nature and consequences of the competitive landscape.

Representing Ad Hoc Categories

Barsalou (1983) proposes that goal-derived ad hoc categories may become well represented in memory over time if they are constructed and accessed frequently (see Loken, Barsalou, and Joiner 2007 for a recent review of brand and product categorization in consumer research). Although we typically think of particular mental accounts in terms of the taxonomic categories they represent (e.g., food, clothing, entertainment), they could also include more general ad-hoc categories such as “things to buy with \$5” (Gourville 1998; Herr 1989; Weber and Johnson 2006) or “things to buy with tips after a good night waitressing” (Fogel 2009). If ad hoc categories of opportunity costs are used frequently, they may become well-represented in memory and lead to consideration of typical opportunity costs. Such frequent use may result from facing chronic resource constraints and thus repeatedly attempting to think of opportunity costs from the category “things that cost \$5” (see Essay 1).

Earmarks

Earmarked resources play an important role in consumer life. Zelizer (1997) examined the role of resources earmarked for particular purposes. Novemsky and

Kahneman (2005) discuss how goods earmarked for exchange will not induce loss aversion. Shafir and Thaler (2006) demonstrate how consumer products only incur a mental cost when used in an unintended or unearmarked way. Psychologically, resources are effectively spent and goods effectively used when intentions are set, prior to actual spending or use. At the time of earmarking, intentions can establish psychological tags that remind consumers of resource uses (i.e., make those uses accessible in memory) at the time of later use even in the absence of other cues (e.g., Gollwitzer and Sheeran 2006; McDaniels and Einstein 2007).

Earmarked resources will exhibit similar patterns of asymmetric opportunity cost consideration as those observed in Study 1. In Study 1, when considering a food purchase with a Starbucks gift card, beverages (typical uses) were considered as opportunity costs but when considering a beverage purchase with a Starbucks gift card, foods (atypical uses) were not. Similarly, when considering a non-intended purchase with earmarked resources, the earmarked use will be considered as an opportunity cost whereas when considering an intended purchase with earmarked resources, non-earmarked uses will not be. In many circumstances, this is a rational approach to limited mental resources: once resources have been budgeted and earmarked, there is little reason to reconsider opportunity costs at every turn. Planning moves the deliberative phase of a decision forward in time, thereby reducing the mental burden at the time of purchase. Although circumstances sometimes change, the cost savings of deciding once and then implementing a plan likely exceeds the benefits of constantly reconsidering decisions.

Prospective Mental Accounting

Finally, this work has implications for prospective mental budgets. Mental accounts and mental budgets have largely been regarded as retrospective and concurrent tools. In Heath and Soll's (1996) original treatment, mental budgets work to reduce current consumption because of previous expenditures that have already been made. The current work, in conjunction with that of Essay 1, suggests that mental budgets may not only reduce consumption as a result of previous expenditures, but also as a result of anticipated future expenditures. That is, individuals prospectively budget and account, earmarking and considering future uses of their resources as opportunity costs when making purchase decisions. Heath and Soll (1996) find that typical purchases are more likely to be assigned to a mental account than atypical purchases. The present model implies that typicality of future purchases will influence prospective mental accounting via consideration of opportunity costs, just as the typicality of past purchases influence retrospective and concurrent mental accounting.

Conclusion

In this essay, I demonstrated that resource use accessibility is an important driver of opportunity cost consideration. This model allows us to better understand why opportunity costs may often be neglected (Frederick et al. 2009), important and common conditions under which they will be considered, how different resource types lead to differential opportunity cost consideration, and which opportunity costs will be considered. This work also has practical implications beyond understanding the consumer

decision process. Because consumers faced with resources with different use limitations consider different opportunity costs to different extents, those limitations influence the degree of competition different products face, leading to different cross-elasticities within and between categories. Important questions remain regarding the extent to which participants actually follow through and purchase their considered opportunity costs, the base rates of using resources with usage constraints, and extensions of this framework to the use of other non-monetary resources such as self-control, calories, or time. This work provides an important step in understanding opportunity cost consideration and how non-normative, memorial properties of resources affect decision construal and consumption choices.

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Biography

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