How do consumers adjust their spending when their budget changes? A common view is that the allocation of one's current budget should not depend on previous budget allocations. Contrary to this, the authors find that when the budget contracts to a particular level, consumers select less variety (as measured by the number of different items with some of the budget allocated to them) than when their budget expands to that same level. This budget contraction effect stems from a reduction in variety under the contracting budget, not from variety expansion under the expanding budget. Evidence from five experiments indicates that the effect is driven by a desire to avoid feelings of loss associated with spreading allocation cuts (relative to reference quantities from previous allocations) across many items.

Keywords: budget contraction, allocation variety, loss aversion, reference quantities

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The Budget Contraction Effect: How Contracting Budgets Lead to Less Varied Choice

In stable economic times, approximately 300,000 new unemployment claims are filed in the United States each month. People who have lost their jobs typically experience an income loss of 25%-40% in the 12 months following the loss (Ruhm 1991; Stephens 2001), either because they fail to find a new job or because the new job pays less than the lost job (Stephens 1997). Matters are even worse when the economy experiences a significant contraction. For example, a recent Pew survey found that during a recession (e.g., the one that began in 2007), 55% of adult U.S. workers experienced a work-related financial contraction due to a pay cut, a reduction in hours, or an involuntary transition to part-time work (Taylor et al. 2010). More than half those surveyed (62%) also reported reducing their household spending in response to the economic contraction.

In addition to income contractions from economic hardship, many other life events can cause consumers to reduce their disposable budgets. Two of the most significant and common events are paying for college (Souleles 2000) and retirement (Banks, Blundell, and Tanner 1998; Bernheim, Skinner, and Weinberg 2001). For example, Bernheim, Skinner, and Weinberg (2001) find that retirement coincided with a drop in U.S. food budgets of 24% for households in the first income quartile, 15% for those in the second, and 9% for those in the third and fourth quartiles.

The prevalence of budget contractions in everyday consumer life raises the important question of how consumers adjust their spending under a budget contraction compared with a budget expansion. The standard economic view is that consumers move up and down their utility surface to whatever allocation provides the highest utility for the current budget. A basic assumption is that the trajectory of a person's budget does not change the shape of his or her util-
ity surface. This means that if all other factors are held constant (e.g., tastes, prices, liquidity), the path down the utility surface will be the same as the path up the surface. For budget allocations, this means that consumers will allocate their budget to the same set of goods in the same proportions for a budget of $X$, regardless of whether their previous budget was greater than or less than $X$.

In this research, we contend that this single path assumption and the implications derived from it are not warranted when consumers allocate a sequence of budgets. We propose that when a consumer allocates an initial budget across an assortment of items, the amount allocated to each item serves as a reference point for subsequent allocations. If a new budget is lower than the prior budget, the consumer must allocate less to some items than the reference level established under the previous allocation. In accordance with loss aversion, we predict that consumers will anticipate psychological loss for every item for which their new allocation is less than its reference allocation. To minimize the sum of these anticipated psychological losses, consumers will allocate cuts to a relatively small subset of items. As a consequence, the number of different items to which a given budget (e.g., $100) is allocated (which we refer to as “allocation variety”) will be fewer when the budget sequence is contracting (i.e., if the previous budget was higher at, for example, $150) than when it is expanding (i.e., if the previous budget was lower at, for example, $50). We refer to this effect of budget trajectory on allocation variety as the “budget contraction effect.”

In the remainder of this article, we review the relevant literature and develop our research hypothesis that allocations of a given budget will be less varied when that budget was part of a contracting sequence than when the same budget was part of an expanding sequence. We then present five choice experiments that show choice patterns consistent with the budget contraction effect; with these experiments, we trace the budget contraction effect’s origins to loss aversion, in which consumers use previous budget allocations as a reference point when contemplating future allocations.

**THEORETICAL DEVELOPMENT**

**Consumption in the Face of Changing Budgets**

It is well established that changes in income have a significant influence on aggregate consumption patterns (e.g., Hall 1979; Hall and Mishkin 1982). It is also known that consumers do not always react symmetrically to increasing and decreasing income. For example, Shea (1995a, b) analyzes quarterly U.S. consumption data and finds that drops in consumer income lead to more changes in consumption than equal income increases. Likewise, Bowman, Minehart, and Rabin (1993) find asymmetry in how total consumption changes in the face of news regarding future income (expected to decrease or expected to increase). They find that when consumers expect income to increase, they are more likely to immediately alter their total consumption than when they expect their income to decrease. Dargay (2001) finds that income effects on car ownership are not symmetric, with consumers being less likely to cut car spending when income declines than to expand car spending when income expands. More recently, Kamakura and Du (2012) observe that during a recession, consumers increase (decrease) spending on essential goods that are consumed in less (more) visible circumstances, compared with when the economy is expanding.

In contrast with prior research, which has focused mainly on aggregate income changes and their effects on aggregate spending, we examine the effects of budget changes on allocations for individual consumers. We do so for three main reasons. First, it is difficult to analyze income effects without first specifying consumer expectations. Specifically, the study of income effects requires specification of whether an income shock was anticipated or unanticipated and whether it was expected to be permanent or transitory (Jappelli and Pistaferri 2010). Second, by focusing on budgets instead of income, we can avoid the complex issue of expenditure smoothing through saving or borrowing against future income. Third, examining the effect of budget changes on allocations enables us to control for consumer myopia and liquidity constraints, the two hypotheses most typically advanced for asymmetric income effects (Shea 1995a).

