

When Less is More: Consumer Aversion to Unused Utility

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ABSTRACT

A series of experiments demonstrates that consumers exhibit aversion to waste during forward-looking purchase. These experiments further reveal that such behavior is driven by distaste for unused utility, a reaction that is shown to be distinct from an aversion to squandering money. Waste aversion is especially pronounced when consumers anticipate future consequences and deprivation is salient. In addition to demonstrating robustness across consumers and marketing contexts, the results also demonstrate how waste aversion can lead to self-defeating behavior in which consumers forego desired utility. Finally, the present research demonstrates and discusses the implications of waste aversion for a variety of marketing issues, including buy-rent markets, bundling, and the fundamental distinction between goods and services.

Keywords: waste; rule-based decisions; consumer preference; goods and services; sin

WHEN LESS IS MORE: CONSUMER AVERSION TO UNUSED UTILITY

One day Beatrice entered their stateroom to find Marconi consigning his dirty socks to the sea through a porthole. Stunned, she asked him why. His explanation: It was more efficient to get new ones than wait for them to be laundered. (Larson, 2006, p. 286)

The prescription to avoid waste is intuitively appealing but, if simplistically followed, evades consideration of the nature of waste, the motivation to avoid it, and costs incurred in doing so. Although consumers frequently shun waste to avoid the squandering of money, they may also experience a visceral aversion to unused utility in a purchase or may fear the environmental consequences of disposal. (In Beatrice's case, she may have had other plans for the money that will instead be used to purchase Marconi new socks, she may have lamented the discarding of socks that possess ample utility, and/or she may have regretted the impact of tossing socks into the sea.) These rationales are quite different, but they are not mutually exclusive. Moreover, conscious consideration of waste is particularly salient when consumers must decide to retain or discard a product, and all three rationales bias the decision in the seemingly sensible direction of retention.

The present research examines waste aversion in ways that depart not only from previous treatment of the issue but also from intuition. First, we examine the influence of waste on purchase decisions; that is, waste is considered prospectively rather than at the time of disposal. Second, we focus on aversion to unused utility rather than the monetary or environmental consequences of waste. Third, we argue that aversion to waste can be irrational in the sense that it leads to self-defeating decisions to forego desired utility. And, finally, we suggest that waste aversion is commonplace and that its self-defeating nature is largely opaque to consumers.

AVERSION TO WASTE

Wasting Money

Waste aversion has received very little attention as a topic of scientific inquiry. The primary exception has been the work of Arkes, who first broached waste as an explanation for the sunk-cost bias (Arkes & Blumer, 1985; see also Arkes, 1996). According to this formulation, people persist in a losing endeavor because abandonment would depict prior monetary investments as wasted. The emphasis is on forfeited resources and how current behavior can be inappropriately influenced by decisions made previously. In a related vein, research suggests that both managers and consumers may inappropriately delay purchase of replacement equipment or products if replacement requires disposal of a previous purchase before the financial investment in the equipment has been recouped (see Cripps & Meyer, 1994; Okada, 2001, 2006). Both lines of research illustrate how behavior can be impelled by a relatively straightforward aversion to monetary waste.

Wasting Utility

Unused (or “leftover”) utility is defined as utility associated with a purchase that will go unconsumed. The present research makes a nontrivial distinction between an aversion to the wasting of money and the previously unexamined distaste for unused utility. The latter would be most clearly illustrated in a situation in which two products have identical prices and provide identical utility and yet possess unequal amounts of unused utility and thereby evoke different levels of aversion to disposal. Our guiding hypothesis is not merely that unused utility is aversive but that the anticipation of unused utility can cause consumers to forego purchase.

Rule-Driven Behavior. A natural question concerns the reason why consumers are averse to unused utility. We argue for a simple explanation involving over-generalization of a common-

sense rule. The directive to avoid waste is culturally ingrained because waste is frequently undesirable. As with many helpful rules, however, undesirable outcomes may obtain if the rule is applied indiscriminantly (Arkes, 1991; Arkes & Ayton, 1999) or if consumers engage in rule-based decision-making (Amir, Lobel, & Ariely, 2005). Baron (1994, 2000) argues that many decision biases stem from the overgeneralization of otherwise useful rules. Similarly, Langer (1994, p. 42), speaking to the propensity to overgeneralize, further argues that “society’s norms and values, passed on to use in fairy tales, truisms, adages, and direct teachings from parents and teachers, are often processed mindlessly.”

Deprivation. An overgeneralization rationale in turn begs the question of the origin of the rule. One likely source is the experience of deprivation, which leads consumers to be particularly alert to avenues that forestall future deprivation. Consistent with the adage “waste not, want not,” utility discarded today will not be available to satisfy a need that may arise in the future. Evidence for the universality of such common-sense rules or heuristics can be observed in proverbs (e.g., the Chinese proverb, “Though you live near a forest, do not waste firewood”), moral tales (e.g., “Waste Not Want Not Stories,” Edgeworth, 1854), and religious sources of moral instruction (e.g., Proverbs 21: 20, Holy Qur’an 6:141). These varied sources appear to advocate waste aversion in order to forestall future deprivation—that is, waste not *in order to* want not. If so, then consumer aversion to waste arising from unused utility should be especially pronounced when deprivation is made salient. Testing this hypothesis also allows us to assess (1) the normative status of waste aversion and (2) the robustness of waste aversion to “debiasing” by comparing consumer response when deprivation is salient to comparable decision-making under a more analytic mindset.

Consideration of Future Consequences. Avoiding waste in order to forestall future

deprivation also suggests that waste aversion is a forward-looking phenomenon; that is, consumers anticipate unused utility as a future consequence of purchase. Prior research indicates that consumers differ in their tendencies to anticipate immediate versus distant consequences of purchase (Strathman et al., 1994). The extent to which consumers consider future consequences has been linked to a variety of phenomenon, including persuasion, un/healthy behaviors, aggression, and fiscal responsibility (Strathman et al., 1994; Joireman, Anderson, & Strathman, 2003; Joireman & Sprott, 2005). In a purchase context, we argue that consumer aversion to waste occurs when consumers anticipate unused utility as a future consequence of purchase. Consequently, consumer aversion to waste arising from unused utility should be especially pronounced among consumers who tend to consider future consequences during purchase. Testing this hypothesis also allows us to distinguish anticipatory waste aversion from previous retrospective treatments of waste (as a form of sunk costs).

The Question of Rationality. An explanation for waste aversion based on over-generalization of a commonsense rule raises the question of rationality. We suggest that consumers may frequently engage in self-defeating behavior in order to avoid waste. That is, if consumers refrain from purchase due to an aversion to unused utility rather than the wasting of money, they may forego desired utility without any apparent return for doing so. Indeed, the normative perspective of value-based pricing argues that consumers should be indifferent to residual unused utility as long as they receive an acceptable amount of value from a purchase. The present research explores this question of rationality and, moreover, the extent to which consumers are willing to incur costs to avoid waste.

To summarize, we hypothesize that:

H1: Consumers are averse to waste arising from unused utility.

H2: Consumers anticipate waste arising from unused utility during purchase.

H3: Aversion to unused utility is especially pronounced when consumers anticipate future consequences during purchase.

H4: Aversion to unused utility is especially pronounced when deprivation is made salient.

EMPIRICAL OVERVIEW

Figure 1 offers an organizing framework for our studies. We first provide an empirical illustration of the basic phenomenon, consumer aversion to unused utility (testing H1). Experiment 1 examines how waste aversion affects routine purchase (testing H1 and H2) and, in so doing, demonstrates the implications of waste aversion for firms in goods versus rental markets; experiments 2A and 2B examine how waste aversion affects routine purchase (testing H1 and H2) and, in so doing, demonstrates the implications for goods and services markets; experiments 3A and 3B explore the psychology underlying waste aversion by examining its forward-looking nature and the role of deprivation (testing H3 and H4); experiments 4A and 4B examine the generalizability of waste aversion across consumers and context. In addition, experiments 3B, 4A and 4B further examine susceptibility to waste aversion for goods versus services while also extending the practical implications of waste aversion to the increasingly important issue of bundling. To demonstrate that waste arising from unused utility is distinct from the squandering of money, our experiments either control for the squandering of money (illustration, experiments 1—3A) or pit wasted utility against money (experiments 3B—4B). In so doing, we make no claims regarding the relative strength of wasted utility versus money; our purpose is simply to disentangle the two forms of waste in order to focus our investigation on unused utility.

Taken together, the experiments (1) demonstrate how forward-looking anticipation of waste affects consumer purchase behavior, thereby addressing a longstanding gap in the literature; (2) document a previously ignored form of waste aversion, namely, aversion to unused

utility, and disentangle it from the more intuitive squandering of money examined in prior research; (3) identify deprivation as an underlying driver of waste aversion while simultaneously assessing its normative status via comparison to more analytic decision-making; (4) demonstrate whether and how aversion to unused utility, which on its surface is a sensible decision rule, can be over-applied to the point that undesirable outcomes are realized; and, (5) illustrate several important consequences of waste aversion for both consumers and the competitive marketplace.

ILLUSTRATION

We begin with an illustration that underscores the potential consequences of waste aversion for consumers and the marketplace. It compares consumer response to goods versus service purchases that provide equivalent levels of utility at an equivalent price—but that differ in terms of unused utility inherent in their nature. The goods condition contains unused utility, whereas the service is naturally devoid of residual unused utility.

