

Preference Refinement after a Budget Contraction

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How does coping with a resource loss of time, space, or money change a consumer? In the current work, we argue that resource losses that give rise to budget contractions require a coping strategy that not only influences choice in the moment but also changes underlying consumer preferences. We show that the preference restructuring that occurs when coping with a budget loss also leads to stabilization of preferences. Specifically, a consumer who allocates a budget to a set of items prior to a budget contraction and allocates that same budget post-contraction when the budget is fully restored will allocate the restored budget to fewer options in the set. Coping with the contraction helps consumers prioritize what matters to them, leading to refinement of preference. This within-consumer preference refinement effect exists for budgets of time, space, and money. We identify boundary conditions (i.e., significant budget contractions and self-determined contraction allocations are necessary for prioritization to occur) and rule out non-prioritization explanations (e.g., anchoring and under-adjusting). These findings suggest that marketers should focus on capturing consumers who are dealing with budget contractions as this is one of the moments where individuals revisit and rediscover what matters most to them.

Keywords: budget contraction, allocation variety, preference stabilization, preference prioritization, government shutdown, pandemic

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"Mostly it is loss which teaches us about the worth of things."

-Arthur Schopenhauer (1788–1860)

At some point, most consumers will face an unavoidable loss of income due to a major change in their life. Income-reducing changes can result from events such as losing one's job, going back to school, suffering an injury, falling ill, or being furloughed. The amount of income lost in such situations can be substantial. For example, research suggests that the average American who experiences job displacement will face a 25–40% reduction in income that year (Stephens 2001), and this percentage can climb as high as 55% during a recession (Pew Research Center 2010). In addition to encountering periodic income contractions, life events can also cause people to experience losses of discretionary time and space due to events such as going back to school while working, starting a second job, having a child, or moving into a smaller house. When consumers cannot borrow against future income, time, or

space, events like those above will generally produce a budget contraction, which will necessitate a cut in spending. (Note that we use the term “spending” generally to represent spending of money, time, or space resources.)

Prior research has found that a contracting economy and/or a contracting personal budget causes consumers to cut their spending on non-essential items like cars (Dargay 2001), even those consumed in more visible circumstances (Kamakura and Du 2012), and to reduce the overall number of different items consumers buy (Carlson et al. 2015). This prior work has focused on either aggregate consumer purchases or how individual consumers allocate a contracting budget, and so is silent on what effect (if any) coping with a budget contraction has on consumers’ future choices.

The current article advances the idea that coping with a contracting budget and making tradeoffs across alternatives causes consumers to prioritize what they value, and that this prioritization causes a non-transient change or refinement in the consumers’ preference structure. These prioritization-driven cuts manifest as a reduction in the number of unique items to which the budget is allocated. If the preference structure of the consumer changes during the contraction, then these “refined” preferences should persist when the budget is restored to original levels. This will produce a specific pattern of allocations in which the number of unique items to which the final budget is allocated is lower than the number of items to which that same budget was allocated initially, so long as a contracted budget was allocated in the interim. We refer to this within-consumer revealed preference pattern as the *preference refinement effect*.

We predict that preference refinement will be greater for those who have, rather than have not, coped with a budget contraction. We also predict that this greater refinement will occur because managing a budget loss causes consumers to prioritize what they value. In short, we expect loss will indeed be a fine teacher of the worth of things.

The remainder of the article is organized as follows. We review the literature on which the preference refinement hypothesis is based. We then present a series of choice studies that demonstrate the hypothesized effect. We establish moderators of the effect, rule out alternative explanations, and identify the goal of prioritization as the mediating mechanism. We conclude with a discussion of the theoretical and practical implications of this work.

THEORETICAL DEVELOPMENT

Researchers have been fascinated with loss for decades, and there is a deep literature on how consumers attempt to take risks in order to avoid losses whenever possible (i.e., loss aversion). Indeed, this behavior is the centerpiece of prospect theory (Kahneman and Tversky 1979). But what

happens when loss is unavoidable, when it is exogenously determined, and when it cannot be thwarted by taking a risky path? According to Harvey (1996), a loss occurs when a person has an emotional investment in a resource that is then reduced. This resource may be tangible or intangible in nature. In the present work, we are interested in what occurs within the consumer when losses cannot be avoided and must be managed. How might that process of coping affect both the person and their preferences, and how does it manifest in downstream choices? Though we do not expect the sort of losses discussed here to produce the same kind of changes as say the loss of a loved one, some research suggests that coping with an unavoidable loss can alter the way people perceive risk and the value they place on physical items (Ferraro, Shiv, and Bettman 2005; Rindfleisch, Burroughs, and Wong 2009).

The question we address in this article focuses on a particular type of loss—a budget contraction. Specifically, does coping with an unavoidable budget loss lead to a change in a consumer’s preference structure, and if so, what is the process by which this change occurs?

Coping with Economic Contractions

What evidence do we have that a consumer, coping with budget loss, might undergo a psychological change that persists in future decisions when the budget is restored? To date, we know of no research that has explicitly looked at the within-person changes that result from dealing with a budget loss.

Prior research has shown, at an operational level, that aggregate consumption patterns differ when the economy contracts versus expands (Hall 1979) and that consumers faced with a contracting budget behave differently than those faced with an expanding or stable budget (Carlson et al. 2015; Dargay 2001; Kamakura and Du 2012; Shea 1995). For instance, Kamakura and Du (2012) found that when the economy is in a recession, consumers spend more on essential goods when consumption is not highly visible to others as opposed to during an economic expansion. Further, Shea (1995) found that when consumers’ incomes decrease, consumption changes to a greater degree than if their incomes increased by the same amount. Dealing with a contraction also tends to put consumers into a scarcity mind-set, causing them to focus on what is most imperative and valuable to them (Mani et al. 2013; Mullainathan and Shafir 2013; Shah, Shafir, and Mullainathan 2015).

The work above does not take a position on what effect, if any, experiencing an unavoidable budget contraction has on a consumer’s psychology and/or preference structure. We can think of at least two reasons for this. First, the work above has either examined correlations using aggregate data or has relied on between-participant experiments. Because prior work has not examined changes in the

choices of specific individuals over time, it cannot directly address the question of how consumers cope with the loss and whether the choices of a particular consumer trend toward preference restructuring and stabilization as a result of contraction. Second, the idea that a change in one's budget (i.e., the constraint in a utility optimization framework) might alter the shape of one's underlying utility function (i.e., the objective function to be maximized) flies in the face of most models of consumer choice. For example, optimization models of consumer choice not only assume that consumers do their best (i.e., optimize their consumer choices) over the constraints that determine which combination of alternatives can be acquired but also assume that preferences are not altered as a result of the constraint. Therefore, such models would only apply to consumer choices for consumers with utility functions that are not impacted by changes in budget constraints.

The focus of the current work is to examine the idea that coping with a budget contraction will do more than just change behavior in the moment—it will influence consumers' underlying utility function. Such an alteration would be reflected in the preferences and the subsequent choices revealed within-person by a consumer over time.

Preferences after Coping with a Budget Contraction

There are three ways that coping with a budget contraction might influence consumers' preferences. One view, perhaps most aligned with rational economic theory, is that utility functions do not change at all when the budget changes (Samuelson and Zeckhauser 1988). This view maintains that whatever consumers do to cope with a budget contraction in the short run can be attributed to a processing convenience (e.g., to avoid negative affect from making overly broad cuts; Carlson et al. 2015) or situated as a context effect (Bettman, Luce, and Payne 2008). Under this view, consumers who allocate an initial budget and then allocate a smaller (contracted) budget will not see their underlying utility function change. When these same consumers are given the chance to allocate the original (higher) budget a second time, this view predicts that their choices will not systematically differ from the choices made initially as they will be governed by the same utility function and preference structure faced initially.

A broad stream of the psychology literature aligns with the rational economic theory in this case. Namely, consistency theories predict that a single consumer who made the same choice under the same budget constraint at two different times in a relatively short span of time would seek to make budget allocations that were the same (Cialdini, Trost, and Newsom 1995; Elliot and Devine 1994; Festinger 1957; Russo et al. 2008; Simon, Snow, and Read 2004; Thagard 2000). Indeed, these motivations are believed to be so strong that they discourage most

experimental researchers from using within-participant designs. All things being equal, consistency motives should compel consumers to make identical choices pre-contraction and post-contraction so long as the alternatives and the budget are the same.

A second possibility is that coping with a budget contraction causes utility functions to be transformed reactively (Brehm 1966). That is, consumers who cannot afford certain items when their budget contracts develop an increased affinity for these items compared to consumers who have not dealt with a contraction. This view, which can be thought of as the *reactance hypothesis*, derives from research that has demonstrated that perceptions of scarcity increase an individual's preference for that scarce good (van Herpen, Pieters, and Zeelenberg 2009; Verhallen 1982). For example, van Herpen et al. (2009) found that when products appear scarce, they become more popular and are more likely to be chosen. Parker and Lehmann (2011) extended these findings and discovered that popularity perceptions, more so than quality perceptions, drive this increased choice share.