In addition to the focus on discretionary budgets, the current work departs from prior work in two other important ways. First, in general prior research has used either panel data or aggregate-level consumption data to explore the effect of income changes on expenditures as a whole. Such settings are quite different from individual-level experiments that examine how a specific consumer reacts to a budget change. Consequently, prior research lacks the strong internal validity and the concomitant causal inference that experimental designs provide. Second, whereas prior research has examined aggregate expenditures or how spending shifts from certain types of items to other types of items, we examine how the variety in the allocation basket fluctuates in response to budget changes. This enables us to make direct statements not about substitution effects across products but about the shape of the income expansion path.

**The Consumer’s Budget Allocation Problem**

When allocating a budget across a set of items, the consumer’s budget allocation problem can be stated as follows: “to identify and commit to the affordable assortment of items that is expected to provide the greatest utility.” In this statement, the identification with and commitment to an assortment define a choice (Russo and Carlson 2002). Assortment refers to the set of items to which a nonzero amount of the budget is allocated. The term “affordable” simply means that the consumer has sufficient resources to cover the total cost of the assortment. The phrase “expected to provide the greatest utility” means that the consumer’s objective is to maximize expected utility, given an evaluation of the alternatives. Importantly, when making such choices, consumers do not necessarily maximize actual utility but instead maximize expected utility (Coombs, Dawes, and Tversky 1970). This means that consumers can make choices that turn out to be suboptimal if their expectations are wrong, as has been well documented in literature on affective forecasting (e.g., Kahneman and Thaler 2006; Loewenstein, O’Donoghue, and Rabin 2003). The disconnect between expected and actual utility often occurs because expected utility depends on how consumers evaluate alternatives, and evaluations often depend on the context in which the alternatives are considered (e.g., Johnson and
When a consumer allocates an initial budget to an assortment of items, they might come to this realization only after realizing how much utility they will receive from it. After the initial budget is allocated, they will have to cut other expenditures when their income increases. As with other reference points (Kalyanaraman and Winer 1995; Lattin and Bucklin 1989; Oliver 1980), these allocation reference quantities can influence how consumers perceive and evaluate items. We contend that consumers will evaluate each item's new allocation level relative to its reference quantity from the previous allocation, such that they will perceive a reduction in quantity as a loss and an increase in quantity as a gain. As a consequence, contracting budget trajectories will involve reference quantities above those available to consumers under the new (lower) budget, causing consumers to view new allocation possibilities as losses relative to prior allocation levels. In contrast, an expanding budget trajectory will involve reference quantities below those available at the new budget level, causing consumers to view expanding allocation levels as gains. As we discuss subsequently, this can have implications for how consumers allocate a given budget (e.g., $80) to a set of items (e.g., groceries) under a contracting budget trajectory (if, for example, the previous budget was $120) versus an expanding budget trajectory (if, for example, the previous budget was $40).

Asymmetry in Allocations

The allocation of a specific budget under a contracting trajectory could differ from an allocation of the same budget when the budget is part of an expanding sequence for several reasons. First, consumers might have contractual obligations (akin to liquidity constraints) that cause them to focus most spending on contracted items and to cut noncontract items when budgets are reduced. For example, consumers who buy a car with a loan or a house with a mortgage will have to cut other expenditures when their income declines. Second, consumers have more opportunity to learn what they really like when allocating larger budgets because the larger budgets allow for greater exploration. For example, someone who wants to join a country club, but will only realize how much utility he or she will receive from it after joining the club, might come to this realization only after allocating a large discretionary entertainment budget, some of which is allocated to the country club. Later, if the budget declines, he or she might continue with the country club membership and sacrifice other forms of entertainment. This example reflects consumer learning, such that a higher budget allocation helps the consumer learn about his or her true preferences, and thus responds to a different utility surface under budget contraction than under budget expansion.

Beyond learning asymmetries and contractual commitments, we expect that budget allocations differ for expanding and contracting budget trajectories for another reason. When a consumer allocates an initial budget to an assortment of items, the amount allocated to each item serves as a reference point for subsequent budget allocation decisions. This idea is consistent with Geier, Rozin, and Doros's (2006) unit bias heuristic. Specifically, Geier, Rozin, and Doros find that consumers tend to accept as normal and optimal whatever reasonable quantity of an item they are given. In their study, people given a larger scoop (a quarter cup) for scooping items (e.g., pretzels, M&Ms) took (and presumably consumed) more of the items in the bowl than people given a smaller (tablespoon) scoop. The authors contend that the scoop created a reference quantity that seemed normal and appropriate, causing consumers to comply with it by scooping more when the scoop was larger. If self-selected quantities gain a similar status, original allocation quantities would be considered reference values that are normal and appropriate.

When the new budget is lower than the initial budget, the consumer must allocate less to some items than the reference level for those items. In other words, when a budget contracts, a consumer will code the prospective amount of any item that had a nonzero prior allocation as either the same or a loss relative to that item's reference level. Following loss aversion (e.g., Hardie, Johnson, and Fader 1993; Kahneman and Tversky 1979; Novemsky and Kahneman 2005), we expect that consumers will try to avoid incurring such losses across many items. This is because the loss function is convex and steepest immediately below the reference level. Therefore, to minimize the sum total of these anticipated losses, consumers facing a contracting budget trajectory will distribute their budget cuts across a relatively narrower subset of items. Consequently, the number of different items to which a given budget (e.g., $100) is allocated (i.e., allocation variety) will be fewer when the previous budget was larger (e.g., $150) than when the previous budget was smaller (e.g., $50).

We focus on allocation variety because the amount of variety in the choice set is often an important factor that consumers contemplate when making purchase decisions (Kahn and Ratner 2005) and because it provides a way to examine assortment differences across individuals. As noted previously, we refer to the phenomenon of lesser allocation variety for a given budget under a contracting trajectory than for one under an expanding trajectory as the “budget contraction effect.” We test for this in five experiments by comparing allocation variety for a sequence of budget allocations that is expanding with the allocations of the same budgets when the sequence is contracting. Our experiments control for learning about the alternatives and liquidity constraints.