Method

Participants were staff and students at two universities and a hospital who received financial remuneration for their participation. The experiment was a 2-group (unused utility/none) between-subjects design with 75 participants.

Two alternative purchase contexts were created such that the two offerings would provide equivalent levels of utility at an equivalent price but differ in unused utility. Participants were asked to read one of the following scenarios:

Anne has a dinner party for some friends. She buys a fondue set and ingredients for a fondue dinner. The dinner party costs her \$250. Her friends enjoy the meal and have a good time. She never uses the fondue set again. [unused utility condition]

Jane has a dinner party for some friends. She reserves dinner at a fondue restaurant. The dinner party costs her \$250. Her friends enjoy the meal and have a good time. [no unused utility condition]

Participants were then asked “What is your impression of Jane/Anne?” They responded by rating Jane or Anne on the following five-point scales (anchored by disagree/agree): intelligent, foolish, and sensible. After an open-ended thought-listing task, participants further rated Jane or Anne as wasteful, generous, and creative, and the dinner party in terms of quality, fun, and deliciousness (also on five-point scales).

Results and Discussion

A wisdom index was created by averaging the items assessing intelligence, foolishness (reverse-coded), and sensibleness (coefficient $\alpha = 0.73$). As expected, an ANOVA of the index revealed significantly lower ratings when the purchase entailed unused utility ($M_{unused\ utility} = 2.70$ (0.60) vs. $M_{none} = 3.30$ (0.59); $F(1, 73) = 18.90, p < .01$). In a corresponding manner, waste perceptions were also higher in the unused utility condition ($M_{unused\ utility} = 3.66$ (1.05) vs. $M_{none} = 2.78$ (1.11); $F(1, 73) = 12.33, p < .01$).

Finally, in all experiments reported here, analyses were conducted to examine whether participants’ concerns about waste mediated preferences and intentions. These mediational analyses used the bootstrapping approach advocated by Zhao, Lynch, and Chen (2010) and are presented in the Appendix. In all cases, mediation was strongly supported. In the present case, the effect of unused utility on perceived wisdom was mediated by waste ratings. Note also that perceptions of quality, enjoyment, etc. were unaffected by our manipulation and cannot account for the pattern of results. Analysis supports mediation by waste ratings after controlling for these variables.¹

Consistent with H1, therefore, it seemed perfectly reasonable to our participants to spend

¹ For completeness, these ratings were as follows (for unused utility condition vs. none condition): generosity ($M_{unused\ utility} = 3.58$ (1.13) vs. $M_{none} = 4.05$ (0.97)), creativity (3.11 (1.06) vs. 3.16 (0.96)), good quality (3.95 (0.93) vs. 3.84 (0.93)), fun (4.13 (0.99) vs. 3.95 (0.97)), and delicious (4.03 (1.03) vs. 3.78 (1.00)). None of these ratings account for the pattern of response reported in the main text. Note also that a within-subject version of the same study was also supportive (omitted for brevity).

a considerable amount of money for an offering that is ephemeral than to spend the same amount on a purchase with residual unused utility—despite a perceived equivalence in quality and enjoyment of the options. That is, consumers are sensitive not only to traditional monetary and utility-based considerations but also to the creation of unused utility, a result that is further bolstered by the significant mediating effect of perceived wastefulness.

The results also have practical implications for a competitive marketplace. To the extent that offerings in the marketplace differ in terms of unused utility, consumers may judge purchases that entail unused utility as wasteful and therefore less sensible—creating competitive (dis)advantage among sellers. Indeed, the scenario was selected in part to illustrate the unrecognized ubiquity of the phenomenon in everyday consumer behavior. We argue more speculatively that purchase of a good for one-time use is generally beyond the consideration of most consumers, even when it provides a level of utility that compares favorably with an alternative purchase that is devoid of perceived waste. That is, the good is an implicit option that rarely becomes an explicit and consciously recognized one.

Nonetheless, this study serves primarily as an illustration because comparisons across offerings are fraught with problems that preclude strong claims of causality, despite our ability to (1) equate the purchases on multiple important dimensions (quality, enjoyment, etc.) and (2) document the mediational effect of perceived waste. Subsequent studies employ paradigms that provide greater experimental control.

EXPERIMENT 1: WASTE AVERSION DURING PURCHASE

Experiment 1 controls for product category in a context that both places the participant in the role of the consumer and allows anticipation of unused utility to affect purchase behavior. We manipulate waste via the buy-versus-rent decision—a frequently encountered dilemma that

has received recent attention (Pocheptsova, Kivetz, & Dhar, 2007) and may conceptually overlap with the good-service distinction (Lovelock & Gummesson, 2004). We argue that the potential for waste is more salient when the transaction involves purchase rather than renting because purchase, unlike renting, gives rise to unused utility in the form of tangible “leftovers.”

Experiment 1 examines the situation in which consumers engage in purchase or rental of a good, following either prior purchase, prior rental, or mere prior usage. Consistent with H1 and H2, we predict an aversion to unused utility arising from duplicate purchase of a good (versus duplicate rental of a good). Consumers are expected to be (1) averse to re-purchase of a good and (2) more averse to re-purchase of a good than to either re-purchase of a rental or purchase of a good following prior rental or prior trial.

Method

Participants were staff and students at two universities and a hospital in the northeastern United States who received financial remuneration for their participation. The study was a 3 (past purchase: good purchase vs. rental vs. trial) x 2 (present purchase: good purchase vs. rental) between-subjects design with 172 participants.²

Participants read the following scenario (with past and present purchase manipulations shown in square brackets).

Imagine that you are traveling on business. Unexpectedly, you have several days off and decide to go to a local resort. It turns out that, among other things, the resort offers snowshoeing as a sporting activity. [Back home last season, you rented snowshoes several times and really enjoyed it. / Back home last season, you bought snowshoes and used them several times and really enjoyed it. / Back home last season, you tried snowshoeing several times and really enjoyed it.] It will cost you \$100 to [buy/rent] snowshoes to use during your visit to the resort.

Participants were then asked “How likely are you to [buy/rent] the snowshoes?” and responded

² An additional 20 participants were eliminated for failure to follow the instructions. These participants completed the study in an unrealistically short amount of time. An alternative analysis based on participants who correctly answered manipulation-check items was also supportive.

on a seven-point scale (with endpoints “very unlikely/very likely”). Afterward, participants provided reasons for their judgments.

Results

The descriptive data in figure 2 are consistent with aversion to the unused utility inherent in duplicate purchase of a good. Consumers were particularly unwilling to repurchase snowshoes, even though purchase was no more expensive than rental. Planned interaction contrasts further indicated that purchase ratings for purchase versus rental did not differ as a function of past trial or rental ($F < 1$) but did differ when contrasted to past purchase ($F(1,166) = 4.92, p < .05$). When past purchase entailed a good, current purchase declined for purchase versus rental of the good ($F(1,166) = 11.18, p < .05$). When past purchase entailed rental or trial, current purchase did not differ for purchase or rental of the good (F 's < 1).

[Insert figure 2 about here.]

Participants' responses were coded by two independent judges to identify explicit consideration of waste. (Judges were blind to experimental condition, and inter-coder agreement was 81%.) Categorical analysis of waste (vs. non-waste) rationales revealed a non-significant interaction contrast for purchase-versus-rental as a function of past trial or rental ($\chi^2 = 0.00$) but a significant interaction contrast when past trial and rental were contrasted against past purchase ($\chi^2 = 5.90, p < .05$). When past purchase entailed a good, mentions of waste increased for purchase versus rental of the good ($\chi^2 = 7.44, p < .01$); when past purchase entailed rental or trial, mentions of waste did not differ for purchase or rental (p 's $> .80$). When conditionalized on rationale, purchase ratings were lower for participants who provided waste rationales ($M_{waste} = 3.42 (1.58)$ vs. $M_{no-waste} = 5.24 (1.30)$; $F(1,167) = 66.73, p < .01$). As expected, a bootstrapping analysis supported mediation of the effects of the interaction contrast on behavioral intentions by

waste concerns (see appendix).

Discussion

When comparing purchase intent across conditions, it is important to recall that the rent-versus-buy distinction was irrelevant when purchase on a later occasion followed previous rental or trial; that is, consumers were equally willing to rent or purchase the snowshoes. In contrast, the rent-buy distinction mattered a great deal when purchase on a later occasion followed past purchase of a good; that is, consumers were more willing to re-rent than re-purchase the snowshoes. Notably, both rental and purchase provided equivalent utility at the same price within the consumption setting; however, re-purchase of the good would result in additional “leftover” utility that could not be enjoyed whereas rental of the same good would not.³ This result is conceptually identical to that of the illustration study, which demonstrated how purchase of a good with leftover unused utility was more aversive than purchase of an offering equivalent on all other dimensions save the absence of unused utility.