If the inability to acquire certain items under a budget contraction makes these items more appealing, then items cut in response to a budget contraction will not simply re-enter the shopper's basket at pre-contraction levels when the budget is fully restored, but rather they will re-enter as a larger share of the basket than they represented pre-contraction. This reactance-driven preference pattern fits with the idea of an existing preference that is temporarily suppressed (during contraction) and re-emerges in a way to make up for the lost consumption of the cut items during contraction. Much like a suppressed goal may return and escalate when it has been thwarted (Carlson, Meloy and Miller 2013; Chartrand et al. 2008), this account suggests that due to the loss, the suppressed preference will return at an increased level when the budget is restored.

The third possibility, which we call the *preference refinement hypothesis*, is that coping with a budget contraction will alter consumers' utility functions in line with how each specific consumer opts to manage the loss. That is, during the loss consumers will engage in a process of prioritization in which they home in on what they value most and least. For those who experience a contraction, this prioritization process will lead to a refined awareness of what really matters to the consumer. This will cause consumers who have coped with a budget contraction to exhibit preference refinement, relative to those who have not had to cope with a budget contraction. Empirically, the preference refinement hypothesis suggests that consumers who have experienced a budget contraction and have their budget restored should have fewer unique items in their post-contraction choice sets than they had in their pre-contraction choice sets. Further, we should *not* see an increase in the share of items that were cut during the intervening budget contraction.

This hypothesis derives from two streams of research. First, while consumers often construct preferences among the options available at that point in time (Bettman, Luce, and Payne 1998; Russo, Carlson, and Meloy 2006; Tversky and Simonson 1993), they also often have stable preferences for frequently considered products (Fischhoff 1991; Hoeffler, Ariely, and West 2006). This suggests that preference discovery begins with a construction process and stabilizes with experience, begging the question: what type of experience leads to preference stabilization? To answer this question, we turn to a second line of research that shows that preference stabilization can be facilitated by making tradeoffs. Fernbach, Kan, and Lynch (2015) find that priority planning (vs. efficiency planning) results from experiencing loss and requires that tradeoffs be made to eliminate items within the same resource budget (e.g., time for time). Likewise, Hoeffler and Ariely (1999) find that consumers faced with easy choice environments are more likely to have relatively unstable preferences when compared to those who face difficult choice environments (presumably where prioritization is necessary).

We believe that coping with a budget contraction requires precisely the sort of tradeoff making and concomitant preference prioritization that gives rise to preference stabilization. As such, we expect that consumers who face the same budget allocation on two different occasions will experience preference stabilization if they have experienced an intervening budget contraction. This stabilization should manifest itself in a change in the final allocation (as compared to the initial allocation) where the final allocation contains less allocation variety (i.e., fewer unique items)—the *preference refinement effect*. Further, because we claim that prioritization leads to preference restructuring and stabilization, the refined preferences should withstand the test of time and affect choices in new contexts as well.

Research Overview

To determine whether experiencing a budget contraction leads to a non-transient change in an individual's preferences, we conducted our studies using within-person designs. We gave consumers budgets of time, space, or money and had them allocate these budgets across a set of alternatives (e.g., allocating a travel time budget of 21 days to a set of 12 different European cities). In most of our studies, participants made three sequential allocation decisions: an initial allocation at an initial budget level (e.g., 21 days), a middle allocation at a lower, contracted budget level (e.g., 7 days), and a final allocation at the original budget level (e.g., 21 days). We compare each consumer's initial and final allocation to see whether preferences change due to coping with allocating the contracted budget. We are specifically interested in whether the final allocation contains fewer unique items than the initial allocation. Our within-person

designs allow for detection of small changes in individuals' revealed preferences.

We first explore the preference refinement effect in allocations of time to travel, space to resources, and money to products and services. We then examine theoretically derived moderators of the effect and rule out some alternative explanations. We show carryover effects of the refined preferences to a new choice context, and we identify prioritization as the mediating goal. Finally, we demonstrate our effect in a real-world example of contraction: the government shutdown that occurred December 22, 2018 through January 25, 2019.

STUDIES 1A–D: PREFERENCE REFINEMENT IN TIME, SPACE, AND MONEY

Studies 1A–D seek to test the preference refinement hypothesis in choices involving time (1A), space (1B), and monetary (1C) budgets. We also look for evidence of the effect in a consequential choice study (1D). To test for preference refinement, we measure the number of unique items to which an initial (pre-contraction) budget was allocated (X_1) and compare this with the number of unique items to which the same size post-contraction budget was allocated (X_3). We then check for a negative difference between X_3 and X_1 (i.e., $X_D < 0$) to determine whether preference refinement has occurred. We also use repeated measures ANOVA to verify that the overall pattern (i.e., time of allocation: X_1 , X_2 , X_3) is consistent with our theorizing.

Study 1A—Time

Participants were asked to imagine they were taking a vacation to Europe and subsequently allocated 21 travel days across 12 cities. The travel time then contracted to 7 days and subsequently returned to the original 21 days. The economics/consistency hypothesis predicts that the initial 21-day allocation (X_1) and the third allocation, after the contraction and restoration of the budget (X_3) would, on average, be the same. Under the reactance hypothesis, the items dropped under contraction should reappear in the final allocation as a greater share than some of the items that survived contraction. In contrast, under the preference refinement hypothesis, some of the items eliminated during contraction will not reappear when the budget is restored.

Method. One hundred nineteen students (43% females, median age = 19) from a large university in the United States completed the study and were given course extra credit in exchange for their participation. Students were told that they were planning to go on a 3-week European vacation with a friend. A list of 12 cities was displayed (see table 1). Participants allocated the 21 days of travel to

TABLE 1
STUDIES 1A–D SUMMARY RESULTS

Study	Budget type/choice domain	Number of items available for allocation in the choice domain	Budget levels (initial–contracted–expanded)	Number of items to which initial budget was allocated	Number of items to which expanded budget was allocated	Mean difference, <i>p</i> -value
1A	Time/travel	12 cities ^a	21–7–21 days	9.39 (2.64 ^b)	8.97 (2.54 ^b)	–0.42, <i>p</i> = .003
1B	Space/garden seeds	12 plants ^c	21–7–21	8.74 (3.12 ^b)	8.27 (3.31 ^b)	–0.47, <i>p</i> = .002
1C	Money/shore excursions	15 excursions ^d	\$300–\$100–\$300	5.53 (3.04 ^b)	5.32 (3.01 ^b)	–0.21, <i>p</i> = .04
1D	Tokens/Easter candy	12 candies ^e	21–7–21 tokens	5.08 (2.01 ^b)	4.89 (1.98 ^b)	–0.20, <i>p</i> = .01

NOTE.—Numbers in parentheses represent number of tokens required to purchase each item. The token prices are proportional to the retail prices.

^aAmsterdam, Lisbon, London, Madrid, Marseilles, Milan, Munich, Naples, Paris, Prague, Rome, Vienna.

^bStandard deviation.

^cBroccoli, Brussels Sprouts, Cabbage, Cucumbers, Green Beans, Kale, Leaf Lettuce, Melons, Peppers, Spinach, Tomatoes, Zucchini.

^dAdventure Yacht Turtle and Reef Snorkel, An Evening of Rum and Reggae, Bahama Royal Blue Golf (18 Holes), Kayak Adventure, VIP Beach Cabana with Lunch (for two guests), Swim with the Dolphins on Blue Lagoon Island, Eco Nature Walking Tour, Blue Lagoon Island via Segway and Beach Day, Certified Scuba Dive, Guided Tour of Marine Life Aquarium, Sightseeing Tour of Nassau in Jeep, Deep Sea Fishing Adventure, Full Day Beach Bungalow Rental, Parasail Adventure Tour, All Day Relaxing Spa Getaway.

^eDove Dark Chocolate Eggs (3), Hershey's Cookies 'n' Creme Eggs (1), Hershey's Milk Chocolate Eggs (1), Hershey's Mini Bunnies (3), M&M's Fun Size (2), Reese's Mini Reester Bunnies (3), Rolos (2), Sour Patch Bunnies (2), Starburst Minis (2), Swedish Fish Treat Size (2), Tootsie Fruit Chews (1), Twix Minis (2).

these 12 cities. In order to travel to a city, at least 1 day had to be allocated to that city. Next, travel was reduced to 7 days due to a time constraint. Again, participants made allocations from the same list of cities. Participants were prohibited from viewing their prior allocations to reduce the pressure to be consistent. Finally, the full 21 days of travel was again possible—the budget was “restored.” The same allocation procedure was used. For all three allocations, participants had to allocate the entire travel budget; they were not allowed to carryover or save any travel days. If we had permitted savings, it would not have allowed us to examine the change in an individual's preferences across the available options. The [web appendix](#) contains the full stimuli used.

Results. We measured allocation variety for the first 21-day and the second 21-day budgets. For example, if in the first allocation a participant allocated 3 days each to seven different cities, this would mean X_1 (allocation variety) would equal 7. The preference pattern, from an average of 9.39 cities to 4.76–8.97 across the three allocations, revealed the expected pattern (see [table 1](#)). The average within-participant difference between the first and last allocations ($X_D = X_3 - X_1$) was significantly less than zero ($M = -0.42$, $SD = 1.49$, $t(118) = -3.07$, $p = .003$).