In general, loss aversion is believed to occur because of the expectation that the pain of losing something will be greater than the pleasure of an equivalent gain (e.g., Ariely, Huber, and Wertenbroch 2005; Kahneman and Tversky 1984). Indeed, when gains and losses can be compared in the same context, the anticipation of greater feelings from a loss (vs. an equivalent gain) influences the choices consumers ultimately make (McGraw et al. 2010). Therefore, for the purposes of testing and understanding the budget contraction effect, we are interested in consumers’ expected utility regarding the decisions they make, rather than the actual experienced utility that follows after selected items are consumed and experienced. We are also interested in the
choices consumers actually make, rather than the choices they “should” make.

If budget trajectory influences allocations as we expect, for consumers making a sequence of three budgets allocations (low, middle, and high budgets) in either an expanding or a contracting sequence, the allocation variety for the lowest budget should differ more than the allocation variety for the highest budget. This is because the middle budget allocation provides a set of reference quantities that represent prospective losses for the lowest budget level in the contracting budget condition, but there are no such reference quantities for the lowest budget allocation in the expanding budget sequence. In contrast, the middle budget allocation provides a set of reference quantities that signal prospective gains for the highest budget level in the expanding budget condition, but there are no such reference quantities for the highest budget in the contracting sequence. Because reference points are likely to be less salient under gains and the concavity of the value function for gains is generally modest (with quickly diminishing marginal gains in utility), we expect this reference allocation effect to have little or no influence on allocations when budgets are expanding. We test for this asymmetry by comparing the slopes of the allocation varieties for each budget level across expanding and contracting budget conditions.

If we are correct, a difference in the budget trajectory by itself is insufficient to create the budget contraction effect. This is because the effect requires that reference allocation levels for the items being considered under the new budget reference levels come from the allocation of the previous budget. Therefore, if the budget declines, but consumers did not allocate the previous budget to specific items, there will be no reference allocation levels and no felt loss from allocating less to an item. Therefore, if previous budgets were not allocated, the budget contraction effect should be mitigated.

Research Overview

The subsequent experiments explore budget allocations for common consumer budgeting decisions, including grocery store purchases, investments, and cities to visit on a trip. Experiments 1–3b demonstrate the budget contraction effect, and Experiments 3b and 4 explore the psychological mechanism underlying it. We measure allocation variety as the number of different items to which the middle budget is allocated. This differs from definitions of variety seeking that involve the pursuit of stimulation through the consumption of novel items (Faison 1977), and it differs from phenomenological definitions of variety seeking that emphasize a preference for lesser-valued and previously unselected items over higher-valued and currently selected items (Mitchell, Kahn, and Knasko 1995; Simonson 1990). However, allocation variety accords with more general definitions of variety seeking, in which evidence of the pursuit of variety is revealed by a preference for larger portfolios of items over smaller portfolios of items (Kahn and Ratner 2005; McAlister 1982).

We designed the consideration sets used in the experiments to have a substantial amount of utility independence across the items so that participants would be unlikely to make decisions about one item conditional on the other items they selected. We expect that when complementarity exists, the budget contraction effect will still operate but will do so at the level of goal-derived categories rather than at the level of product categories (Barsalou 1983; Blanchard and DeSarbo 2013; Ratneshwar, Pechmann, and Shocker 1996). For example, although frosting and cake mixes are complements in a distinct product category, we argue that consumers who want to bake cakes will view them as members of a single goal-derived category (“Items I need to make a cake”) and, under budget contraction, will be more likely to stop buying items from an entire category (e.g., items to make a pizza) to preserve other goal-derived categories (e.g., baking a cake). Thus, it is not immediately clear how inherent complementarity in the consideration set might influence the budget contraction effect. In some cases, the budget contraction effect might lead to the cutting of several items that belong to one goal-derived category. In other cases, it might lead to a shallow cut of items across all categories. The issue is further complicated by the reality that each individual consumer constructs his or her own unique goal-derived categories at will. For these reasons, we selected sets of items for the experiments that we believe are unlikely to be deemed obvious complements of the same goal-derived category.

EXPERIMENT 1: ALLOCATION VARIETY IN GROCERY ORDERS

Experiment 1 tests whether mean and slope differences exist between budget expansion and budget contraction paths. Participants made grocery budget allocations for three budgets that were allocated in either an expanding ($40, $80, $120) or a contracting ($120, $80, $40) budget order. Across these different budget scenarios, we expect lesser allocation variety among participants in the contracting condition than among those in the expanding condition, and we expect this difference to be most pronounced for the lowest budget.

Method

Participants (N = 451) from a national online panel were asked to imagine a shopping spree with a given budget to buy groceries at Costco. They were asked to allocate the budget across nine products that generally come in boxed packages: Thomas’ English Muffin Mix & Match ($3.58), Milton’s Multi-Grain Bread ($4.88), M&M’s Milk Chocolate ($17.97), PowerBar Performance Variety Pack ($21.88), Mott’s Variety Pack Apple Sauce ($8.30), Chef Boyardee Beef Ravioli ($8.30), Red Baron Deep Dish Singles Pizza Variety ($10.44), DiGiorno Pepperoni Pizza ($12.88), and The Cheesecake Factory Original Cheesecake ($9.45). In the budget expansion condition, participants began with a $40 budget and indicated the quantity they would purchase of each item on a product order form (e.g., four boxes of Thomas’ English Muffin Mix & Match, three boxes of Chef Boyardee Beef Ravioli, and zero boxes of PowerBar Performance Variety Pack). After allocating the initial budget, participants were told to imagine that a few weeks had passed and that they had eaten all the food but now had won an $80 shopping spree at Costco, in which they could spend what they wished on the same set of nine products. Participants used a new blank product entry form to complete this second allocation. After this, participants imagined the same
The Budget Contraction Effect

scenario, but this time with a budget of $120. The stimuli for participants in the contracting budget were the same as in the expansion budget, except that the first budget was $120, the second budget was $80, and the third budget was $40. (The experimental stimuli for this and subsequent experiments can be found in the Web Appendix.)