These straightforward and ecologically plausible studies (1) demonstrate that consumers anticipate waste concerns during purchase (rather than at disposal), supporting H2; (2) further portray a neglected form of waste aversion arising from unused utility (rather than the squandering of money), supporting H1; (3) demonstrate how aversion to waste creates a constraint on the pursuit of utility, inasmuch as consumers reject an otherwise acceptable and desired level of utility (as reflected in the control groups); and (4) as we elaborate below, illustrate the implications of aversion to unused utility for the competitive marketplace (including

³ In a follow-up study, an arguably more conservative within-subject design of the same scenario was utilized that offered participants a choice between renting and purchasing the snowshoes. Once again, relative preference for rental versus purchase was a function of unused utility. Furthermore, an additional condition in which waste was made explicit (i.e., the snowshoes could not be taken home and used again, ruling out inventory costs) revealed similar preferences to that of the past-purchase condition—suggesting that consumer aversion to unused utility occurs spontaneously when faced with re-purchase of a tangible good. We also note an element of conservatism in both studies. Rental arguably offered lower value to the consumer, inasmuch as nothing in the scenario prohibited post-purchase re-sale or further use of the good to recoup a portion of the original investment.

do-it-yourself and buy-versus-rent markets).

EXPERIMENT 2A: WASTE AVERSION AND PURCHASE AVOIDANCE

The illustration study compared different purchases deemed equivalent on multiple dimensions with the exception of unused utility; experiment 1 provided a cleaner test by comparing purchase versus rental of the same tangible good. The present experiment compares re-purchase of a tangible good versus re-purchase of an intangible service. The design alleviates the need to make direct good-service comparisons by providing the good and service conditions with their own control groups. Consistent with H1 and H2, we predict waste aversion arising from anticipation of unused utility when consumers consider re-purchase of the tangible good. In the service conditions, we expect no such outcome. Thus, the service conditions themselves provide a baseline for re-purchase behavior in the absence of unused utility. These service conditions are analogous to the rental conditions in experiment 1 in the sense that rental similarly represents an intangible service with no residual utility. As in the illustration study, the design also provides an example of the broader implications of waste aversion as a phenomenon with implications for the competition of goods and services in the marketplace.

Method

Participants were students at a southern university in the United States and staff and students at two universities and a hospital in the northeastern United States who received extra credit or financial remuneration for their participation. The study was a 2 (good/ service) x 2 (duplicate purchase) between-subjects design with 128 participants.

All participants read the following scenario, which was intended to convey a nontrivial consumer need:

Imagine that you are a parent on vacation with your two children. You are returning home and learn that your flight has been delayed for several hours. You need to find a

way to entertain the children during this time.

In the good condition, the scenario continued as follows (with the duplicate purchase manipulation shown in brackets):

Now imagine that the airport has a store selling board games. In the store, you find a game: it is a popular one that entertains children well, and the children are very enthusiastic to play it. [It is a game that you have already purchased for the children to play with at home.] The total price will be \$20 to purchase the board game for your children to play.

In the service condition, the scenario instead continued as follows (with the duplicate purchase manipulation again shown in brackets):

Now imagine that the airport has a cinema showing movies. The cinema has a children's movie: it is a popular one that entertains children well, and the children are very enthusiastic to see it. [It is a movie that you have already paid for the children to see at the cinema at home.] The total price will be \$20 to purchase the tickets for your children to see the movie.

Participants then rated “How likely are you to purchase the [game / movie tickets]?” on a seven-point scale (anchored by “very unlikely/very likely”). Participants were then asked “How would you rate the item that you purchased?” and rated it as wasteful, enjoyable and good quality on five-point scales (anchored by “disagree/agree”).

Results and Discussion

An ANOVA of purchase likelihood revealed a significant effect of duplicate purchase ($F(1, 124) = 14.54, p < .05$), qualified by its interaction with good/service context ($F(1, 124) = 4.43, p < .05$). The pattern of means in table 1 is supportive of H2. Purchase of a good declined after past purchase of a good ($F(1, 124) = 17.10, p < .05$); re-purchase of a service did not decline ($F(1, 124) = 1.45, p = .22$).

Consistent with H1, waste ratings produced a similar pattern of results. An ANOVA revealed a significant effect of duplicate purchase ($F(1, 124) = 4.86, p < .05$), qualified by its

interaction with good/service context ($F(1, 124) = 5.94, p < .05$). For a good, re-purchase increased waste ratings ($F(1, 124) = 10.52, p < .05$); for a service, re-purchase did not affect waste ratings ($F < 1$). As expected, a bootstrapping analysis supported mediation by waste ratings (see appendix).

Alternative explanations based on the quality or enjoyment of the offerings receive no support. Substituting these measures for perceived waste, the two-way interaction was non-significant for enjoyment ($F(1, 124) = 1.04, p = .31$) although, unexpectedly, significant for quality ($F(1, 124) = 4.67, p < .05$). However, the pattern of means for quality cannot account for likelihood ratings, and a mediational analysis was wholly non-supportive. Moreover, an analysis that controls for quality also supported the mediating role played by waste perceptions.

[Insert table 1 about here.]

We interpret these results in terms of waste aversion: goods contain unused utility and therefore present consumers with the dilemma of being wasteful—even when the purchase provides a desired amount of needed utility. In concrete terms, participants were willing to bear the burden of a very aversive experience in order to avoid repurchasing an already owned good.⁴ Such behavior stands in contrast to that of participants who showed no compunction about repurchasing a previously experienced service. Consumption of a movie leaves no residual utility and therefore little sense of the wastefulness that accompanies owning identical versions of a tangible object. Thus, we again observe how purchase avoidance, driven by anticipated waste, imposes a constraint on the pursuit of utility. Moreover, the irrationality of such behavior is highlighted by comparison to the service conditions in which consumers were willing to pay an

⁴ Because we manipulated waste via past purchase of the product, participants may have avoided repurchase of the good due to a desire to avoid the inventory cost of a second identical product. In a follow-up study, participants reacted to a similar scenario in which waste of the good was also cued via airline luggage limits that precluded taking the good home. Results showed that reluctance to purchase the good was not lessened by the absence of inventory costs.

equivalent price for comparable utility.

EXPERIMENT 2B: RISK AVERSION AND WASTE AVERSION

Aversion to waste can be expressed in ways other than purchase avoidance (and its consequent self-denial of utility). The present experiment explores consumers' risk tolerance and willingness to incur an unpleasant purchase outcome. Specifically, consumers were asked to choose between two product offerings for which attractiveness of the first option was known and favorable but attractiveness of the second option was unknown. As in the preceding study, waste was manipulated via duplicate purchase of a good and is contrasted to duplicate purchase of a less tangible service. Consistent with H1 and H2, we argue that relative to consumers in the service conditions, consumers in the tangible goods conditions will increasingly prefer the unknown option in order to avoid waste arising from unused utility. Preference for an unknown option represents risk-seeking behavior inasmuch as the option of known attractiveness poses less risk of a negative outcome (i.e., an unpleasant experience). That is, an aversion to unused utility in re-purchase of a tangible good is expected to lead consumers to assume risk and choose an unknown option.

Method

Participants were undergraduate students at a university in the northeastern United States who received extra credit in an introductory marketing class. The study was a 2 (good/service) x 2 (duplicate purchase) between-subjects design with 138 participants.

Participants read a scenario describing current purchase of either a tangible good or an intangible service. Waste arising from unused utility is manipulated via a past purchase cue (such that current purchase of the good gives rise to additional leftover utility whereas current purchase

of the service does not). In the good condition, participants read as follows (with the duplicate purchase manipulation shown in brackets):

Imagine that you are a parent on vacation with your children. You are returning home and you learn that your flight has been delayed for several hours. You need to find a way to entertain the children during this time. The airport store has 2 games that are suitable for children. The first game is one that the children have already played so you know they will enjoy it. (It is a game that you have already purchased for your children at home.) You don't know much about the second game so you are not sure whether the children will enjoy it.

In the service condition, participants read a similar scenario that substituted a less tangible service for the good (with the duplicate purchase manipulation again shown in brackets):

Imagine that you are a parent on vacation with your children. You are returning home and you learn that your flight has been delayed for several hours. You need to find a way to entertain the children during this time. The airport has a cinema that is playing 2 children's movies. The first movie is a film that the children have seen so you know they will enjoy it. (It is a film that you have already purchased for your children on video at home.) You don't know much about the second movie so you are not sure whether the children will enjoy it.

Participants were then asked to indicate "Which movie/game would you buy at the airport?" on a seven-point scale (with endpoints indicating "option 1" and "option 2"). Option 2 represented the uncertain option. Afterward, participants provided reasons for their judgments.

Results

We hypothesized that consumers would prefer an unknown option when the alternative entailed waste (arising from duplicate purchase of a good). As shown in figure 3, purchase intent for the familiar option varied as a function of the interaction of good/service and the duplicate purchase cue ($F(1,134) = 8.46, p < .01$). In the good conditions, purchase of the known option declined when it had been purchased previously ($F(1,134) = 9.28, p < .01$). In the service conditions, duplicate purchase had no effect ($F(1,13) = 1.11, p = .29$). Viewed another way, the good was preferred to the service when duplicate purchase was not cued ($F(1,134) = 6.51, p <$

.01) but not when duplicate purchase was cued ($F(1,134) = 2.46, p = .12$). These results support H2.

Participants' purchase rationales were coded by two independent judges to identify explicit consideration of waste. (Judges were again blind to experimental condition and attained an 85% level of agreement). Categorical analysis of waste versus non-waste rationales revealed a significant interaction of good/service and duplicate purchase cue ($\chi^2(1) = 22.24, p < .01$) such that more reasons reflected waste consideration for goods than services when duplicate purchase was cued versus not cued. As expected, a bootstrapping analysis supported mediation by waste rationales (see appendix). These results support H1.