To confirm the results above, a repeated measures ANOVA of the three allocations (at 21, 7, and 21 days) was conducted. The analysis revealed a significant difference (Wilks' $\Lambda = .198$, $F(2, 117) = 236.98$, $p < .001$, partial $\eta^2 = .80$) as well as a significant quadratic trend ($F(1, 118) = 477.17$, $p < .001$). *Post hoc* analysis revealed that all three allocations were significantly different from each

other (all $ps < .01$). Overall, participants allocated the equivalent number of days of travel to fewer cities when allocating the post-contraction budget than when allocating the same budget pre-contraction. Thus, study 1A provides initial evidence for a within-participant preference refinement in the domain of time.

Next, we examined the specific allocation of days to cities. Did cities cut during the contraction re-emerge and steal share away post-contraction from the cities that had been retained during the cut (i.e., evidence of reactance) or did the cities that were cut suffer from reduced share in the final allocation (i.e., evidence of preference refinement)? To answer this question, we calculated the change in share of days in the initial allocation compared to the final allocation for cities cut during the contraction. For instance, if a participant allocated 3 days to Milan in the initial allocation, cut Milan during the contraction, and subsequently allocated 2 days to Milan when the budget was restored, this would demonstrate a decrease in the share of days to Milan and provide support for the preference refinement effect. If, however, Milan had increased to 4 days, this increase in share of Milan would provide support for the reactance account.

The analysis revealed that overall, the preference refinement account was significantly more prevalent than the reactance account. Within-person, the share of the budget allocated to cities that were cut and increased in share when the budget was restored (0.134) was significantly less than the cities whose share decreased (0.279) ($t(117) = -5.09$, $p < .001$). Though some individuals exhibited a pattern of reactance, preference refinement was twice as common.

Study 1B—Space

Study 1B sought to test for the preference refinement effect in a choice requiring the allocation of a space budget. Participants in this study allocated different vegetables to a community garden plot. Paralleling the design of study 1A, participants allocated 12 vegetable varieties to 21 planting rows, then to 7 rows, and then again to 21 planting rows. As in study 1A, we expected that the mean preference difference (X_D) would be less than zero signaling that the allocation variety had decreased and preferences had refined.

Method. Participants ($n = 123$) were students (46% females; median age = 20) at a large university in the United States who received course extra credit in exchange for their participation. Students were asked to imagine they had decided to plant a garden and had received 21 rows of space. They were presented with 12 vegetables and instructed that one vegetable could be planted per row (see [table 1](#)). Following the method of study 1A, individuals made three allocations of vegetables to garden space—from 21 rows (X_1), to a contracted 7 rows (X_2), and a final allocation (X_3) to the full 21 rows. (The stimuli are available in the [web appendix](#).) After the final allocation, participants completed basic demographic questions.

Results. The vegetable allocation exhibited the expected preference pattern, from 8.74 different vegetables, to 4.97 during the contraction, to 8.27 in the final. The mean difference (X_D) was significantly less than zero ($M = -0.47$, $SD = 1.69$) ($t(122) = -3.10$, $p = .002$) (see [table 1](#)). Using the three allocations, the repeated measures analysis revealed an overall significant difference between the mean number of vegetables chosen at each time allocation, Wilks' $\Lambda = .29$, $F(2, 121) = 146.55$, $p < .001$, partial $\eta^2 = .71$, as well as a significant quadratic trend ($F(1, 122) = 286.95$, $p < .001$). *Post hoc* comparisons revealed that the mean number of vegetables selected differed at all three time periods (all $ps < .01$).

We also examined the data patterns for reactance and our proposed preference refinement effect. Following the method outlined in study 1A, the analysis again revealed that overall, the preference refinement effect was more prevalent than the reactance account. Within-person, the share of the budget allocated to the unique vegetable categories that were cut and increased in share when the budget returned to previous levels (.123) was significantly less than the vegetables whose share decreased as a result of the contraction (.321), $t(122) = -5.84$, $p < .001$.

Study 1C—Money

In this study, we examine whether the preference refinement effect generalizes to the domain of money and test for preference refinement when a contraction is either believed to be permanent or temporary. The context for the

study was allocating money to various shore excursions while on a cruise. Starting with an initial budget of \$300 and a list of 15 shore excursions to which one could allocate money, we then imposed the budget contraction, reducing the budget to \$100. To instantiate the contraction, participants were told that their paycheck had either been cut permanently or temporarily. After making the allocation under the contraction, all participants were told that the budget was subsequently restored to \$300. Because the process of prioritizing would occur for both a temporary and a permanent budget cut, we did not expect differences between conditions.

Method. Students ($n = 223$) at a large university in the United States participated in this study in exchange for extra credit (53% females; median age = 19). Participants imagined that they were going on a cruise for spring break and wanted to book shore excursions. Participants first allocated \$300 across a set of 15 different shore excursions (e.g., Deep Sea Fishing Adventure, Parasail Adventure Tour) (see [table 1](#)). Participants then learned that where they work full-time was having a bad year and their pay was being either permanently or temporarily cut, leaving only \$100 to allocate across the same 15 shore excursions. Participants made the second allocation. They later learned that their pay was restored and \$300 was again available to allocate to shore excursions. (The full stimuli are available in the [web appendix](#).)

Results. First, we calculated the number of unique shore excursions that dollars were allocated to across the three allocations. Repeated measures ANOVA revealed an overall significant difference for time of allocation, Wilks' $\Lambda = .38$, $F(2, 220) = 181.27$, $p < .001$, partial $\eta^2 = .62$. The interaction between time of allocation and condition (i.e., temporary or permanent contraction) was not significant, Wilks' $\Lambda = .99$, $F(2, 220) = 0.74$, $p = .48$, partial $\eta^2 = .007$. This provides initial evidence that the preference refinement effect is driven by the act of prioritizing during the contraction itself and not by the nature of the contraction (i.e., temporary or permanent).

As there was no difference between the temporary and permanent contraction, the conditions were collapsed. The allocation exhibited the expected preference pattern, from 5.53 different excursions, to 2.92 during the contraction, to 5.32 in the final. The mean difference (X_D) was significantly less than zero ($M = -0.21$, $SD = 1.50$) ($t(222) = -2.05$, $p = .04$). Repeated measures analysis confirmed that there was a significant difference for allocation time point, Wilks' $\Lambda = .38$, $F(2, 221) = 181.11$, $p < .001$, partial $\eta^2 = .62$. As expected, a significant quadratic trend was also found ($F(1, 222) = 362.22$, $p < .001$). *Post hoc* tests showed that the mean number of shore excursions was significantly different between each time period in the repeated measures ANOVA (all $ps < .05$).

We next examined the specific choice shares as in studies 1A and 1B. The proportion of cut shore excursions that increased in share (0.10) was significantly less than the proportion of excursions that decreased in share (0.43) ($t(222) = -11.37, p < .001$).

Study 1D—Consequential Choice

Study 1D used allocations of financial tokens to acquire real Easter candies in a consequential choice study. Participants were told that they would be able to earn tokens (which would constitute their budget) by completing a decision-making task and performing well. By expending effort to earn the tokens and knowing they would be taking the candies with them, we expected participants to exercise more care in making their allocations. They performed an initial allocation of tokens to a variety of Easter candies but were later told that they had lost some tokens due to poor performance on the decision-making task. Participants later earned the tokens back and were able to allocate the original number of tokens to Easter candies (see [web appendix](#) for stimuli).

To verify that the hypothetical choice studies reported above serve as a good approximation for what happens in consequential choice, we included a hypothetical choice condition in study 1D. The same procedure was used in the hypothetical condition as in the consequential choice condition, but no candy was distributed to these participants. The two conditions together allow for a comparison between consequential and hypothetical choices.

Method. Participants ($n = 178$) were students (32% females; median age = 19) at a large university in the United States who were given course extra credit in exchange for participating in this study. The study was conducted just before Easter; participants were told that they would be selecting Easter candies for themselves. Students participated in one of two choice conditions: consequential or hypothetical. Consequential choice participants were told that they would receive the candy at the completion of the study, but otherwise the procedures were identical.

Participants allocated 21 tokens across 12 different types of candies, each costing a different number of tokens (see [table 1](#) for each candy's token cost). Participants were instructed to put the number of tokens they wanted to allocate next to each candy. For example, if a participant wanted three Starburst Minis, they would place a 6 (3 Starburst Minis \times 2 tokens) next to that item. Next, the participants completed the task that would enable them to earn the tokens, a choice task involving selecting the more deserving of two scholarship applicants ([Meloy, Russo, and Miller 2006](#)).

After reviewing the materials and making a choice, all participants learned that they had made the wrong decision in the token earning task and so had earned just seven

tokens. Students then completed the Positive and Negative Affect Schedule (PANAS) ([Watson, Clark, and Tellegen 1988](#)). They subsequently allocated the seven tokens across the same set of candies. We used the PANAS to verify that the contraction was not inducing a negative affective state and this affective state was not leading to the preference refinement effect (see the [web appendix](#) for full PANAS analysis). After making the contracted allocation to the Easter candies, we told participants they had a chance to earn back the full 21 tokens by participating in a final task. After completing this task, all students were told that they had earned the 21 tokens back and they again allocated the tokens across the 12 Easter candies.