Because real prices and products were used in this experiment, it was not possible to restrict participants to spending the exact dollar amount of each shopping spree (e.g., exactly $40). Therefore, participants in this experiment were not required to spend the exact amount of their shopping spree budget. Rather, those who overspent their budget did so expecting to cover the difference from their own pockets, and those who underspent their budget did so expecting to forfeit the remainder of the shopping spree budget.1

Results

After eliminating nine participants with missing values, we were left with 442 observations (for three budget levels) for our analyses. The experimental design included two budget trajectories (expanding and contracting) across subjects and three budget levels ($40, $80, and $120) within subject. We analyzed allocation variety as a function of (1) three budget levels ($40, $80, and $120; within-subject) and (2) two budget trajectories (expanding and contracting; between-subjects) with a within-subject analysis of variance (ANOVA). In addition to including individual random effects, we included the total number of items purchased as a covariate. We then used planned contrasts to investigate our hypotheses.

As Figure 1 shows, higher budgets lead to a greater mean number of grocery items chosen. (For reference, Table 1 reports the sample mean quantities purchased of each item at each budget level.) We found a significant interaction between budget levels and the budget trajectory ($F(2, 879) = 3.46, p = .03$), which is best explained by contrasting the slopes of the budget trajectory. The within-subject difference in allocation variety between the lowest budget level and the highest budget level was significantly greater for the contracting than the expanding budget condition ($M = .36$; $F(1, 879) = 6.86, p = .01$). This difference in slopes provides initial support for the budget contraction effect.

Another approach to test for the budget contraction effect is to examine allocation variety, measured as the number of different products chosen with the middle budget across budget trajectories. This approach involves a comparison in which participants in both conditions have made one prior allocation and are facing the same current budget. Contrasts revealed lesser allocation variety for the $80 budget in the contracting condition ($M = 4.17$) than in the expanding budget condition ($M = 4.62$; $F(1, 879) = 20.41, p < .01$). At all budget levels, participants in the contracting condition had lesser allocation variety than those in the expanding condition. Specifically, planned contrasts revealed that when the budget was $40, participants in the contracting condition had lesser allocation variety in their choice sets ($M = 2.99$) than those in the expanding condition ($M = 3.57$; $F(1, 879) = 3.46, p = .03$).

The average total spending at the $40, $80, and $120 budget levels did not significantly differ between the expanding and contracting conditions ($40 budget: M_{exp} = 58.96, M_{con} = 58.57; F(1, 450) = .00, p > .90$; $80 budget: M_{exp} = 103.60, M_{con} = 106.70; F(1, 450) = .03, p > .80$; $120 budget: M_{exp} = 149.28, M_{con} = 129.06; F(1, 450) = .95, p > .30$).

### Table 1

<table>
<thead>
<tr>
<th>Grocery Items</th>
<th>Between-Subject Means</th>
<th>$40 Budget</th>
<th>$80 Budget</th>
<th>$120 Budget</th>
<th>$120 Budget – $40 Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Expanding</td>
<td>Contracting</td>
<td>Expanding</td>
<td>Contracting</td>
</tr>
<tr>
<td>Thomas' English Muffin Mix &amp; Match</td>
<td>.86</td>
<td>.90</td>
<td>1.48</td>
<td>1.25</td>
<td>.20</td>
</tr>
<tr>
<td>Milton's Multi-Grain Bread</td>
<td>1.29</td>
<td>1.27</td>
<td>2.21</td>
<td>1.60</td>
<td>.29</td>
</tr>
<tr>
<td>M&amp;K's Milk Chocolate</td>
<td>.16</td>
<td>.14</td>
<td>.41</td>
<td>.35</td>
<td>.15</td>
</tr>
<tr>
<td>PowerBar Performance Variety Pack</td>
<td>.25</td>
<td>.27</td>
<td>.33</td>
<td>.41</td>
<td>.56</td>
</tr>
<tr>
<td>Mott's Variety Pack Apple Sauce</td>
<td>.73</td>
<td>.52</td>
<td>1.77</td>
<td>1.33</td>
<td>.21</td>
</tr>
<tr>
<td>Chef Boyardee Beef Ravioli</td>
<td>1.47</td>
<td>1.42</td>
<td>2.35</td>
<td>2.12</td>
<td>.30</td>
</tr>
<tr>
<td>Red Baron Deep Dish Singles Pizza Variety</td>
<td>.91</td>
<td>.98</td>
<td>1.65</td>
<td>1.95</td>
<td>.24</td>
</tr>
<tr>
<td>DiGiorno Pepperoni Pizza</td>
<td>.82</td>
<td>1.03</td>
<td>1.31</td>
<td>2.05</td>
<td>.18</td>
</tr>
<tr>
<td>Cheesecake Factory Cheesecake</td>
<td>.32</td>
<td>.14</td>
<td>.49</td>
<td>.39</td>
<td>.63</td>
</tr>
</tbody>
</table>
Finally, at the highest budget level ($120), allocation variety also significantly differed between participants in the contracting condition (M = 4.82) and those in the expanding condition (M = 5.12; F(1, 879) = 5.46, p = .02). These effects hold when we control for the number of items purchased, in line with allocation variety (F(1, 879) = 50.34, p < .01).