[Insert figure 3 about here.]

The pattern of results indicates that consumers will incur risk to avoid waste. In the absence of a previous purchase, consumers show a sensible willingness to purchase a good that ensures utility over a good of unknown appeal. However, this tendency is significantly reduced when the same utility is obtained from re-purchase of that good. That is, risk-seeking behavior ensues as consumer preference for the option of unknown utility increases. In the service conditions (acting as control groups), consumers are unaffected by past purchase. Indeed, there was a directional preference to repurchase the known service over the unknown service, presumably because its utility was known and appreciated. Taken together, the results suggest that it is the unused utility in the goods condition that makes waste salient and leads to preference for the unknown option. The tangible good "lives on" and contains additional utility that will not be enjoyed; the service does not. Such behavior is not irrational, per se, because there is no normative benchmark for risk tolerance. Nonetheless, consistent with H1 and H2, waste aversion in the case of goods constrains the pursuit of utility, inasmuch as it represents a

rejection of an otherwise acceptable and known level of utility (as reflected in the corresponding service conditions).

Discussion

Experiments 2A and 2B indicate that anticipation of unused utility constrains the purchase of tangible goods. These studies are significant for three reasons: (1) They demonstrate that consumers anticipate waste arising from unused utility during purchase and prior to disposal. Such waste aversion is distinct from the mere squandering of money (as controlled for in the equivalent service conditions). (2) They demonstrate how aversion to waste creates a constraint on the pursuit of utility, inasmuch as consumers reject an otherwise acceptable and desired level of utility (as reflected in the service conditions) and may even engage in risk-seeking behavior (purchase of an offering of unknown utility) in order to avoid waste. (3) Both studies illustrate the implications of aversion to unused utility for goods versus service markets.

EXPERIMENT 3A: WASTE AS A FORWARD-LOOKING PHENOMENON

The preceding experiments show that, unlike research on sunk costs, unused utility can inhibit purchase in prospect, sometimes to the detriment of the consumer. Experiments 3A and 3B reinforce this finding but are further designed to illuminate underlying psychology. We have argued that waste aversion in prospect should be exacerbated by two factors: (1) consumers' propensity to be forward-looking and (2) thoughts of deprivation. Consumers who exhibit a greater inclination to look to the future should be most sensitive to expectations of unused utility; consumers for whom deprivation is salient should similarly be most inclined to avoid waste. Experiments 3A and 3B, respectively, examine these two variables. In so doing, they test H3 and H4.

Method

Participants were undergraduate students at a university in the northeastern United States who received extra credit for their participation. The study was a two-group between-subjects design with 76 participants.

All participants first responded to a series of ten items (on seven-point scales, anchored by “disagree/agree) that measured consideration of future consequences (CFC, adapted from Strathman et al., 1994). Sample items include: “I consider how things might be in the future and try to influence those things with my day to day behavior,” and “My behavior is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions” (reverse-coded).

After completion of several filler tasks, participants then read a scenario. The scenario manipulated waste via duplicate purchase of a good versus a service, using the precise wording of experiment 2A. Participants then provided ratings for purchase likelihood and waste (see wording in experiment 2A).

Results and Discussion

Initial analyses as a function of good/service context revealed main effects on purchase likelihood ($F(1, 74) = 9.86, p < .01$) and waste ($F(1, 74) = 4.45, p < .05$), but not enjoyment or quality (F 's < 1). As expected, participants were less likely to re-purchase the good than to re-purchase the service ($M_{service} = 5.54 (1.41)$ vs. $M_{good} = 4.38 (1.77)$), and waste ratings were higher for re-purchase of the good versus service ($M_{good} = 3.28 (1.30)$ vs. $M_{service} = 2.68 (1.20)$). These results, replicating experiment 2A, are consistent with H1 and H2 and demonstrate waste aversion arising from unused utility inherent in re-purchase of the good.

Of focal interest for testing H3, ANOVAs were then conducted as a function of the good/service context, CFC (standardized $M = 0 (1)$), and their two-way interaction. For purchase

likelihood, ANOVA revealed a main effect of good/service context ($F(1, 72) = 10.56, p < .01$), qualified by the expected interaction with CFC ($F(1, 72) = 4.29, p < .05$); the main effect of CFC was non-significant ($F < 1$). To understand the nature of the two-way interaction, spotlight analyses were conducted at higher and lower levels of CFC. When CFC was higher (i.e., at +1 SD), re-purchase of the good was less likely than re-purchase of the service ($M_{good} = 4.04$ vs. $M_{service} = 6.08, t = 3.77, p < .01$). When CFC was lower (i.e., at -1 SD), re-purchase of the good and service did not differ ($M_{good} = 4.68$ vs. $M_{service} = 5.11, t = .82, p = .42$). This pattern of results, illustrated in figure 4, is consistent with H3 and indicates spontaneous anticipation of waste arising from unused utility when consumers consider future consequences. That is, waste aversion is a forward-looking phenomenon.

[Insert figure 4 about here.]

Waste ratings are supportive of this interpretation. When prompted to assess waste, participants provided waste ratings that were higher for re-purchase of the good than re-purchase of the service ($F(1, 72) = 4.49, p < .05$); other effects were non-significant (F 's < 1). (Ratings of quality and enjoyment revealed no significant effects (p 's $> .30$.) As expected, a bootstrapping analysis supported mediation by waste perceptions when CFC was higher but not lower (see appendix).

To summarize, experiment 3A provides direct evidence that waste aversion is a forward-looking phenomenon, emerging most strongly among consumers who are prone to consider the future consequences of purchase. As in the previous studies, the current findings also demonstrate that waste aversion is distinct from the mere squandering of money and that it can lead consumers to reject an otherwise acceptable and desired level of utility (as reflected in the service condition).

EXPERIMENT 3B: DEPRIVATION AND TANGIBILITY

We interpret self-defeating aversion to waste to be a consequence of over-generalization and/or mindless reliance on the common-sense rule to avoid waste in order to forestall deprivation (i.e., waste not *in order to* want not). Experiment 3B was designed, in part, to explore the role of deprivation more directly. Specifically, we examine how priming deprivation (versus analytic thinking) affects consumer decisions that entail residual unused utility. As articulated in H4, consumers should be especially averse to unused utility when deprivation is primed prior to decision-making, relative to either neutral priming or the priming of analytic thinking. These comparisons also enable examination of the normative status of waste aversion, the robustness of (spontaneous) waste aversion to corrective intervention, and the important question of spontaneity.

Tangibility. Inasmuch as waste aversion arises from a desire to forestall deprivation, a natural question then arises regarding the salience of deprivation in routine consumer purchases, irrespective of priming. We suggest that tangibility is a natural correlate of waste in the purchase environment, and we surmise that the otherwise sensible rule to avoid waste resonates most strongly when waste involves tangible objects.

Tangibility plays a central role in marketing thought (Zeithaml, Parasuraman, & Berry, 1985) and has been shown empirically to influence a variety of consumer responses (Bolton & Alba, 2006; Rick & Loewenstein, 2008). Experiments 2A—3A manipulated unused utility by comparing goods and services; that is, tangibility correlated with unused utility in these experiments. Experiment 3B, in contrast, examines offerings that differ in tangibility while controlling for unused utility. Thus, unlike the preceding studies, the intent is to test whether

there is an additive effect of tangibility (which, we argue, makes waste salient during purchase). Formally, we hypothesize that:

H5: Waste aversion will be stronger for tangible (vs. intangible) unused utility.

Bundling. Finally, these tests of deprivation and tangibility were conducted in the important marketing context of bundling, which also affords a convenient opportunity to pit the squandering of money against unused utility. Specifically, consumers chose between individual items and a lower-priced bundle of the same items that entailed unused utility. Preference for the individual items over the bundle represents an increased aversion to unused utility versus the squandering of money. Hence, the current approach allows us to operationalize unused utility via a portion of the current product offering and to examine relative purchase preference (in contrast to the previous studies that have operationalized unused utility by manipulating past purchase of a product and examining purchase likelihoods).

We predict that: (1) consumers will exhibit greater preference for the purchase of individual items over the bundle due to waste aversion arising from unused utility in the bundle; (2) waste aversion will be heightened when deprivation (vs. analytic thinking) is primed; and (3) waste aversion will be heightened for tangible goods versus intangible services. Stated differently, deprivation should decrease preference for a bundle with unused utility whereas analytic thinking should increase preference for the more economically priced bundle despite its unused utility.

Method

Participants were undergraduate students at a university in the northeastern United States who received extra credit for participation. The study was a 2 (good/service) x 3 (priming: neutral, deprivation, analytic thinking) between-subjects design with 173 participants.

