



# **BYOB: How Bringing your Own Shopping Bags Leads to Treating Yourself, and the Environment**

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**Working Paper**

**14-065**

**January 29, 2014**

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The authors would like to thank Jose Alvarez, Tulin Erdem, and Priya Raghubir for their comments and suggestions on this work.

## **BYOB: How Bringing your Own Shopping Bags Leads to Treating Yourself, and the Environment**

As concerns about climate change and resource availability become more central in public discourse, using reusable grocery bags has been strongly promoted as an environmentally and socially conscious virtue. In parallel, firms have joined policy makers in using a variety of initiatives to reduce the use of plastic bags. However, little is known about how adopting reusable bags might alter consumers' in-store behavior. Using scanner panel data from a single California location of a major grocery chain, and completely controlling for consumer heterogeneity, we demonstrate that bringing your own bags simultaneously increases your purchases of environmentally conscious and indulgent (hedonic) items. Supporting these effects, we use experimental methods to demonstrate that participants who imagined shopping with their own bags are more likely to spontaneously consider purchasing chips or dessert items, and indicate relatively higher willingness to pay for foods in these categories, as well as for organic foods. Furthermore, we show that the impact on organic and indulgent items is dissociable in a manner dependent on the consumers' motivation for bringing bags. These findings have implications for decisions related to product pricing, placement and assortment, store layout, and the choice of strategies to increase the use of reusable bags.

Keywords: grocery shopping, reusable bags, licensing, priming, goals, hedonic

Attention to environmental concerns has been steadily increasing in the popular sphere, along with education about environmental issues and policies designed to encourage “green” behaviors. In particular, significant efforts have been taken to promote the adoption of reusable shopping bags. Several cities, and even countries, have taken steps to ban retail use of plastic bags, or to require businesses to charge for giving them out (Galbraith, 2012). These can be found in Tables 1 and 2, taken from Wang (2013).

Insert Table 1 About Here

Insert Table 2 About Here

There are obvious financial reasons why firms, in addition to policy makers, might encourage consumers to use reusable shopping bags in lieu of using plastic bags. Some stores currently promote the use of reusable bags by selling them directly, using reusable bag giveaways, and/or offering financial and social incentives for shoppers who bring their own bags (Smith, 2007; Stern 2007, O’Donnell 2010). Depending on the community, there is likely to be significant social approval supporting this behavior as well.

An interesting question that arises is whether the use of reusable bags might have a measurable influence on individuals’ shopping behavior. A recent survey of U.S. consumers found that 29% had used their own reusable bags during their most recent shopping trip (Food Shopper Insights, 2011). This reflects a sizeable adoption of the practice, but also indicates that the behavior is not routine for most people, and may be inconsistent even for those who do expect to bring their bags. In contrast to more habitual parts of a shopping trip, bringing a bag

may be novel enough to effectively signal information to a consumer that could influence other decisions. For example, seeing reusable bags in their cart could evoke goals of buying environmentally friendly products, or signal to consumers that they are the type of virtuous people who takes socially or morally responsible actions (Mazar and Zhong, 2010). However, the bags could also remind shoppers that they have already done something to accomplish progress towards these goals. Thus behavioral theory is unclear in its predictions as to whether consumers will act in a manner that is consistent with goals of environmental behavior, or whether such goal progress will lead them to shirk environmentally in their later behaviors. Furthermore, given the complexity of the shopping environment and range of goals that it can evoke, it is unknown whether cross-domain licensing effects (e.g. Fishbach and Dhar 2005, Khan and Dhar 2006) or other factors could coexist or compete with the environmental ones.

Based on these considerations, we propose that bringing one's own shopping bags has at least two effects on consumer's grocery shopping. First, it can signal or prime people to increase their consideration of environmentally responsible or "green" goods. Second, as an indication of having engaged in a virtuous behavior, we hypothesize that bringing one's own bags can license individuals to treat themselves by making more indulgent choices. Using empirical methods together with experimental ones, we examine the effects of this decision in terms of subsequently made product choices. These findings have implications for firm decisions regarding product placement and pricing, as well as their strategy for promoting (or not promoting) the use of reusable bags.