Discussion

The budget contraction effect we found is consistent with the notion that consumers try to avoid spreading losses slowly across many items and instead constrict them to a narrower set of items. Our explanation for the budget contraction effect stems from the idea that the allocation of the initial budget provides a reference quantity for each item in the allocation set. Experiment 2 explores the generalizability of the budget contraction effect by examining a setting in which money is allocated to investments. In this case, the budget is not allocated to different products, but to an assortment of financial investment vehicles. Furthermore, the use of investments instead of groceries helps eliminate potential variation due to any possibility of dependence among the available items; participants do not have any information to potentially attempt to make inferences about complementarity of the available alternatives.

**EXPERIMENT 2: ALLOCATION VARIETY IN FINANCIAL DIVERSIFICATION**

It is common for people to have retirement accounts to which they contribute each month. Such accounts generally allow investors to adjust how their balance is allocated across various investments. In this experiment, we explore how people allocate investment contributions to various investment vehicles under either increasing or decreasing investment allocation budgets. This experiment enables us to examine whether the budget contraction effect generalizes to a setting in which the budget and the items to which the allocations are made are both monetary. By limiting the number of investment vehicles to four and by sizing the budgets so that there is sufficient money to allocate to all four vehicles, we can mute any possible effects of differential consideration of costly alternatives in the initial allocations of the declining and expanding budget conditions (i.e., participants first faced with the largest budget and those first faced with the smallest budget) that could have potentially existed in Experiment 1. In addition, because there are no prices for the items in this setting and all items had positive expected value, we could require participants to allocate the exact amount of each budget.

**Method**

Participants were 588 adults from a national online panel. Each participant was asked to imagine that the U.S. government was implementing a new retirement plan that gave people money each month to allocate to four investment vehicles that differed in their risk and likely return: "very safe, guaranteed low returns"; "safe, almost always with modest returns"; "somewhat risky, normally with above average returns"; and "very risky, with the possibility for high returns." The plan allowed people to spread their monthly investment stipend/budget across the four vehicles as they wished. Each participant received and allocated three retirement budgets in either an expanding sequence ($500, $1,000, $1,500) or a contracting sequence ($1,500, $1,000, $500).

For each of the three sequential budget allocation decisions, participants reported how much of the current budget (in dollars) they wished to allocate to each of the four investment vehicles. We deemed vehicles that received a nonzero investment amount as having been invested in for that budget. Thus, a participant’s allocation variety for a given budget could range from a low of one (i.e., the entire budget allocated to one vehicle) to a high of four (i.e., some portion of the budget allocated to each of the four vehicles).

As in Experiment 1, the key test was whether the mean and slopes for the allocations of a given budget were less varied (i.e., applied to fewer vehicles) in the contracting sequence than in the expanding sequence.

Unlike in the grocery purchases, participants in this experiment were not led to believe that the previous allocation had been consumed, but rather that each new allocation would be added to the previous month’s (e.g., “The government has decided to up the allocation amount for this month. This month they are giving people $1,000 to invest”). Thus, if the budget contraction effect only occurs when people cannot pursue interperiod allocation strategies, it should not occur in this experiment.

**Results**

As in Experiment 1, the experimental design had two budget trajectories (expanding and contracting; between-subjects) and three budget levels ($500, $1,000, and $1,500; within-subject), and we analyzed allocation variety as a function of budget trajectories, budget level, and their interaction with a within-subject ANOVA. Three measures of allocation variety were thus obtained for each of the 588 participants.

First, we found a significant interaction between budget allocation and budget trajectory (F(2, 1772) = 28.53, p < .01). Figure 2 displays the (between-subject) number of investments to which participants in the expanding and contracting conditions allocated each of the three budgets (between-subject means). As in Experiment 1, planned budget level x budget trajectory within-subject planned contrast revealed that the slope (difference in allocation variety) between the largest and smallest budgets (within-subject) was significantly greater in the expanding than the contracting condition (M = .44, F(1, 1772) = 54.78, p < .001). This again provides support for the budget contraction effect.

Second, we found, as expected, that allocation variety was lesser for the $1,000 budget under the contracting trajectory (M = 2.95) than for that under the expanding trajectory (M = 3.26; F(1, 1172) = 52.17, p < .001). Comparison of the allocation variety for the other budget levels revealed a pattern similar to that in Experiment 1. Specifically, at the lowest budget level ($500), participants in the contracting condition had less allocation variety in their choice sets (M = 2.57) than those in the expanding condition (M = 3.17; F(1, 1172) = 204.66, p < .001). In addition, at the highest budget level ($1,500), the difference was smaller but significant (Mcontracting = 3.14, Mexpanding = 3.30; F(1, 1172) = 14.73, p = .01).
that declining budgets generate less mean allocation variety than expanding budgets and, through slope tests, that the successive declines have a much larger impact on initial control choices than successive budget expansions.

**EXPERIMENT 3: ALLOCATION VARIETY IN TRAVEL ITINERARIES**

Experiment 3 assesses allocation variety by the number of cities to be visited on a trip with differing numbers of days, thus testing whether the effect extends to time budgets. The question of extension to time budgets is important because time is one of the most significant resources consumers have to allocate (Okada and Hoch 2004). The generalization of the budget contraction effect to time budgets is uncertain, though, because money and time differ in the length of planning horizons they encourage (Lynch et al. 2010), in the concreteness of their valuation (Okada and Hoch 2004), in their tendency to direct attention to possession versus experience (Mogilner and Aaker 2009), and in the extent to which they encourage heuristic versus systematic processing (Saini and Monga 2008). Thus, anticipated psychological reactions to changes in time budgets may differ from changes in monetary budgets.