In ostensibly unrelated tasks, participants first completed a task intended to prime deprivation or analytic thinking or neutral priming, adapted from approaches used elsewhere (e.g., Srull & Wyer, 1979; Hsee & Rottenstreich, 2004). To prime deprivation, participants completed a sentence scramble task within which were embedded words related to deprivation (e.g., deprive, lacking, without, empty). A neutral prime utilized the same sentence completion task with embedded words that were neutral (e.g., pencil, table, pretty). To prime analytic thinking, participants completed a task asking participants to complete short math and logic problems (e.g., If $a > b$ and $b > c$ then $a > c$: true or false? $5 \times (2 + 3) = 25$: true or false?).⁵

Participants were then asked to read a short scenario that asked for preference between two options of a good or service: the bundle option B was priced lower but included additional unused utility. In the goods condition, the scenario read as follows:

You are at an amusement park with three friends/family members. The four of you decide to buy some lunch at a takeaway counter that serves pre-made sandwiches. It is your turn to pay for everyone. Individual sandwich packs are \$8 each and so it will cost you \$32 total (option A). Then you notice a special promotion - you can buy a multi-pack of six sandwiches for \$30 (option B). Your group will use four of the sandwiches; the rest will go unused and be thrown away. Assume that no one else wants the remaining sandwiches and that they cannot be saved for later or given or sold to anyone else. Which option do you prefer?

In the service condition, the scenario read as follows:

You are at an amusement park with three friends/family members. The four of you decide to go to an entertainment show that is playing. It is your turn to pay for everyone. Individual tickets are \$8 each and so it will cost you \$32 total (option A). Then you notice a special promotion – you can buy a package of six tickets for \$30 (option B). Your group will use four of the tickets; the rest will go unused and be thrown away. Assume that no one else wants the remaining tickets and that they cannot be saved for later or given or sold to anyone else. Which option do you prefer?

⁵ In a pre-test, participants who completed the deprivation priming task indicated greater agreement with the statements (“I have experienced deprivation” and “I know what it is like to do without”, each on five-point disagree-agree scales) than participants who completed the analytic priming task ($M_{deprivation} = 3.00$ (1.12) vs. $M_{analytic} = 2.42$ (0.92); $F(1, 59) = 4.85, p < .05$).

The services condition, representing a relatively intangible offering, serves as a comparison group against which waste aversion for a tangible offering can be assessed.

Participants then indicated their preference on a six-point scale (with endpoints “Strongly prefer option A/Strongly prefer option B”) and also rated which option is more wasteful and economical (also on six-point scales, with endpoints “Option A is much more / Option B is much more”, and a mid-point labeled “No difference”).

Results

ANOVA of relative preference revealed main effects of priming ($F(2, 167) = 3.00, p = .05$) and good/service ($F(1, 167) = 32.31, p < .01$). Bundle preference was reduced under deprivation versus analytic priming ($M_{deprivation} = 4.11 (2.00)$ vs. $M_{analytic} = 4.84 (1.88)$; $F(1, 167) = 5.99, p < .05$). That is, participants primed with deprivation (analytic thinking) exhibited greater preference for the less wasteful non-bundled offering (more economical bundle); preference under neutral priming ($M_{neutral} = 4.26 (2.08)$) lies in between. Moreover, participants also showed greater preference for the services bundle than the goods bundle ($M_{service} = 5.18 (1.70)$ vs. $M_{good} = 3.55 (2.13)$). That is, consumers appear more averse to the unused utility in the tangible than in the intangible purchase.

The other scale responses were also submitted to ANOVA, and the results point to waste perceptions as a mediator.⁶ For the critical assessment of wastefulness, the pattern mimics that of preference with main effects of good/service ($F(1, 167) = 3.07, p = .08$) and priming ($F(2, 167) = 4.23, p < .05$). First, perceived waste was lower under analytic priming versus deprivation priming ($M_{analytic} = 3.98 (1.24)$ vs. $M_{deprivation} = 4.49 (0.90)$, $F(1, 167) = 8.28, p < .01$); waste perceptions under neutral priming ($M_{neutral} = 4.20 (1.12)$) lie in between. Second, waste was

⁶ Economical ratings did not differ for either product or priming (p 's $> .29$) and will not be discussed further. These results again distinguish between aversion to unused utility versus the squandering of money.

perceived to be greater for the tangible goods bundle than the intangible service bundle ($M_{service} = 4.10 (1.09)$ vs. $M_{good} = 4.39 (1.10)$). Consistent with this result, mediational analysis revealed that participants' waste concerns mediated the effects of priming and good/service on preference (see the Appendix).

To examine the neutral priming condition further, two judges (blind to hypotheses and experimental condition) coded whether the cognitive responses reflected thoughts about wasted utility or wasted money (inter-coder agreement 93%; disagreements resolved via discussion). Consistent with our theory, more thoughts reflected wasted utility (wasted money) for the tangible (intangible) offering ($\chi^2 = 7.64, p < .01$). In turn, thoughts about wasted utility led to lower preference for the bundled offering whereas thoughts about wasted money favored the bundled offering ($M_{wasted\ utility} = 2.36 (1.50)$; $M_{wasted\ money} = 5.45 (1.35)$; $F(1, 47) = 38.12, p < .01$). This pattern of results aligns with findings when deprivation and analytic thinking are primed.

Discussion

To summarize, waste aversion reduced preference for a more economical bundled offering with residual unused utility, especially when deprivation (vs. analytic thinking) was primed. In addition, bundle preference was reduced for a tangible (vs. intangible) offering, suggesting greater aversion to tangible unused utility. Finally, neutral priming revealed bundle preferences that lie between the deprivation and analytic baselines, with follow-up analyses indicating that the salience of spontaneous thoughts about wasting utility (money) reduce (increase) bundle preference. These results support H1, H2, H4, and H5 and are significant because they: (1) provide evidence that waste aversion occurs in response to (primed) deprivation; (2) show that aversion to wasted utility occurs spontaneously and can drive preference in opposite directions from an aversion to squandering money; (3) suggest that waste

aversion is non-normative, inasmuch as it was reduced by an analytic prime; and (4) support the conjecture that waste aversion is heightened when residual unused utility is tangible. We view the latter as a preliminary finding and assess its generalizability in subsequent experiments.

EXPERIMENT 4A: GENERALIZABILITY ACROSS CONSUMERS

Although the preceding experiments support robustness across decision contexts, the final pair of studies examines generalizability across consumers and purchases. Experiment 4A is a simple test of the former. To that end, we employed a sample of adult consumers and examined whether waste aversion is stronger for tangible versus intangible offerings (i.e., testing H1, H2, and H5). We utilize a bundling context that again allows us to disentangle aversion to unused utility from its close cousin, distaste for the squandering of money.

Method

Participants were drawn from a commercial panel of adult consumers who received financial remuneration for participation. The study was a 2 (good/service) between-subjects design. The sample of 220 participants skewed female (74%), had a median annual household income in the range of \$40,000-49,999, and had desirable heterogeneity with regard to education (22% had high school diploma or less, 42% had some college or a 2-year college degree, 25.5% had a 4-year college degree, 10% had graduate-level or professional degrees).

As in experiment 3B, participants were asked to read a short scenario that asked for a preference between two options of a good or service: the bundle option B was priced lower but included additional unused utility. The good and service conditions were virtually identical to experiment 3B, describing purchase of sandwiches or tickets. As in experiment 3B, the service condition serves as a comparison group that controls for the amount of expenditure and against which waste aversion for the tangible offering can be assessed. In addition, relative preference

for the bundle with unused utility versus higher-priced individual items pits waste arising from unused utility against the squandering of money.

After reading the scenario, participants indicated their preference and then rated which option is more wasteful and economical (see experiment 3B for precise wording). Finally, participants responded to background questions, including income, education, and economics training.

Results and Discussion

An ANOVA of preference revealed a main effect of good/service context ($F(1, 218) = 15.57, p < .01$): preference for the bundle declined in the good versus service condition ($M_{good} = 3.07 (1.95)$ vs. $M_{service} = 4.13 (1.97)$). Likewise, ANOVA of waste perceptions also revealed a main effect of good/service ($F(1, 218) = 21.32, p < .01$): consumers perceived more waste in the good versus service bundle ($M_{good} = 4.15 (1.22)$ vs. $M_{service} = 3.33 (1.38)$).⁷ As expected, a bootstrapping analysis confirmed that participants' waste concerns mediated the effects of the good/service context on preference (see appendix). That is, consumers' relative preference for a bundle with unused utility (vs. individual items) was lower for a tangible (vs. intangible) offering, driven by consumer aversion to waste. Although both bundles contained additional utility that would go unused, the results indicate that tangible leftovers are especially aversive.

To further assess generalizability, post-hoc analyses were conducted to assess waste aversion as a function of education and income (based on median splits), and self-reported economics training. In all cases, consumer preference was lower, and waste perceptions were higher, for the tangible (vs. intangible) bundle—pointing to the robustness of our results. Finally, we note that, when converted to a choice measure, 59% (33%) of consumers were willing to

⁷ For completeness' sake: Economical ratings were directionally higher for the service than goods bundle ($M_{service} = 3.82 (1.38)$ vs. $M_{good} = 3.52 (1.46)$, $F(1, 218) = 2.52, p = .11$). Follow-up analyses indicate that this difference cannot account for the pattern observed for bundle preference, nor its mediation by waste perceptions.

purchase the more expensive option to avoid waste inherent in the tangible (intangible) bundle. Put simply, consumer aversion to wasted utility led to the squandering of money.