Results. We examined the participants' allocation variety using repeated measures ANOVA. This analysis revealed an overall significant difference for time of allocation (Wilks' $\Lambda = .32, F(2, 175) = 190.10, p < .001$, partial $\eta^2 = .69$) and a non-significant interaction between allocation and condition (consequential vs. hypothetical) (Wilks' $\Lambda = .985, F(2, 175) = 1.30, p = .27$, partial $\eta^2 = .02$). As such, we collapsed across conditions. The analysis again showed a significant difference for time of allocation, Wilks' $\Lambda = .32, F(2, 176) = 187.83, p < .001$, partial $\eta^2 = .68$. The quadratic trend was significant for the time of allocation ($F(1, 177) = 374.61, p < .001$). Pairwise comparisons revealed that all time allocations were significantly different in terms of the number of candies chosen (all $ps < .02$).

The mean preference difference (X_D) was calculated. The number of unique candies selected in the final allocation was significantly smaller than the initial allocation ($M = -0.20, SD = 1.04; t(177) = -2.52, p = .01$). The initial mean candy allocation variety was 5.08 and the final candy allocation variety was 4.89. The mean number of unique candies selected during the contraction was 2.81 (see [table 1](#) for full details). In keeping with studies 1A–C, the proportion of cut candies that increased in share (0.116) was significantly less than the proportion of candies that decreased in share (0.41) ($t(177) = -9.19, p < .001$).

Discussion

The four studies above reveal a preference refinement effect in time, space, and money. In addition, study 1C shows that whether the budget contraction is permanent or temporary does not affect the level of preference refinement occurring. Further, study 1D shows that the effect occurs not only in hypothetical choice but also in consequential choice, and the differences between hypothetical and consequential choices are not significant. [Table 1](#) summarizes the results of these four studies. Participants allocated their budgets to a smaller number of unique items after a contraction and subsequent restoration to pre-

contraction budget levels than would be predicted by either economic or consistency theories.

The results above are consistent with preference refinement, but they might also be explained by preference polarization due to scarcity-induced arousal (Zhu and Ratner 2015). That is, arousal from coping with a budget that is scarcer could dissipate more slowly than the memory of the triggering event (i.e., the coping). This residual arousal might extend to the final allocation and attach itself to the most preferred and the least preferred items, causing consumers to prefer the most preferred items more and the least preferred items less than they would if this arousal were not present. This would lead to a reduction in allocation variety, but it should do so not because consumers are sorting out the complicated prioritization of the middling options on the cusp of being cut or not, but because consumers are moving share into the most preferred items as they shun the least preferred items with greater vigor.

To test for this preference polarization account, we examined allocations to the option that was most preferred by each respondent during the contraction (i.e., the option that received the greatest share during allocation of the contracted budget). This is the *de facto* most preferred option.¹ If preference polarization occurs, the share of the most preferred option (as identified during the contraction) should increase between the initial allocation and the final allocation at the same budget level. If, however, preference refinement occurs, the allocation to the most preferred option should be the same in the initial and final allocations. To examine any change in allocation for this preferred option, we subtracted the initial allocation amount from the final; we then tested whether the average change differed from zero (i.e., staying the same) for studies 1A–D. For study 1A, the mean was not significantly different from zero ($M = 0.17$, $SD = 2.26$, $p = .42$); 70% of participants continued to allocate the same budget to their most preferred option. In study 1B, the mean was also not significantly different ($M = 0.39$, $SD = 2.68$, $p = .11$; 57% remained the same). There was also no difference in study 1C ($M = 2.91$, $SD = 33.66$, $p = .20$; 62% remained the same). Finally, there was no difference in study 1D ($M = 0.23$, $SD = 2.18$, $p = .16$; 62% remained the same). If a polarization of preference was occurring, we would expect an increase in the amount of the budget allocated to this most preferred option. The results are consistent with preference refinement and not preference polarization.

Follow-up

All our scenarios thus far have allowed participants to control both the items to which they allocate their budget and the quantity selected. In this follow-up, we remove

control of quantity by examining allocations where consumers can select only a single unit of each item, and where there is no forced expansion to the original budget level. We predict that those required to reconcile a budget contraction by cutting items from their initially endowed set will have fewer items in their final set than those who are simply invited to remove any unwanted items from the initial endowment.

We hypothetically endowed female consumers with 25 unique make-up items (e.g., lipstick, mascara, tweezers, brush, band-aids) in a make-up bag. All participants were informed that they needed to move the items to a new make-up bag. Half of the participants were restricted to a maximum of 8 items in the new make-up bag (i.e., contraction condition); the other half had no restriction and could keep up to 25 items (i.e., no-contraction condition). Both groups were later told that their mother had provided a new bag that could accommodate all 25 items (see the [web appendix](#) for stimuli and full details of the method and results).

We then compared the final number of items selected for inclusion in the Mom-provided make-up bag across conditions. In the contraction condition, the final number of items was 13.94 ($SD = 3.45$), a number significantly lower than the no-contraction condition ($M = 16.66$, $SD = 4.68$; $F(1, 100) = 11.19$, $p = .001$, partial $\eta^2 = .10$). The preference refinement effect generalizes to settings where consumers are permitted to reduce or expand as they wish and where every item is unique. Facing a budget contraction led individuals to retain fewer items in the final, unrestricted space, compared to individuals who had not faced a contraction. The findings also help us rule out an alternative explanation—that the effect is driven by depletion or decision fatigue—because participants in both conditions considered the same number of options.

Thus far, we have examined rather substantial cuts in a budget (i.e., more than a 50% reduction). An open question is: how substantial does a contraction need to be in order to generate the preference refinement effect? Additionally, will the preference refinement effect appear if the choices made during the contraction are determined by someone else and not self-determined? In the next two studies, we explore these two potential moderators of the preference refinement effect.

STUDIES 2A AND 2B: MODERATING THE PREFERENCE REFINEMENT EFFECT

Studies 2A and 2B examine factors that should, based on our theorizing, moderate the magnitude of the preference refinement effect. In study 2A, we manipulate the size of the budget cut during the contraction—one constrained budget allowed the participant to pick one of everything and the other did not. We expect that greater

¹ In the case of a tie for most preferred option, we randomly chose one of the most preferred.

contraction will put more pressure on participants to prioritize what they value, and so should lead to a stronger preference refinement effect. In study 2B, we manipulate whether the contracted allocation decision is made by the participant or by someone else. When the contracted allocation decision is made by someone else, the preference refinement effect should be eliminated.

Study 2A—Strength of Contraction

This study manipulated the magnitude of contraction applied to a travel time budget. The loss of time was either extreme (14 days lost) or modest (7 days lost). The stimuli from study 1A were used. We reasoned that those experiencing a more extreme contraction would be forced into greater prioritization, resulting in increased preference refinement.

Method. Amazon Mechanical Turk workers ($n = 128$; 44% females; median age = 35) received a small payment for their participation. The magnitude of the contraction was manipulated to either be modest (14 days remaining) or extreme (7 days remaining).

Results. In the modest contraction condition, the mean preference difference from the initial allocation to the final allocation ($M = -0.11$, $SD = 0.80$) was not significantly less than zero, ($t(63) = -1.10$, $p = .28$). The mean number of cities chosen in the first 21-day allocation ($M = 8.48$, $SD = 3.41$) was directionally greater than in the second 21-day allocation ($M = 8.38$, $SD = 3.55$). During the contraction, participants chose, on average, 7.16 cities ($SD = 3.80$).

In the extreme contraction condition, the mean preference difference ($M = -0.61$, $SD = 1.87$) was significantly different than zero, ($t(63) = -2.61$, $p = .01$). The first 21-day allocation ($M = 8.84$, $SD = 3.43$) was larger than the second, post-contraction 21-day allocation ($M = 8.23$, $SD = 3.49$). During the contraction, participants chose, on average, 4.25 cities ($SD = 2.21$). Finally, the preference difference between the extreme and the modest contraction conditions was significant ($p = .05$).² Taken together, the results suggest that more extreme contractions facilitate the emergence of the preference refinement effect.

2 Using repeated measures analysis, the mean number of cities chosen at each allocation time point was significantly different (Wilks' $\Lambda = .35$, $F(2, 125) = 118.15$, $p < .001$, partial $\eta^2 = .65$) but was qualified by an interaction between condition and allocation time point (Wilks' $\Lambda = .64$, $F(2, 125) = 34.87$, $p < .001$, partial $\eta^2 = .36$). In the modest contraction condition, the comparison between the initial and final allocation mean numbers of cities was not significantly different ($p = .543$), while the same comparison in the extreme contraction condition was significantly different ($p = .001$).

Study 2B—Self- versus Other-Determined Constraints

This study explores whether the prioritization process required when a decision maker copes with a budget cut him/herself is necessary for the preference refinement effect to emerge. We predict that prioritization and the preference refinement effect require that the decision maker wrestle with the budget cut directly (i.e., which categories to drop). As such, we expect that preference refinement will be mitigated when decision makers are told which specific cuts to make. The travel stimuli from study 1A were again used.