To examine the allocation of time budgets, Experiment 3a explores how people allocate travel-day budgets to cities when planning a trip through Western Europe. Experiment 3b uses this same travel context to examine whether making many shallow cuts to a reference allocation indeed involves more severe feelings of loss than making fewer deep cuts.

**Experiment 3a: Impact of a High Initial Budget**

**Method.** All participants (N = 410) from a national online panel were asked to imagine winning an all-expenses-paid trip through Western Europe for 21 days. Participants in the expanding budget condition were then told that because of work obligations, they could only travel for 7 of the 21 days. Participants were then shown the list of cities they could visit (i.e., Amsterdam, Copenhagen, Edinburgh, Lisbon, London, Madrid, Marseilles, Milan, Munich, Naples, Paris, Prague, Rome, and Vienna) and were told to indicate which cities they would visit and how many days they would spend in each city. After making the initial allocation, participants were told that time had freed up in their work schedule and they could now travel instead for 14 days. Participants completed a new travel itinerary, indicating how they would allocate their 14 travel days across the various cities. Finally, participants were told that their schedule had freed up completely and they could travel instead for all 21 days, and they completed a final travel itinerary. Participants in the contracting travel budget condition followed the same procedure, except that the order was reversed, beginning with 21 days and ending with 7 days, with each contraction due to an unexpected constraint in their work obligations, they could only travel for 7 of the 21 days.

**Results.** As with the previous experiments, we analyzed the allocation variety as a function of the three budget levels (7 days, 14 days, and 21 days; within-subject) and budget trajectory (expanding or contracting; between-subjects) with a within-subject ANOVA. First, we found a significant interaction between budget trajectory and budget level (F(2, 815) = 9.43, p < .01). To illustrate this interaction, Figure 3
The data from this experiment replicate the budget contraction effect found previously for time budgets. As we predicted, a within-subject slope test (i.e., a planned budget level x budget trajectory within-subject contrast) revealed that the difference in allocation variety between the highest and lowest budgets was significantly greater for participants in the contracting budget condition than for those in the expanding budget condition (M = 1.00; F(1, 815) = 18.86, p < .001). At the highest budget level (21 days), there was a smaller but significant difference in allocation variety between participants in the contracting condition had lesser allocation variety in their choice sets (M = 5.64) than those in the expanding condition (M = 6.46; F(1, 815) = 25.97, p < .01). The same was true for the 7-day budget, in which participants in the contracting condition had lesser allocation variety in their choice sets (M = 3.11) than those in the expanding condition (M = 4.43; F(1, 815) = 66.96, p < .001). At the highest budget level (21 days), there was a smaller but significant difference in allocation variety between participants in the contracting condition (M = 7.28) and those in the expanding condition (M = 7.60; F(1, 815) = 4.13, p = .04).

Discussion. The data from this experiment replicate the budget contracton effect found previously for time budgets. Specifically, the budget contraction effect replicated in terms of both the main effect at the middle budget and the slope difference. A noteworthy design feature of this experiment was that participants were told at the outset to imagine that they had won a trip for 21 days. This is a departure from the previous experiments, in which the initial default budget that participants brought to each decision context was presumably zero (i.e., not having won a shopping spree to Costco and not having received money from the government to invest for retirement). Nevertheless, the effects here replicated those in the previous experiments. This indirect evidence suggests that the budget contraction effect does not stem from differences in budget trajectory alone, but rather from differences in reference quantities that emerge when initial budgets are allocated to items. We examine this idea directly in Experiment 4.

Thus far, three experiments using groceries, investments, and travel itineraries have shown that allocations of contracting budgets have lesser allocation variety than allocations of expanding budgets. Although at the lowest budgets there is little opportunity to find differences of extreme magnitude, the reported experiments consistently find that the largest differences in allocation variety across the budget trajectories come from the lowest budget levels. This is consistent with evidence that consumers try to avoid some of the feelings of loss from making broad but shallow allocation cuts to many items, but the evidence is indirect.

The purpose of Experiment 3b is to provide more direct evidence that the budget contraction effect stems from a desire to avoid feelings of loss. Specifically, the experiment uses a travel itinerary task to show how a desire to avoid feelings of loss associated with making cuts to many options may underlie the budget contraction effect.

Experiment 3b: Expected Feelings of Loss from Broad Versus Focused Cuts

This experiment examines the expected feelings of loss of two strategies for dealing with a declining budget: a "broad-cut" strategy, which involves making many small, shallow cuts across many items, and a "focused-cut" strategy, which involves focusing cuts on a limited set of items. As discussed, choices derive from expected utility (e.g., Mellers and McGraw 2001), not from actual experienced utility after decisions are made, and so we specifically focus on expected feelings of loss to better understand why the budget contraction effect may occur. The loss aversion account for the budget contraction effect suggests that consumers will have less severe feelings of loss when executing a focused-cut strategy than a broad-cut strategy.

Method. Participants were 124 undergraduate students from a large eastern university who participated in exchange for monetary compensation ($10). They were given the same 21-day budget scenario as in the budget contraction conditions of Experiment 3a and were asked to indicate how they would allocate their travel budget. Participants were then told to imagine that they could only travel for 14 days and so had to eliminate 7 days of travel in a way requested by their travel agency. Participants in the focused-cut condition were told that they would have to use a focused-cut strategy to adjust their travel plans: "For logistical reasons, the travel agency with which you booked your trip tells you that you must cut your 7 days in a way that preserves the length of your stay in as many cities as possible, thus leading you to have to cut out some of your chosen cities altogether." Participants in the broad-cut condition read the same instructions but were told that they would have to use a broad-cut strategy to revise their travel plans. The italicized portion in the previous condition was replaced with "visiting as many cities as possible, thus leading you to have
to reduce the number of days you spend traveling in at least some of your chosen cities."