EXPERIMENT 4B: GENERALIZABILITY ACROSS CATEGORY

A final experiment was conducted to assess generalizability across product category. We speculate that wasting food may be especially aversive because it represents a particularly acute form of deprivation (i.e., hunger) and/or rises to the level of immoral or sinful behavior. Sinfulness has been implicated in other aspects of consumption avoidance, particularly the consumption of hedonic products (Kivetz & Simonson, 2002). It is interesting in the present context that several major dictionaries use food waste as an example in their definition of sin. For example, Merriam-Webster (2008) refers to “a regrettable or blameworthy act (it’s a sin to waste food when people are starving.” Moreover, both the New and Old Testaments contains several passages regarding the waste of food (e.g., Genesis 41: 35-6, John 6: 12). Such sources suggest that the failure to avoid waste (especially the waste of food) may rise to the level of sinful or immoral behavior. To test this notion, we replicate and extend the findings of experiment 3B and 4A for bundling (observed for intangible ticket and tangible food categories) to another category (tangible souvenirs).

Method

Participants were staff and students of two universities and a hospital in the northeastern United States who received financial remuneration for their participation. The study was a 3-group between-subjects design with 103 participants.

As in experiments 3B and 4A, participants were asked to read a short scenario that asked for a preference between two options: Option A involved the purchase of individual items, whereas option B involved the purchase of a bundle of the same items that was lower-priced but

entailed unused utility. One of the scenarios pertained to an intangible product (admission to a show) while the other two scenarios pertained to goods (sandwiches, souvenirs). The wording of the scenario for the souvenir condition read as follows.

Imagine the following situation: You are at an amusement park with three friends. The four of you decide to buy matching souvenirs of your visit from the gift shop. Individual souvenirs are \$8 each and so it will cost you \$32 total (option A). Then you notice a special promotion—you can buy a set of six souvenirs for \$30 (option B). Your group will use four of the souvenirs; the rest will go unused and be thrown away. (Assume that no one else wants the remaining souvenirs and that they cannot be saved for later or given or sold to anyone else.) Which option do you prefer?

The sandwich and ticket conditions used wording similar to experiments 3B and 4A.

Afterward, participants provided ratings for preference and waste on six-point scales (see experiment 3B and 4A for precise wording).

Results

Consistent with H5, relative preference for the bundle containing unused utility was highest in the service condition ($M_{service} = 5.39 (1.27)$) than in the goods conditions ($F(1, 100) = 9.48, p < .01$). That is, consumers were more averse to waste when the purchase was tangible than intangible. In the goods conditions, preference for the bundle was higher for the souvenir versus sandwich bundle ($M_{souvenir} = 4.71 (1.67)$ vs. $M_{sandwich} = 3.91 (1.95)$; $F(1, 100) = 4.06, p < .05$), consistent with our speculation that wasting food is particularly aversive.

The waste ratings provide further support for this interpretation. Consumers perceived less waste in the intangible service bundle ($M_{service} = 3.36 (2.21)$) than in the more tangible goods bundles ($F(1, 100) = 12.90, p < .01$). In the goods conditions, waste perceptions for the souvenir and sandwich bundles did not significantly differ ($M_{souvenir} = 4.51 (1.80)$ vs. $M_{sandwich} = 5.11 (1.71)$; $F(1, 100) = 1.72, p = .19$). As expected and consistent with the pattern for waste and

preference, a bootstrapping analysis supports mediation of in/tangible preference differences (but not sandwich/souvenir differences) by waste ratings (see appendix).

Discussion

These results demonstrate robustness of our prior findings and generalizability across product contexts. Although both good and service bundles contained additional unused utility, consumers were particularly averse to tangible waste inasmuch as tangible goods “live on” and remind consumers of the additional utility that will not be enjoyed. In addition, waste may seem particularly “sinful” for certain types of products, such as food, which would magnify aversion to waste.

The latter finding further refutes an alternative explanation based on inventory costs or a desire not to accumulate things (see footnotes 3 and 4). Consumers were less inclined to purchase the sandwich bundle than the souvenir bundle, despite the fact that sandwiches cannot be inventoried over extended periods of time. Also, inasmuch as sandwiches are biodegradable, ecological concerns cannot account for the pattern of results.

GENERAL DISCUSSION

We have shown that consumers exhibit forward-looking aversion to waste during purchase that is driven by aversion to unused utility (rather than the squandering of money) and originates at least in part to a desire to forestall deprivation. In many instances, the rule that underlies waste aversion enhances consumer welfare. However, when overapplied or applied mindlessly, it constrains the pursuit of utility, which in turn raises the question of ir/rationality. We showed how the potential for waste leads consumers to reject utility that has otherwise been deemed acceptable (as reflected in control groups in the studies). Although we are wary of characterizing waste aversion as “irrational,” constraints on the pursuit of desired utility could be

deemed as such from a traditional economic perspective. Indeed, waste aversion declined when analytic thinking was primed, which also may be taken as evidence of its non-normative status. We conclude that waste aversion, on its surface a sensible decision rule, is over-applied and that the implications for both consumers and the competitive marketplace are consequential.

Before addressing these broader implications, we acknowledge reliance on a scenario-based approach and recognize the caveats that usually apply. Nonetheless, we have tried to address the potential for unintended differences across scenarios by: (1) employing multiple operationalizations of unused utility (e.g., buy vs. rent, good vs. service, bundling); (2) employing multiple types of control conditions as referents; (3) measuring and then rejecting specific alternative causes; (4) employing multiple measures of waste; (5) subjecting the results to mediational analyses, which routinely proved supportive; (6) producing interactive effects that do not parsimoniously lend themselves to plausible alternative processes; and (7) devising scenarios and experimental designs with the deliberate objective of systematically addressing and ruling out various alternative explanations to wasting utility. For example, the distinction between wasting utility and wasting money was designed into every experiment.

Implications and Future Research

A better understanding of the role played by waste in consumer response to product offerings is important to firms for several reasons. Fundamentally, waste aversion is another example of the limitations of value-based pricing in the sense that consumer preference for a higher-value option can be reduced when the option entails unused utility. Moreover, waste can shift preference among product offerings. For example, consumers prefer rental over purchase of a good when the purchase entails unused utility, even when both offer equivalent utility (experiment 1). Similarly, consumers prefer to pay more for individual items in order to avoid

waste inherent in a bundle (experiments 3B, 4A, and 4B). Although we examine differences in unused utility in scenarios that carefully control for all other differences among the product offerings, we believe that waste aversion will affect consumer response whenever competing alternatives differ in terms of unused utility—with important consequences for consumers and the marketplace.

Goods and Services. We have suggested that waste aversion arising from unused utility will be stronger for goods than for services because tangible goods “live on” and are a salient (indeed tangible) reminder of waste arising from unused utility. For example, consumers are more averse to waste arising from unused utility in a tangible versus intangible bundle (experiments 3B, 4A, and 4B). In addition, we suggest that tangibility is a natural correlate of unused utility, inasmuch as tangible goods are more likely to contain additional unused utility than more ephemeral services—with consequences for goods and services that compete against each other. In our initial illustration, consumers judged it more reasonable to spend a considerable amount of money for a service (a fondue dinner) than to spend the same amount when it involved a tangible good with residual unused utility (a fondue set)—despite a perceived equivalence in quality and enjoyment of the options. In experiments 2A and 2B, we also found that, in the pursuit of entertainment, consumers were quite willing to repurchase an intangible offering (a movie) but relatively unwilling to repurchase a tangible good (a game). This result obtained despite a perceived equivalence in quality and enjoyment of the alternatives and a perceived need for the entertainment; that is, consumers were willing to bear a nontrivial cost in order to avoid the waste attached to repurchase of a tangible good. In both studies, perceptions of wastefulness were shown to drive the results.

Generalizing to the broader marketplace, such results indicate that goods providers are at

a disadvantage relative to service providers due to differential vulnerability to waste aversion. In addition, service providers may be better able to charge a price commensurate with an offering's utility because the inherent nature of a service makes it less likely to contain unused utility. In fact, experiment 1 provides a demonstration of this phenomenon in that rental of a good (i.e., a relatively intangible service) was less vulnerable to waste aversion than was purchase of a good. More generally, our research provides evidence that goods and service providers will have differential competitive advantage in the marketplace (cf. Bolton, Warlop, & Alba, 2003; Bolton & Alba, 2006)—and points to the need for future research to explore how the good-service distinction affects consumer behavior and, in turn, the nature of competition.⁸

Bundle Preference. The present research also explores the consequences of forward-looking aversion to unused utility for bundled offerings. Intuition and past research suggest that the addition of utility will increase the attractiveness of an offering (Nowlis & Simonson, 1996). However, research also suggests that purchase of a core product declines when bundled with an ancillary product, ostensibly because the firm's willingness to include the ancillary product prompts unfavorable inferences about core product quality (Simonson, Carmon, & O'Curry, 1994) or, more generally, because consumers may use the value of the certain item in a bundle to infer the value of the less certain item (Popkowski, Leszczyc, Pracejus, & Shen, 2008). As another driver of bundle preference, we find that prospective concerns about waste can also reduce the attractiveness of a bundle. That is, additional unused utility in a bundled offering drives aversion and reduces preference for the bundle. Subsequent research could examine

⁸ Although the good-services distinction is well-established in the broader marketing literature, empirical research involving direct good-service comparisons are only rarely conducted. (A Google Scholar search reveals that of the many hundreds of citations of Zeithaml's (1981) seminal paper on differences in consumer evaluation of goods versus services, only a handful empirically examine the good-service distinction.) A more recent "service-centered dominant logic" proposes that "value is perceived and determined by the consumer on the basis of 'value in use'" rather than as embedded in the tangible goods (Vargo & Lusch, 2004, p.7). Our research is equally congenial with this newer perspective inasmuch as consumer sensitivity to unused utility implies that consumers evaluate offerings in terms of their usage—and non-usage.

whether waste aversion extends to feature bundles (Thompson, Hamilton, & Rust, 2005) and, inasmuch as a rental contract represents a bundle of services, how rental contract terms alter waste aversion in rental markets (Pocheptsova et al., 2007). To our knowledge, past research has not examined the role of aversion to unused utility in bundle preference.