Method. Students (46% females; median age = 18) were recruited from a large university in the United States and earned course extra credit for their participation. Two hundred twenty-seven participants were randomly assigned to either a self- or other-determined condition. In both conditions, students initially allocated 21 travel days across 12 cities. As in the contraction conditions in the previous studies, those participants in the self-determined condition faced a contracted (7-day) budget and had to rely on their own personal preferences to select the cities for those 7 days. In the other-determined condition, a travel companion chose three cities (i.e., Amsterdam, London, and Paris) for the 7-day trip, and participants allocated the specific number of days to travel to each of these three cities. (We note that these three cities were always the most popular with the participant population. Even though participants were not permitted to select the cities in the other-determined condition, the cities selected by the friend to visit were the most appealing cities. See additional analysis in the [web appendix](#) concerning this point.) All three cities had to have at least 1 day of travel allocated; participants who failed this instruction were eliminated from the study ($n = 8$), leaving a total of 219 participants. Individuals in both conditions then allocated 21 days of their post-contraction budget to the same 12 cities (see [web appendix](#) for stimuli).

Results. First, we examined preference refinement across the two conditions. In the self-determined condition ($n = 113$), the first 21-day allocation ($M = 8.73$, $SD = 2.56$) was greater than the second 21-day allocation ($M = 8.37$, $SD = 2.64$). The preference difference ($M = -0.36$, $SD = 1.76$) was significantly less than zero ($t(112) = -2.19$, $p = .03$). As expected, this replicates the preference refinement effect. The mean number of unique cities chosen during the contraction was 4.27 ($SD = 1.64$). In the other-determined condition ($n = 106$), however, the mean number of cities chosen in the first 21-day allocation ($M = 9.00$, $SD = 2.47$) was significantly *less* than the second 21-day allocation ($M = 9.22$, $SD = 2.48$). In other words, the number of cities visited after the contraction *increased*. The preference difference ($M = 0.22$, $SD = 1.13$) was significant ($t(105) = 1.98$, $p = .05$), but in the opposite

direction of preference refinement and more consistent with the reactance account.

We conducted a repeated measures ANOVA analysis to confirm the results. Overall, there was a significant effect of allocation time point, Wilks' $\Lambda = .16$, $F(2, 216) = 564.64$, $p < .001$, partial $\eta^2 = .84$, and a significant interaction between allocation and condition, Wilks' $\Lambda = .82$, $F(2, 216) = 23.17$, $p < .001$, partial $\eta^2 = .18$. Pairwise comparisons revealed that in the self-determined condition, the mean number of cities chosen was significantly different at each point in time (all $ps < .05$). In the other-determined condition, the difference between the initial and contraction allocations was significantly different ($p < .001$), but the difference between the first 21-day allocation and the final 21-day allocation was not ($p = .14$). The results demonstrate that the choice of allocation variety during the contraction must be made by the self and not be determined by someone else for the preference refinement effect to emerge.

Discussion

Studies 2A and 2B establish theory-consistent boundary conditions on the preference refinement effect. Study 2A suggests that a more extreme contraction necessitates more rigorous prioritization as individuals determine which options they should retain during the contractionary period. Additionally, study 2B reveals that decisions about which options to cut must be made by the self, not others, for the preference refinement effect to occur. This study provides preliminary evidence that anchoring cannot account for the effect because participants in both conditions were anchored on the same 7-day budget during the contraction allocation. Further, if the anchor value was the number of cities allocated to during the contraction, the lower anchor value in the other-determined condition should have led to reduced variety in the final allocation in this condition, relative to the self-determined condition. This did not occur.

All the studies have so far shown a robust preference refinement effect. To establish that a contraction leads to real preference change, it would be beneficial to show that refined preferences persist over time. In the next study, we seek to establish that the preferences formed during the contraction, and which are revealed when the original budget is restored, are lasting. We also address remaining alternative explanations.

STUDY 3: THE ENDURANCE OF PRIORITIZATION-DRIVEN REFINEMENT

If preference refinement occurs as a result of a prioritization process as we have hypothesized, then the refinement and change in preference structure should be more stable than transitory. This study was designed to test for preference stabilization over time following a budget contraction,

while also more fully ruling out anchoring and under-adjustment and consistency as alternative explanations.

To test the focal idea that the preference refinement effect reflects a persistent change in priorities, we created stimuli similar to study 1A (time) and asked participants to perform an additional fourth allocation (X_4) 2 days after making the first three allocations. If prioritization occurs and preference refinement and stabilization are responsible for this, there should be no difference between X_3 and the measurement of preference 2 days later (X_4) at the same budget level. If, however, anchoring and under-adjustment are responsible, then we should find no difference between X_1 and X_4 because preferences will revert to initial levels once the salience of the anchor is gone. That is, the allocation at X_4 should approach X_1 as the effect of the anchor value dissipates. A similar argument can be made for a consistency explanation. The effects of consistency should diminish with time, so if consistency is the cause, then the X_4 allocation should lie between X_1 and X_3 in magnitude.

Method

Students ($n = 77$; 56% females; median age = 19) from a large university in the United States received course extra credit in exchange for their participation. Though 77 individuals participated in the initial study, only 63 individuals responded within 48 hours to the follow-up survey sent 2 days later. We focus on the responses from these 63 individuals who provided full data.

Participants responded to a travel scenario similar to that of study 1A. Participants first selected cities to travel to by allocating 21 days (X_1), then 7 days (X_2), then 21 days again (X_3), and 2 days later allocating 21 days for a final time (X_4) (see the [web appendix](#) for the full stimuli). Before providing the fourth allocation, students were reminded of the scenario and were then asked to allocate 21 days of travel to the cities for the final time. This was the end of the survey; no additional allocations were performed.

Results

Before getting to the focal analysis, we tested for the preference refinement effect by comparing the first and third allocations' variety on the first day. We find evidence of the standard preference refinement effect ($M = -0.33$, $SD = 1.15$; $t(62) = -2.30$, $p = .03$), providing additional support for the idea that preferences are refined during the budget contraction. The mean number of cities chosen in the first 21-day (X_1) allocation ($M = 8.76$, $SD = 1.90$) was greater than in the second 21-day (X_3) allocation ($M = 8.43$, $SD = 2.17$). The contraction mean number of cities (X_2) was 4.79 ($SD = 1.65$).

Next, we compared the initial allocation variety (X_1) against the allocation variety 2 days later (X_4). For the

latter, the mean number of cities chosen in the final 21-day allocation (X_4) ($M = 8.30$, $SD = 2.13$) was significantly lower than the initial 21-day allocation (X_1) ($M_{X_4-X_1} = -0.46$, $SD = 1.20$; $t(62) = -3.04$, $p = .003$). We note that although there was an additional decline between X_3 and X_4 , it was not a significant difference ($M = -0.13$, $SD = 0.91$; $t(62) = -1.11$, $p = .27$). The results reveal a lasting change in preference—the preference refinement that occurred during the contraction continued to affect allocation variety 2 days later.

A repeated measures ANOVA confirmed that the mean number of cities chosen at the four allocation points (i.e., X_1 , X_2 , X_3 , X_4) were significantly different, Wilks' $\Lambda = .14$, $F(3, 60) = 124.75$, $p < .001$, partial $\eta^2 = .86$. The non-linear (i.e., quadratic and cubic) trends were significant ($p < .001$). Contrasts revealed that the mean number of cities chosen in the first 21-day allocation was significantly greater than all other allocations (all $ps < .03$). There was statistically no difference between X_3 and X_4 , confirming the earlier result.

Finally, we examined the data for reactance. Starting with the difference between X_1 and X_3 , the analysis showed that the share of the budget allocated to the unique cities that were cut and increased in share when the budget returned to previous levels (0.08) was significantly less than the cities whose share decreased as a result of the contraction (0.19), $t(62) = -3.07$, $p = .003$. This was also the case for the difference between X_1 and X_4 with the share that increased (0.14) being significantly less than the cities whose share decreased (0.25), $t(62) = -2.85$, $p = .006$.

Discussion

This study establishes that the preference restructuring that occurs during a budget contraction has a lasting impact on preferences when the budget is restored. Assuming that there is some push to be consistent between the initial allocation variety (X_1) and the final allocation variety (X_3) or that anchoring is playing some role, the 2-day delay should make consistency and anchoring fade. We do not find evidence for either consistency or anchoring. What we see instead is that refined preferences persist (X_4).³

The results of study 3 suggest that loss leads consumers to a lasting understanding of what one really likes or dislikes. In the next study, we further test this persistence idea

by demonstrating that what one likes and dislikes will carry forward to a new choice context.

STUDY 4: DOWNSTREAM CONSEQUENCES OF PRIORITIZED PREFERENCES

In this study, we sought to determine whether preference restructuring and stabilization that occurs during the contraction carries over to a new choice context that would be made using the same preference structures. We use Shafir's (1993) select-reject paradigm applied to a choice between an impoverished and an enriched option. Shafir (1993) showed that when an individual is selecting, positive features are weighted more heavily than negative features. However, when an individual is rejecting, negative features take precedence. Therefore, an option that has two well-liked features and two disliked features (an enriched option) will be both selected and rejected more than an option with four acceptable but relatively neutral features (an impoverished option).