All participants then reported the expected psychological experience of making these cuts on nine-point scales ("How much loss do you expect to feel as a result of adjusting your travel schedule by cutting out some of your chosen cities altogether?" and "How psychologically painful do you expect your decision to cut out some of your chosen cities altogether will be?"). On the same scale, participants assessed the expected general difficulty of making the cuts ("How difficult do you expect your decision of which of your chosen cities to cut out altogether will be?"). We explore expectations of difficulty and psychological experience because, according to loss aversion, expectations of the psychological experience drive allocation decisions (e.g., the strategies taken by participants in Experiments 1-3a), not the expected difficulty, actual difficulty, or actual psychological experience that results from the use of a particular allocation strategy.

The first two questions enable us to assess whether expected psychological experiences differ for the two strategies. The general difficulty question enables us to determine whether participants perceive the two strategies as differentially effortful to apply, a potential alternative explanation for the budget contraction effect. We asked this question because if participants expect the focused-cut strategy to be easier to execute, the budget contraction effect might stem from a perceived difference in effort needed to execute specific reduction strategies, rather than the difference in expected psychological experiences of executing different strategies.

Results. The results reveal that participants in the broad-cut condition expected to experience greater feelings of loss (M = 5.26) than those in the focused-cut strategy condition (M = 4.47; F(1, 122) = 4.79, p < .05). This same pattern occurred for the psychological pain question, with participants using the broad-cut strategy anticipating directionally greater psychological pain (M = 3.66) than those using the focused-cut strategy (M = 3.08; F(1, 122) = 2.28, p = .13). An equally weighted linear combination of these two measures produced the same result; those in the broad-cut condition anticipated greater feelings of loss (M = 4.46) than those in the focused-cut strategy (M = 3.77; F(1, 122) = 4.50, p < .05). Finally, the anticipated difficulty of implementing the two strategies did not differ (for both conditions, M = 4.29; F(1, 122) = .00, p > .50).

Discussion. These data provide process evidence for the budget contraction effect, showing that consumers faced with allocating a reduced budget anticipated that making broad, shallow cuts to many alternatives would involve greater feelings of loss than making focused, deep cuts to a few alternatives. However, there was no difference in expected general difficulty of implementing the two strategies. This suggests that the budget contraction effect stems not from a difference in expected effort of executing the two strategies but from a difference in the expected negative psychological experience of implementing them, in line with a loss aversion account.

Experiment 4 examines directly whether reference quantities are necessary to produce the budget contraction effect. Specifically, the experiment tests the critical role of the perception of losses in budget contraction by showing a moderation of the effect when specific items are not allocated in any previous budget.

EXPERIMENT 4: ALLOCATION VARIETY WITHOUT PRIOR ALLOCATIONS

The results of Experiment 3b show that consumers faced with allocating a reduced budget anticipate that making broad, shallow cuts to many alternatives will involve greater feelings of loss than making focused, deep cuts to a few alternatives. We claim that the basis of these concerns about loss is the reference quantities established by the previous budget allocation. If so, the budget contraction effect should not occur if participants do not allocate their initial budget because, without an allocation of the budget, reference quantities will not emerge. To test this, we ask some participants to examine an initial set of alternatives with a budget in mind but not to actually allocate their initial budget.

Method. Participants were 416 adults from a national online panel. The experimental design was similar to that in Experiment 1 involving grocery orders. However, this experiment employed a 2 (budget trajectory: expanding or contracting; between-subjects) x 2 (prior allocation: yes or no; between-subjects) design. All participants allocated an $80 grocery budget after facing either a $40 budget (expanding condition) or a $120 (contracting condition) and after either allocating the initial budget (prior allocation) or not allocating the initial budget (no prior allocation).

Results. Because the only budget allocated by all participants was the $80 budget, the analysis in this experiment centers on the allocation variety of the $80 budgets. The focus was on exploring whether the budget trajectory's influence on allocation variety is moderated by whether participants' previous budget was allocated to items in their consideration set. If so, allocation variety for the $80 budget should be lesser in the prior allocation contracting condition than in the other three conditions. We analyzed the allocation variety with linear regression, with budget trajectory (1: contracting; 0: expanding), prior allocation (1: yes; 0: no), and their interaction as predictors.

We found a marginally significant interaction between budget trajectory and prior allocation (β = -.7220, t(412) = -1.68, p < .10). This interaction (depicted in Figure 4) can be decomposed by contrasting the simple effect of the budget trajectory between prior allocation conditions. We found a significant effect of budget trajectory on allocation variety when the initial budget had been allocated, but no such effect when it had not been allocated. Specifically, when the initial budget was allocated, there was less allocation variety in the contracting condition (M = 4.00) than in the expanding condition (M = 4.65; β = -.65, t(412) = -2.10, p = .04). However, when the initial budget had not been allocated, allocation variety in the contracting budget condition (M = 4.84) was not directionally lower than allocation variety in the expanding condition (M = 4.77; β = .07, t(412) = .24, p = .81). In addition, for those experiencing an expanding budget trajectory, allocation variety in the no prior allocation condition (M = 4.77) did not differ from that in the prior allocation condition (M = 4.65; β = -.22, t(412) = -2.10, p < .05). These findings suggest that the budget contraction effect stems from the presence of prior budget allocation.
tion (M = 4.00) and the prior allocation condition (M = 4.84; \( \beta = -0.84, t(412) = -2.71, p < .01 \)), confirming that the budget contraction effect stems from the contracting budget condition.