Purchase versus Consumption. In the present research, waste aversion influenced forward-looking purchase decisions. On a similar note, Soman and Gourville (2001) report that consumers are more likely to forego post-purchase consumption of a benefit when its purchase was part of a larger bundle. From our perspective, foregoing consumption of a portion of a bundle (where the majority of the bundle has been consumed) is less wasteful than foregoing an equivalent amount of freestanding utility that is otherwise desirable. Using a very different paradigm, however, Wansink (1996) reports that bundling via larger portion and package size increases consumption. From our perspective, aversion to waste may be one reason (among several) why people consume beyond satiation. Indeed, Sen and Block (2009) find that consumers are more likely to consume products past their freshness date—a result that aligns perfectly with an explanation based on aversion to unused utility (and, indeed, the risk-seeking behavior of experiment 2B). More generally, differential salience of waste during purchase versus consumption may have detrimental effects on consumer satisfaction and welfare. Consumers may reject utility due to the salience of waste prior to purchase (as shown in our experiments) or suffer a decline in post-purchase satisfaction or overconsumption if waste becomes salient after the fact. To our knowledge, models of consumer preference and satisfaction have neglected these potential dynamics of waste.

Mitigating Waste. Prior research suggests that sunk-cost and product-replacement biases can be mitigated when decision makers can recoup a portion of a past investment (Arkes, 1996;

Okada, 2001). A similar result may occur in prospect; that is, waste aversion may be mitigated when buyers know they can recoup a portion of the unused utility inherent in their purchase. For example, our own research (available from the authors) suggests that consumers prefer renting to buying when a purchase entails waste but prefer buying to renting when the good can be donated or re-sold. That is, consumers anticipate disposition decisions at the time of purchase (cf. Jacoby, Berning, & Dietvorst, 1977). One implication is that the unused utility inherent in a tangible good provides a competitive *advantage* to sellers when a secondary market for such goods exists. More generally, secondary markets can be effective at reducing waste perceptions and “undoing” the unused utility of a product purchase. Witness, for example, the popularity of the “unconsumption” website, Freecycle, that helps consumers to pass on items with unused utility (Walker, 2007). Indeed, consumers who divest themselves of meaningful possessions appear to exhibit aversion to waste by recipient others (Lastovicka & Fernandez, 2005), perhaps accounting for a portion of the 2.3 billion square feet of self-storage in the United States (Mooallem, 2009). Moreover, companies that can reduce unused utility in their product offerings may achieve competitive advantage in the marketplace if they eliminate the need “to pay for detritus to get the good stuff” (e.g., as when iTunes eliminated the need to buy an entire album just to get a favorite song, Bulkeley, 2006). Similarly, consumers may shift from ownership to access to avoid unused utility (e.g., as in the case of Zipcar and Netflix; Humphreys, 2009; Belk, 2007). Thus, finding ways to help consumers avoid waste can benefit both consumers and firms. Less is indeed more—when more entails waste.

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TABLE 1: WASTE AVERSION AND PURCHASE AVOIDANCE FOR
GOODS VERSUS SERVICES (EXPERIMENT 2A)

Product	Duplicate Purchase	N	Purchase likelihood	Waste	Enjoyment	Quality
Good	None	32	5.59 (1.41)	2.06 (1.13)	4.22 (0.66)	3.59 (0.84)
Good	Duplicate	30	3.73 (1.91)	3.07 (1.46)	4.20 (0.76)	3.87 (0.78)
Service	None	37	5.05 (1.91)	2.57 (1.14)	3.84 (0.87)	3.54 (0.73)
Service	Duplicate	29	4.52 (1.79)	2.52 (1.12)	3.52 (1.02)	3.17 (1.00)

FIGURE 1: ORGANIZING FRAMEWORK FOR INVESTIGATING WASTE AVERSION

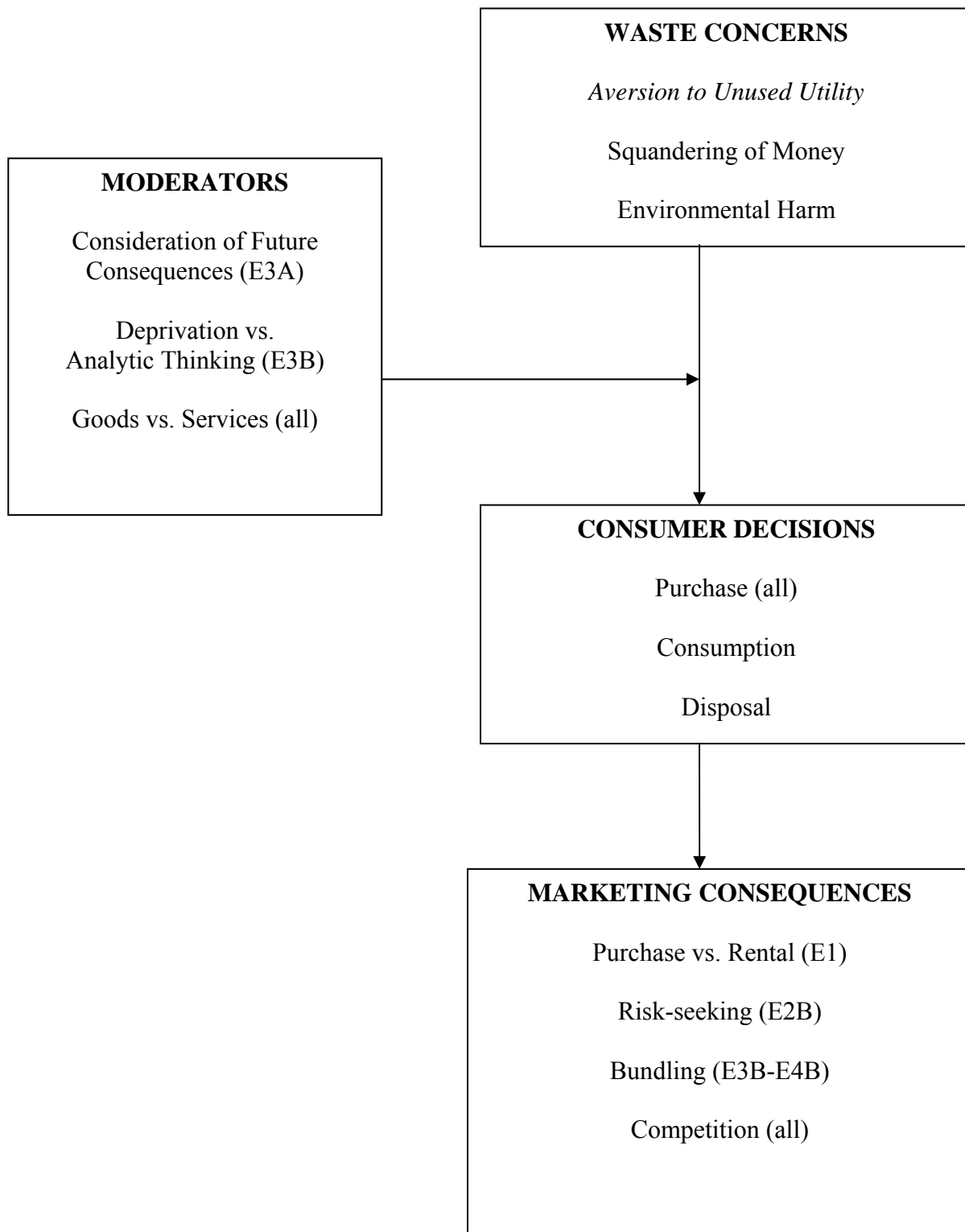


FIGURE 2: AVERSION TO UNUSED UTILITY
FOR PURCHASE VERSUS RENTAL OF GOODS (EXPERIMENT 1)