Our logic in selecting this paradigm and our predictions for it are as follows. We expect that those who have dealt with a contraction will have a better sense of what they like and what they do not like, and this will carry forward to the new choice context. If preference refinement arises from prioritizing options as a result of a budget contraction, then these refined preferences will better allow participants to identify the alternatives they like and do not like, and this will create conditions necessary to exacerbate the select-reject effect. To see why, consider one choice set that comprised options you both like and dislike (the enriched option) and a second set that comprised options you are neutral to (the impoverished option). Based on Shafir (1993), choice share of the option that is enriched should be strengthened for those whose preferences have become refined through a contraction. Thus, we expect that those who have faced a contraction will both select and reject the enriched option more than those who have not faced a contraction.

Method

Amazon MTurk workers ($n = 251$) received a small payment for their participation (40% females; median age = 35). The travel stimuli from study 1A were used. Participants were assigned to either a no-contraction condition (21–21–21) or a contraction condition (21–7–21) (see web appendix for full stimuli). Finally, measures of satisfaction with the final 21-day planned trip were assessed in order to determine whether experiencing a contraction, while difficult, actually leads to a more delighted consumer. If satisfaction is higher in the contraction condition, this would provide evidence that the process of preference

3 This study also speaks to the distinction between the preference refinement account and the preference polarization account. Specifically, if our refinement result is due to an arousal induced preference polarization, then we would expect the effect to disappear after enough time has passed for the arousal to dissipate. Though there may be forms of arousal that could persist for long periods of time, the sort that would drive our results (i.e., the sort that might emerge from coping with a contracted budget) will almost certainly have fully dissipated after 2 days. Therefore, the results in this study are not consistent with a preference polarization account but are consistent with preference refinement.

refinement, even if it comes about by having to cope with a budget contraction, can be beneficial to consumers.

After the three travel day allocations were made, all participants were given a choice between an impoverished and an enriched option under either select or reject instructions. We told participants that they were looking through a magazine and found two different travel agency ads offering European vacation packages. Both advertised trips were 8 days in length and included four different city destinations. In order to create different trip packages, we categorized cities based on previous travel studies according to whether the cities were well-liked, disliked, and neither well-liked nor disliked (i.e., neutral). The analysis showed that the most popular travel destinations were Paris and London, and the least popular were Lisbon and Marseilles. The cities in the middle were Milan, Munich, Vienna, and Prague. The first travel package, Trip A, consisted of the most liked and disliked cities: Paris, London, Lisbon, and Marseilles. In Shafir's (1993) terms, this was the enriched option. Trip B consisted of four cities that individuals were neutral to (i.e., the impoverished option). Participants were randomly assigned to either a select condition or a reject condition. Based on Shafir (1993), we predicted that Trip A would be selected and rejected more so than Trip B. We also predicted that the size of this effect would be larger for those who had experienced a budget contraction earlier in the study. These participants would have a clearer understanding of which cities they liked and did not like and so the focus on selecting (rejecting) appealing (unappealing) cities would be more pronounced for these participants.

Results

To verify the presence of preference refinement, we used repeated measures ANOVA on the allocations in the first part of the study (i.e., that replicated study 1A). Overall, we found a significant main effect of allocation time point, Wilks' $\Lambda = .45$, $F(2, 248) = 153.71$, $p < .001$, partial $\eta^2 = .55$, and a significant interaction between allocation time and condition, Wilks' $\Lambda = .43$, $F(2, 248) = 166.49$, $p < .001$, partial $\eta^2 = .57$. *Post hoc* analysis demonstrated that in the no-contraction condition there was not a significant preference difference across the three allocations ($M_1 = 8.26$, $SD_1 = 3.34$; $M_2 = 8.38$, $SD_2 = 3.57$; $M_3 = 8.33$, $SD_3 = 3.49$; all p s $> .05$). In the contraction condition, however, there was a significant preference difference ($M = -0.49$, $SD = 1.94$). The mean number of cities in the initial 21-day allocation was significantly larger ($M = 8.92$, $SD = 3.48$) than the final allocation ($M = 8.43$, $SD = 3.67$) ($p = .005$). The contraction allocation mean number of cities selected was 4.35 ($SD = 2.13$). All allocations were significantly different from each other ($p < .01$ in all cases).

We then examined how satisfied individuals were with their final 21-day trip using a 1 (extremely dissatisfied) to 7 (extremely satisfied) scale. The mean level of satisfaction was significantly lower in the no-contraction condition ($M = 5.66$, $SD = 1.26$) compared to the contraction condition ($M = 6.07$, $SD = 1.02$) ($F(1, 249) = 7.95$, $p = .005$, partial $\eta^2 = .03$). This suggests that individuals were more satisfied with their final allocation of time to travel because they had prioritized what really mattered to them.

Does preference refinement carryover to a new choice context? To answer this, we looked at the response to the vacation package question. If the budget contraction leads to preference restructuring and refinement that persists across choices (and contexts), we would expect to see accentuation of preference for the enriched option when individuals have faced a budget contraction. There was a significant association between trip choice and selecting or rejecting ($X^2(1) = 20.82$, $p < .001$). Overall, Trip A (the enriched option) was both selected and rejected, on average, 67% of the time. This replicates Shafir's basic finding. More importantly, after experiencing a budget contraction, we see a strengthening of this select-reject difference. That is, for those who had experienced a budget contraction earlier, the proportion selecting Trip A was significantly higher (87.1%) compared to those in the no-contraction condition (74.2%), $z = -1.81$, $p = .03$. Similarly, those who had experienced a budget contraction earlier rejected Trip A significantly more (60.9% of the time) than those who were in the no-contraction condition (46.0%), $z = -1.68$, $p = .05$. In both select and reject, the percentage was larger in the contraction condition compared to the repeated choice.

A logistic regression was performed to determine the effect of contraction condition (yes/no) and select-reject on whether Trip A was chosen. The logistic regression model was significant, $X^2(3) = 27.53$, $p < .001$. Condition was marginally significant ($p = .09$) and select-reject was significant ($p = .002$). The interaction between condition and select-reject was not significant. In the contraction condition, participants were 1.8 times more likely to choose Trip A compared to those in the no-contraction condition. Facing a budget contraction led to accentuation of select-reject differences.

Discussion

Study 4 demonstrates that a budget contraction leads to preference refinement and increased satisfaction because individuals have a clearer idea of what they like and what they do not like. These refined preferences carry forward to subsequent choice in a new context—an accentuation of select-reject differences for an enriched option. Individuals were more likely to select and reject the enriched option when they had faced the task of making a

budget cut earlier in the study relative to a no-contraction condition.

We have contended that a budget contraction forces individuals to prioritize what they value among the available options. Study 5 is designed to more explicitly test the goal of prioritization as the intervening process which occurs during the budget contraction and explains the preference refinement effect.

STUDY 5: PRIORITIZATION MOTIVE AS THE MEDIATOR BETWEEN CONTRACTION AND REFINEMENT

Study 5 was designed to establish that the goal to prioritize drives the preference refinement effect. To gather evidence on processing motivations, we employed a method designed to capture the goals that are active during a decision process (Carlson et al. 2014) and examined four candidate goals: prioritize options, seek consistency, avoid negative feelings, and maximization. We included the goal of consistency because there is a theoretical basis for thinking it could be operating, despite our efforts to rule it out earlier. We also included avoid negative feelings and maximization goals as those could be alternative explanations for what is driving the effect. These four candidate goals were measured at different points in the choice process. Based on our theorizing, we expected that the goal of prioritizing would be the driver of the preference refinement effect and that the other three goals would not mediate the effect.

Method

Students ($n = 206$; 34% females; median age = 19) at a large university in the United States participated in this study in exchange for course extra credit. Participants were randomly assigned to either a no-contraction (21–21–21) or a contraction condition (21–7–21) that mirrored prior studies in the domain of time.

To verify a heightened activation of the prioritize goal after learning about the budget contraction, we followed the catching goals in-process method outlined by Carlson et al. (2014). At the start of the study, all participants were told that the research was about goals and they were provided with a general description of what goals are. We then asked them to become familiar with the following goals: “prioritize options,” “seek consistency,” “avoid negative feelings,” and “maximization.” We defined prioritize options, the focal goal, as *the desire to figure out my priorities and select options which most clearly match those priorities, even if this means giving up other attractive options* (see web appendix for full stimuli). To verify that participants understood what each goal meant, they read multiple scenarios and answered questions that required them to match scenarios with goals. If the wrong goal-

scenario combination was selected, we provided an explanation as to why it was wrong.

After practicing with the goal definitions, students completed an initial goal activation log to a) give participants practice using the measures, and b) to provide a baseline of how much each individual was seeking to achieve each of the four goals at the outset. The instructions asked how much they wanted to achieve each goal right now and to rate how active each goal was using a 0–10 scale (0 = much less active than typical, 10 = much more active than typical). The goals and associated definitions were displayed for the participants' reference. Once the baseline goal activations were assessed, participants moved to the travel scenario and allocation task.

In both conditions, after making their initial 21-day allocation, and finding out they would have to make a second allocation decision, participants completed the goal activation log. After completing the second goal log, they allocated either the 21 or 7 days to the cities, depending on condition. Finally, individuals made the final 21-day allocation and completed a third goal activation log.