**Discussion.** These data show that the budget contraction effect depends on whether allocations to a given set of alternatives were made with a prior reference allocation level in mind, adding support to the notion that the budget contraction effect stems at least in part from feelings of loss of reducing items. When a set of items was not previously selected, allocation variety was insensitive to budget trajectory. This result indicates that feelings of loss are not associated with making cuts to those items, and so there is no need to focus cuts narrowly. The data in this experiment also help us rule out a possible drive to simplification (and, thus, less variety) in response to worsening prospects, because allocation variety did not drop under worsening prospects when there was no initial allocation from which to adjust.

**GENERAL DISCUSSION**

**Theoretical and Managerial Implications**

The experiments demonstrate an asymmetry in budget expansion and contraction paths, with consumers arriving at a particular budget from a higher initial budget selecting fewer different types of items than those arriving at the same budget from a lower initial budget. We found this budget contraction effect in grocery item purchases, investment allocations, and travel budgeting decisions. The results from our experiments suggest that the effect originates from a decrease in allocation variety when budgets contract rather than from an increase in allocation variety when budgets expand. The results also reveal that the budget contraction effect stems from a desire to avoid the anticipated psychological losses associated with spreading budget cuts broadly (but shallowly) across many items. Support for this avoidance of anticipated losses comes from Experiments 3b and 4.

We show that the budget contraction effect is a causal influence of budget trajectory on the amount of variety in one's allocation set. We can make this strong causal claim because of our experimental designs, in which participants were randomly assigned to experience either an expanding or a contracting budget trajectory.

It is important to understand the influence of budget trajectory because even in stable economic times, millions of U.S. households experience a negative budget shock in any given year. The role of budget trajectory (as opposed to income trajectory) on allocation variety might seem a bit academic at first, but we believe that allocation variety is the right place to start for two reasons. First, demand models typically presume that income effects on demand are symmetric for budget expansions and contractions. Our results instead imply that they are not symmetric. That is, our results suggest that income elasticities for particular products are likely to be different when budgets expand than when they contract. Second, the effect of budget trajectory may also influence the exact composition of consumer choice sets. For example, under budget contraction, multi-pack cereals may be less popular at breakfast, and cities containing multiple activity options may be less popular on tours. Speculating on and exploring the nature of this influence is likely to be a fruitful avenue for research.

In an attempt to test and understand the budget contraction effect, we relied on consumers' expected utility (e.g., Loewenstein, O'Donoghue, and Rabin 2003) regarding the decisions they make, rather than the actual experienced utility that follows from consumption. Similarly, we explored the choices consumers actually make, rather than the choices they should make. To better understand the downstream consequences of the budget contraction effect on consumer welfare, future studies might explore the actual experienced utility in contexts similar to those we present herein. Doing so could contribute to a better understanding of what decisions would help consumers maximize their experienced utility.

All the experiments used tightly controlled between-subject designs, which measure changes in allocation variety across adjacent allocations. It remains to be seen if the contraction effect is strong enough to compel a given consumer to opt for a less varied assortment at time \( t + 2 \) with a budget \( B \) than at time \( t \) with the same budget (having had a larger budget at time \( t + 1 \)). For example, if a consumer allocates $40 across a product set, then allocates $80 across the same set, and then allocates $40 again across the same set, will the original $40 allocation have greater variety than the final $40 allocation?

In addition to its theoretical importance, understanding the budget contraction effect might help companies market their products. For example, during times of economic downturn, companies such as Amazon.com may prefer to emphasize albums by artists whose other songs consumers already own or focus on specific genres that a particular consumer has most likely purchased music from in the past. Doing so should be beneficial because such recommendations help consumers in an economic downturn keep their...
allocations narrow. During times of economic prosperity, however, it might be beneficial to expand recommendations to provide easier access to items that would maximize allocation variety.

An understanding of how the phenomenon can affect decision making can also help consumers predict their own future behavior and perhaps prevent times when, for example, choosing a lesser allocation variety during budget contractions could have damaging consequences. Diversifying an investment portfolio is considered a fundamental rule of prudent investing. During downturns in the economy, however, investors may allocate their money to a smaller number of investments, ironically creating a less diversified and, therefore, more risky portfolio. However, such potentially problematic situations may be overcome by an understanding of how budget contractions affect decisions. There are undoubtedly many more contexts in which the budget contraction effect plays a role in decision making, and we hope that clarifying this effect can help explain how people can best deal with harsh economic circumstances.

Conclusion

The budget contraction effect introduced in this article is relevant for understanding the expenditure decisions of consumers whose budgets undergo a contraction, whether due to an income shock, a substantial price increase, or a drop in the discretionary budget as a result of an increase in expenditures elsewhere. Because individual budget contractions are more common during economic downturns, the budget contraction effect is particularly helpful for understanding how consumers adjust their spending during economic contractions. We offer evidence that economic downturns cause consumers to be narrower in their choice sets and to allocate their budgets to fewer categories, suggesting that economic downturns are a particularly important time for brands to reinforce relationships with consumers who must narrow their consumption.

We argue that the budget contraction effect occurs because consumers make choices by considering not only the utility they expect to receive from the items they select but also the psychological costs they expect to incur from consuming these items at levels below a prior reference level. The idea that consumers make choices by focusing on expected utility, rather than actual experienced utility, is not a unique contribution of this work, as that idea can be traced as far back as Bernoulli in 1738 and more recently to Fechner in 1860, who established quantitative psychophysics using a subjective utility scale (see Coombs, Dawes, and Tversky 1970). Rather, our main contribution is showing that prior budget allocations create allocation quantities that act as important reference points for future budget allocation decisions. We also show that part of the utility consumers anticipate, and therefore part of the utility that influences their choices, comes from the losses or gains they anticipate relative to the reference quantities obtained from their previous budget allocations.

REFERENCES