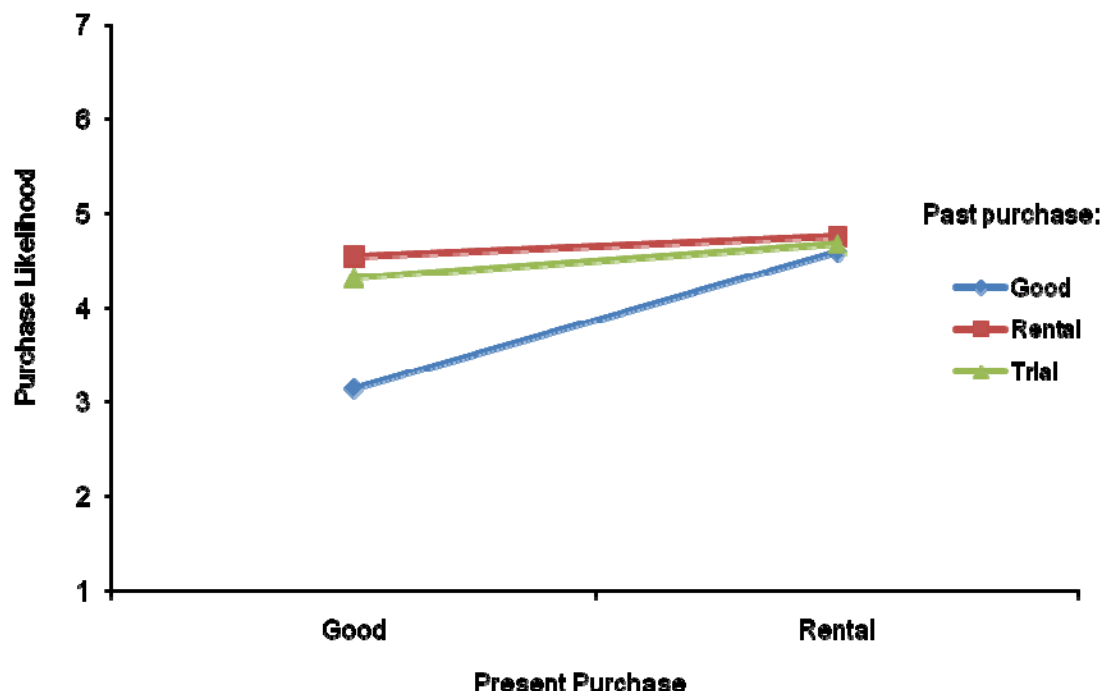
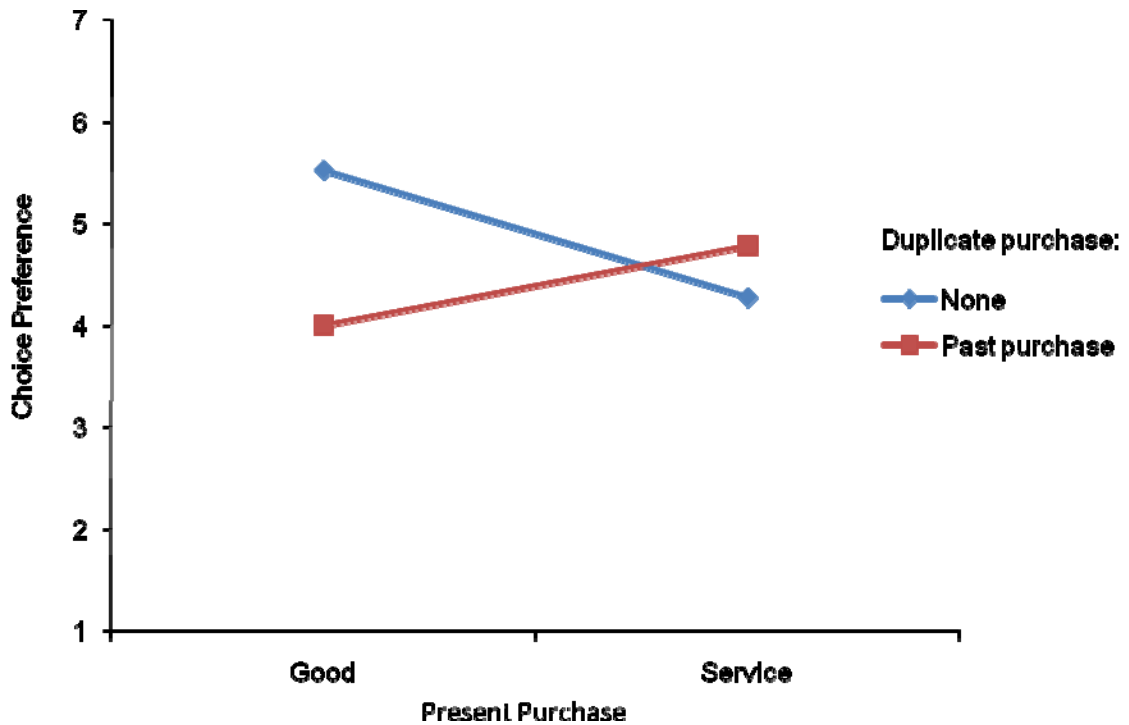
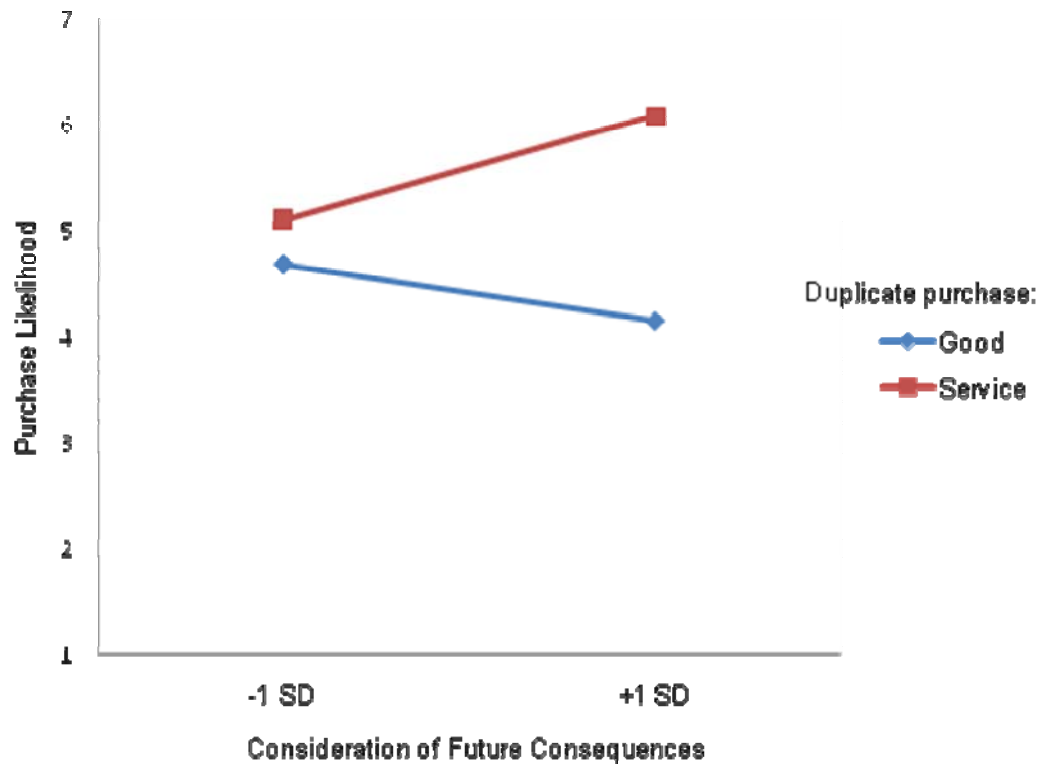


FIGURE 3: RISK AVERSION AND WASTE AVERSION (EXPERIMENT 2B)



Note: higher numbers indicate greater preference for the previously purchased option (i.e., risk aversion); lower numbers indicate greater preference for the option of unknown utility (i.e., risk seeking).

FIGURE 4: FORWARD-LOOKING AVERSION TO WASTE (EXPERIMENT 3A)



APPENDIX: MEDIATIONAL ANALYSES

Coefficient	a (path from I.V. to mediator)	b (path from mediator to D.V.)	c (direct effect of mediator on D.V.)	axb (mean and 95% confidence intervals)
<u>Illustration Study:</u>				
Waste ratings	0.87 (.25)	-0.19 (.06)	-0.60 (.14)	-0.16 (-.38, -.04)
<u>Experiment 1:</u>				
Waste cognitive responses	0.40 (.16)	-1.67 (.22)	-.43 (.47)	-.66 (-1.23, -.17)
<u>Experiment 2A :</u>				
Waste ratings	1.05 (.43)	-0.61 (.12)	-1.32 (.63)	-0.64 (-1.40, -.11)
<u>Experiment 2B :</u>				
Waste cognitive responses	0.33 (.11)	3.16 (.46)	-2.06 (0.70)	-1.04 (-1.82, -.38)
<u>Experiment 3A:</u>				
Waste ratings (higher CFC)	1.00 (.47)	-.50 (.18)	-1.85 (.54)	-.50 (-1.50, -0.04)
Waste ratings (lower CFC)	0.25 (.35)	-0.17 (.23)	-0.55 (.49)	-.04 (-0.59, 0.12) ^a
<u>Experiment 3B:</u>				
Waste ratings	good/service: 0.54 (.19) priming: 0.47 (.19)	-.43 (.16)	-.61 (.34)	-0.23 (-0.51, -0.07) -0.21 (-0.43, -0.06)
<u>Experiment 4A:</u>				
Waste ratings	0.75 (.17)	-0.34 (.09)	-0.83 (.23)	-0.26 (-0.51, -0.10)
<u>Experiment 4B:</u>				
Waste ratings	in/tangible contrast 1.45 (.41) souvenir/sandwich 0.60 (.42)	-0.18 (.09) -0.28 (.12)	-1.08 (.36) -0.80 (.43)	-0.26 (-0.63, -0.05) -0.17 (-0.52, 0.02) ^a

Note: Mediation analyses were conducted per Zhao, Lynch, and Chen (2010) and are summarized in the table for brevity's sake. Throughout, analyses support mediation by waste as expected.

^a Mediation not expected.