Results

Preference Refinement. First, we examined the preference refinement effect across both conditions using repeated measures ANOVA. Overall, the analysis revealed that allocation time point was significant, Wilks' $\Lambda = .32$, $F(2, 203) = 212.54$, $p < .001$, partial $\eta^2 = .68$, as well as the interaction between allocation and condition, Wilks' $\Lambda = .36$, $F(2, 203) = 184.06$, $p < .001$, partial $\eta^2 = .65$. Follow-up contrasts showed that in the no-contraction condition, there were no significant preference differences across allocations ($M_1 = 8.59$, $SD_1 = 2.04$; $M_2 = 8.36$, $SD_2 = 2.23$; $M_3 = 8.40$, $SD_3 = 2.18$; all $ps > 0.15$). In the contraction condition, there was a significant and expected preference difference ($M = -0.63$, $SD = 1.84$). The mean number of cities in the initial 21-day allocation was significantly larger ($M = 8.03$, $SD = 2.28$) than the final allocation ($M = 7.40$, $SD = 2.37$) ($p = .001$). The contraction allocation mean number of cities selected was 4.16 ($SD = 1.58$). All allocations were significantly different from each other (all $ps < .001$) in the contraction condition.

Changes in Goal Activation. We next examined the change in goal activations for the four goals over the three allocation decisions for both conditions. Recall that prior to beginning the task, we had asked participants to complete the goal activation log to establish a baseline for each goal (see table 2 for a summary of all goal activation results). Using repeated measures analysis, the interaction between baseline goal activation and condition was not significant, Wilks' $\Lambda = .99$, $F(3, 202) = 0.852$, $p = .47$, partial $\eta^2 = .01$. We found that there were no differences in the baseline goal activation measures between conditions:

TABLE 2
SUMMARY GOAL ACTIVATIONS (0–10 SCALE)

Condition	Goal log	Prioritize options	Seek consistency	Avoid negative feelings	Maximization
21–21–21	Baseline	7.85	5.69	6.89	7.88
	Middle (contraction)	8.38*	4.45	5.79	7.55*
	Middle minus baseline	0.52*	–1.24	–1.11*	–0.33*
	Final	8.18	5.14	6.02	7.73
21–7–21	Baseline	7.77	6.12	6.80	8.10
	Middle (contraction)	8.85*	4.18	6.48	8.45*
	Middle minus baseline	1.09*	–1.94	–0.32*	0.35*
	Final	8.50	5.69	6.52	8.18

NOTE.—* $p < .05$ denotes the significance testing results of comparing pairs of corresponding numbers across the two main conditions (e.g., 7.85 vs. 7.77 for prioritize options baseline).

prioritize options ($p = .72$), seek consistency ($p = .19$), avoid negative feelings ($p = .77$), and maximization ($p = .43$).

To capture the change in goal activations as a function of condition (i.e., no-contraction vs. contraction), we took the difference between the initial baseline goal measures for each of the goals and the goal activations reported after participants knew that they would have to make a second allocation decision. Repeated measures analysis revealed a significant difference for the change in activation across goals (Wilks' $\Lambda = .65$, $F(3, 202) = 35.98$, $p < .001$, partial $\eta^2 = .35$) and a significant interaction with condition (Wilks' $\Lambda = .96$, $F(3, 202) = 3.07$, $p = .03$, partial $\eta^2 = .04$). As expected, the change in goal activation, created by subtracting the baseline measure from the second goal activation, was significantly higher for the prioritize goal in the contraction condition ($M = 1.09$) compared to the no-contraction condition ($M = 0.52$; $p = .03$). Consumers were actively prioritizing as they coped with the contraction. The other goals also showed differences between conditions from baseline: seek consistency ($p = .09$), avoid negative feelings ($p = .05$), and maximization ($p = .02$) (see table 2 for the specific goal activations across time and condition). The final goal activation log showed no differences between conditions for any of the goals: prioritize options ($p = .23$), seek consistency ($p = .19$), avoid negative feelings ($p = .23$), and maximization ($p = .18$).

Mediation. Finally, we predicted that the prioritize options goal would be the key driver of the preference refinement effect and mediate the relationship between condition and the mean preference difference. We included all four goals in a parallel mediation model. However, we expected only the goal to prioritize to be a significant mediator. Specifically, we used the difference between the baseline and middle goal activation for all four goals as parallel mediators and the preference difference (X_D) as the dependent measure. A mediation analysis was

conducted with the PROCESS macro for SPSS (Model 4) with 5,000 bootstrapped samples. The prioritize options goal was the only significant mediator in the model, $b = -0.07$, $SE = 0.05$, 90% $CI = [-0.1589, -0.0020]$. In the contraction condition, prioritizing options led to greater preference refinement. Figure 1 illustrates the mediation results.

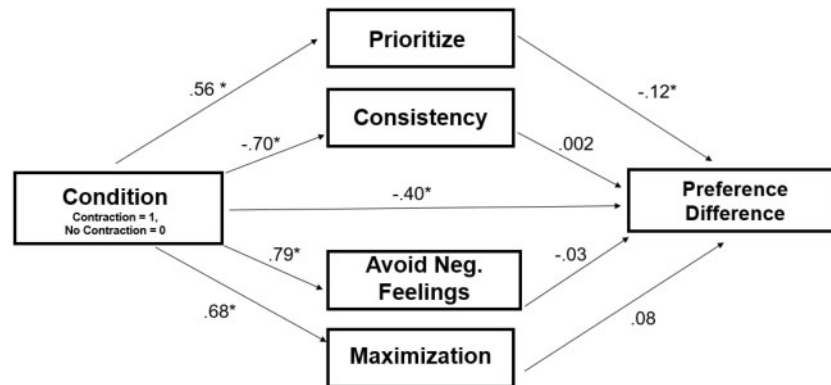
Discussion

The results of study 5 suggest that a budget contraction leads individuals to prioritize options, which in turn leads to the preference refinement effect. While the goals of consistency, avoiding negative emotion, and maximization had changes in activation during the contraction, only the goal of prioritization mediated the preference difference.

STUDY 6: EVIDENCE OF PREFERENCE REFINEMENT DURING THE U.S. GOVERNMENT SHUTDOWN

Thus far, our studies have leaned heavily on experimental studies where we have given people a context and asked them to spend budgets of varying amounts. To lend real-world support to the preference refinement effect, we conducted a longitudinal study during the U.S. government shutdown that occurred from December 22, 2018 through January 25, 2019. During this shutdown, non-essential government employees did not receive a paycheck. At the conclusion of the shutdown, however, these workers received their back pay. In three waves, we asked government workers about their personal budgets and the allocations they were making to different categories of spending. We predicted that those directly affected by the shutdown (i.e., those not receiving a paycheck) would exhibit the preference refinement effect because they were experiencing a true contraction.

FIGURE 1:
STUDY 5 MEDIATION



NOTE.—There is a significant indirect effect of contraction on the preference difference through prioritization only ($b = -0.07$, $SE = 0.05$, BC 90% CI $[-0.16, -0.0020]$). All other paths NS. * $p < .10$.

Method

U.S. government workers were recruited on Amazon Mechanical Turk and paid a small fee in exchange for participating. One hundred twenty-five participants started the first wave; at the conclusion, 36 participants remained (49% females; median age = 37). We asked, as a screening question, whether participants were financially affected by the government shutdown with a focus on those who were affected because they were experiencing the loss (see [web appendix](#) for additional analyses). The first wave (1) was conducted during the shutdown (January 12). The second wave (2) with the same participants was conducted approximately 2 weeks later (January 25) and before the announcement that the shutdown was over. The final wave (3) with the same participants was launched after back pay was received by government workers (February 5).

In order to determine typical allocation categories, in wave 1 we asked participants in an open-ended question format what types of items they were spending money on prior to the shutdown and what they had been cutting from their budget as a result of the shutdown. We took the results of that data as a benchmark to use for the second wave. During wave 2, we asked participants to think back to before the shutdown and allocate their monthly budget to categories of spending (e.g., entertainment, eating out, childcare, food at the grocery store). Next, we asked participants to take that budget and determine what proportion of the original budgeted amount they were currently spending (i.e., during the shutdown). These two questions serve as the first and middle allocations, respectively. In the final wave, after the shutdown had ended and participants had received their back pay, we again asked the same participants to allocate their monthly budget to categories of

spending now that the shutdown had ended. This served as our final allocation. We counted the number of categories participants allocated some money to at each time point to use in our analysis.

Results

For each budget allocation (i.e., the retrospective measure of the categories of spending before, the real-time measures of categories during the shutdown (i.e., the contraction), and the categories of spending real-time post-shutdown with a restored budget), we counted the number of categories participants allocated their monthly budget to. Overall, the analysis revealed that allocation time point was significant, Wilks' $\Lambda = .56$, $F(2, 34) = 13.15$, $p < .001$, partial $\eta^2 = .44$. Follow-up contrasts revealed that the mean number of categories in the pre-government shutdown budget allocation was significantly larger ($M = 10.22$, $SD = 3.33$) than the post-back pay allocation ($M = 8.75$, $SD = 3.28$) ($p = .008$). The contraction allocation was 8.08 ($SD = 3.58$), reflecting that some categories of spending were essential despite not having an income from the government during this time. The contraction and final allocations were not significantly different ($p = .24$). Overall, we see evidence of the preference refinement effect in a real contraction situation, where people were working with their own budgets.

Discussion

This study provides real-world evidence of the preference refinement effect. During the temporary government shutdown, workers who experienced the contraction exhibited the preference refinement effect. The preference

restructuring that took place during the shutdown for those government workers experiencing a contraction persisted even when the income was restored.

GENERAL DISCUSSION

In the current work, we ask what, if anything, happens to consumers' preferences as a result of coping with a budget contraction. We explore this question by comparing pre-contraction allocations against post-contraction allocations of the same budget to the same set of alternatives (i.e., when the budget has been restored). We find that managing a budget contraction causes consumers to prioritize what they value and alters their preference structure, relative to those who did not cope with a budget contraction. The process of prioritization leads to post-contraction allocation sets that are narrower, an effect we refer to as preference refinement. The preference refinement effect was observed when consumers faced contracting time, space, and money budgets (see studies 1A–D and the follow-up). We also found the effect to be stronger when the budget contraction was more extreme and when one had to determine where to make the cuts as opposed to simply executing another's decision (see studies 2A and 2B). The preference refinement effect persisted after a 2-day delay, suggesting that changes to the preference structure endure (study 3). In study 4, we found these refined preferences carried over to a new choice context. In study 5, we showed that the goal of prioritization (i.e., the desire to prioritize) during a contraction mediated the preference refinement effect. Finally, study 6, during the 2019 U.S. government shutdown, provided a real-world test of our preference refinement effect.

Theoretical Contributions

Since the early work on context effects gave rise to the idea of constructed preferences, a number of questions have lingered in the literature, including: what is a constructed preference?, are constructed preferences stable?, how do consumers move from constructed to stable preferences?, and can stable preferences revert to unstable ones? These are some of the most difficult-to-answer questions in our field because they sit at the intersection of psychology and economics, descriptive models and prescriptive models, and behavioral and quantitative methods. Nevertheless, we do know some things. We know, for example, that consumers are adept at transforming a weak leaning for one alternative into a preference strong enough to support selection of the alternative by means of a variety of preference structuring activities, including separation, distortion, and selective attention processes (Brownstein 2003). We also know that consumers defend their strongly preferred brands with gusto. What is missing is a comprehensive understanding of how constructed preferences grow into stable preferences, and how loyalty to a product or brand

solidifies over time. In the terms we have used here, what is missing is a comprehensive understanding of how preference stabilization begins and is realized.

The findings we have reported above start to speak to this process—the early stage of preference stabilization—when consumers are forced, due to a budget contraction, to prioritize what they value as they progress toward consistent choices over time. We believe that the choices our participants made under the initial, pre-contraction budget were based on a mix of inherent preferences and constructed preferences (Simonson 2008) and that a budget contraction nudged our participants toward preference restructuring and stabilization by way of prioritization (Fernbach et al. 2015). Though it would be overreaching to claim that coping with a budget contraction is either necessary or sufficient to produce stable preferences, our evidence indicates that dealing with a budget contraction is sufficient to *begin* the preference stabilization process. That said, we do not believe that a budget contraction is the only way this process can begin. There is evidence that making difficult choices can begin the process (Hoeffler and Ariely 1999), that contemplating multiple attribute levels across various attributes can also initiate the process (Carlson and Pearo 2004), and that early experiences (Hoeffler et al. 2006) can also help consumers begin to formulate stable preferences.

In addition to contributing to the scaffolding on which comprehensive answers to the above questions might be found, we identify an approach for assessing when preference stabilization has begun—namely, a repeated measures examination of a consumer allocating the same budget to the same alternatives over time. When preferences revealed under this approach—where the conditions of choice, the budget, and the alternatives were held constant—tend toward a narrower set of alternatives, we can infer that preference refinement and stabilization has occurred. There is much that is still unknown about the earliest part of the preference stabilization process, but the current work takes an important step in contributing to the scaffolding from which future insights should emerge.

Managerial Implications

Practically, the studies above reveal that consumers in the real world who experience budget contractions are at a critical inflection point. That is, they are at a point where self-discovery is imminent. Importantly, we did not introduce persuasion attempts during this inflection point. Rather, we allowed participants to navigate how they wished to cope with the budget contraction on their own, without intervening during the process. Though we did not directly test the impact of marketing interventions during a budget contraction, we can think of several potential opportunities that might arise for marketers when consumers experience such a contraction.

Our work suggests that marketers should work hard to retain those consumers who are financially distressed, time distressed, or space distressed due to a budget shock to their normal way of life. This time of loss changes the consumer; they may be more open to sticking with a brand that helps them through the tough times. The introduction of special promotions that could ease the cost of retaining more options during these periods (i.e., making the cut appear more modest than extreme) is one obvious option. To the extent that marketers can find ways to remove the need for consumers to cope with the loss, they also may be able to allay the preference refinement process. Providing opportunities for consumers to rent the option during the contraction period, or to provide sweat equity and/or barter for access in some product categories may also be feasible. This leads to the more general suggestion that brand relationships should be reinforced during economic downturns to prevent the marketer's brand from being cut permanently. If the brand ends up being cut during the contraction, it is not clear that consumers will re-introduce it when the budget is restored. As such, it may be critical to re-introduce the brand and re-invigorate its presence during this post-contraction phase to remind the consumer why the brand is necessary.

Future Research Directions

The current work starts the conversation about the role of contractions on preference stabilization, but there are a number of open questions that remain. The frequency and timing of contractions and restorations is such an area. When contractions and expansions are frequent, we assume that preferences will stabilize more rapidly, but this is an open question. Each additional round of contraction and restoration may heighten the salience of the loss and encourage consumers to engage in more risk taking if sadness results (Garvey, Meloy, and Shiv 2017; Raghunathan and Pham 1999).

In our studies, we examine how consumers cope with a contracted budget, rather than focusing on how the re-expanded budget is perceived. For example, will consumers respond similarly when the time between the budget contraction and re-expansion is longer? It stands to reason that the longer the contraction goes on, the more it becomes less of a contraction and more the status quo. Therefore, an expansion may not feel like a restoration, but rather a new budget all together. We again assume that the preference refinement and stabilization that occurs during the contraction will remain, despite the length of time to restoration, but this is again, an open question. Additionally, the monetary value or importance of the items removed during the budget contraction might also impact whether a consumer refines their preferences.

While our survey during the government shutdown was longitudinal in nature, future research could delve further

into important past events that have led to economic contractions and try to segment consumers who have responded similarly when the economy has recovered. Though our within-person studies suggest that the preference refinement effect is robust and lasting, we acknowledge that there could be some segments of consumers for whom reactance is more prevalent following an economic downturn and subsequent recovery. Similarly, it would be useful to know, for segmentation purposes, if individuals with similar backgrounds but different past experiences with income fluctuations respond differently.

In the studies above, though we included hypothetical and consequential choices, we did not allow our participants to experience the full consequences of their choices within the study. That is, though we examined whether the effects of coping with a contraction persisted for a longer duration of time, we did not study this in choices embedded inside actual consumption episodes (e.g., participants did not eat the candy between allocations in the consequential choice study (1D)). In study 4, we did, however, measure satisfaction with the final allocation and satisfaction was higher in the group that experienced the contraction relative to the no-contraction condition. Does loss not only stabilize our preferences but also make us more grateful and positively affect satisfaction? Including actual consumption and examining the downstream consequences of preference refinement on satisfaction would be an interesting avenue for future research.

For example, will consumers who struggled with budget contractions on multiple fronts during the COVID-19 pandemic (e.g., space, money, and retail outlets for purchase) be more satisfied with a simpler lifestyle when the pandemic ends? The results above suggest that in addition to refining their preferences during the quarantine period, individuals likely will be more satisfied with this simpler, more refined lifestyle in the future.

From a more managerial perspective, there are a number of interesting avenues for future research that take the preference refinement effect as the starting point. The possibility of alternative mechanisms for sustaining consumption in the budget categories that would likely be cut during an economic downturn is an interesting avenue for future research. The possibility of renting items (instead of buying) or bartering sweat equity for access could reduce the possibility of the brand being cut during the contraction, but it may undermine the brand equity of the product when the economy recovers. This is something firms may wish to consider as they attempt to woo consumers into retaining their brands during these periods of hardship.

Finally, we did not allow our participants to save any part of their budget. In a world where saving is possible, some people will save and others will not; those who do save should not need to prioritize as much because the impact of the budget contraction will be dampened by dipping into these reserves. This raises the interesting idea that the

minority of people that do tend to save may be the most averse to the prioritization process and the least likely to exhibit preference refinement. This is a direction for future research.

In sum, there is still much to discover surrounding the preference refinement effect including not only theoretical extensions but managerial implications as well. The current work is a clear foundation on which to start this discovery process and from which rich streams of future research should emerge.

DATA COLLECTION INFORMATION

The first and second authors had primary responsibility for the collection of the data and associated analysis. Data were discussed and reviewed jointly by all three authors. Studies 1A–D, follow-up study, 2B, 3, and 5 were conducted online with students in exchange for course extra credit in March 2016, April 2018, February 2019, April 2017, February 2018, February 2017, October 2016, and April 2019, respectively. Studies 2A, 4, and 6 were conducted using Amazon Mechanical Turk with paid online participants in June 2018, July 2018, and January–February 2019, respectively.

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