## **Theoretical Background**

### ***Behavioral Theory : Goal Enhancing and Licensing Effects***

Consumers are subject to a number of influences in nearly any shopping context. For example, various types of information and experiences can prime, or increase the accessibility of related mental constructs (see Schacter and Buckner 1998 for review). This also occurs with personal characteristics or goals that may then encourage consistent subsequent behavior (e.g. Bargh et al. 2001, Shah 2005, Wheeler and DeMarree 2009). Thus bringing one's own bags to the grocery store, and having those bags visible while shopping could motivate more "green" choices by activating a broad goal to gain social approval or a goal to help the environment. The choice to bring reusable bags and their physical presence could also signal to consumers that they possess the trait of environmental conscientiousness via either priming (Wheeler and DeMarree 2009) or by self-perception (Bem, 1967 Bodner and Prelec 2003). Broadly speaking, these mechanisms suggest that bringing a bag would make consumers more likely to purchase organic or similarly environmentally conscientious items when such options are available.

While goal signaling, priming, and self-perception are influences that encourage consistent behavior, there are other psychological mechanisms that might prompt complementary behavior in this situation. For example, awareness of having taken a virtuous action can facilitate subsequent indulgences (Fishbach and Dhar 2005, Khan and Dhar 2006). In particular, Khan and Dhar (2006) showed that one instance of virtuous self-signaling, that is, boosting one's self-concept via a virtuous action or expression of intent, could increase the likelihood of choosing a luxury item over a necessity on a subsequent unrelated choice. Similarly, we predict that by bringing their own bags, individuals feel virtuous for taking a social and environmentally

positive action (e.g. Mazar and Zhong, 2010). This could license them to make more indulgent food purchases during their shopping trip.

While all of these consequences are reasonable predictions, based on past findings, it is unclear whether they would act in concert or conflict with each other, particularly since they arise from the same decision to bring reusable bags. However, a central feature of the work on licensing is that the initial virtuous choice is self-motivated. If the reasons for that action can be attributed to other people or external policies, then its subsequent influence is significantly attenuated (Khan and Dhar 2006). This “agency” mechanism reflects an important consideration for retailers, given the diverse ways in reusable bag adoption is encouraged. It is also a potentially useful way to investigate if the licensing effects can be dissociated from goal enhancing effects arising from the same source stimulus. Broadly speaking, unlike licensing, priming or signaling of a goal can arise from objects or information in a person’s surrounding regardless of the true attribution for their presence (e.g. Dijksterhuis et al. 2005).

### ***The Grocery Environment***

Given the myriad possible psychological effects of choosing to carry reusable shopping bags, it is useful to consider the specific context of the grocery store. Grocery shopping is a ubiquitous activity for the majority of the population, and combines several important features that shape the decision-making process. One is that once a consumer brings a grocery bag with them, it remains in their cart for the duration of their trip while they are making other choices. One might expect this to promote environmentally consistent behavior, possibly by encouraging the consumer to “match” additional items to the current contents of the cart, or by providing a default or reference for the type of item that would be acceptable to add. However,

the bag could also enhance licensing effects by acting as a durable and reinforcing visible credential of having taken a virtuous action.

A second aspect of this type of shopping is that individual purchasing decisions are not necessarily made as explicit comparisons or tradeoffs (unlike the choice context used to demonstrate licensing in laboratory environments). In addition to serving a general purpose (e.g. re-stocking the pantry or “eating healthily”), products can be selected as part of a specific subset (e.g. the ingredients for one recipe) or entirely independently from each other. Thus shoppers can choose a portfolio of items that achieve multiple goals. As a result, it is also possible that the act of bringing a bag interacts in different ways with these different goal-related mechanisms and influences basket composition via both goal-signaling and licensing in parallel.

The nature of the grocery store environment also allows for a variety of unplanned purchases, which is a long-standing domain of interest to marketing researchers (Park et al., 1989; Hauser and Wernerfelt, 1989; Bucklin and Lattin, 1991; Roberts and Lattin, 1991; Beatty and Ferrell, 1998; Inman et al., 2009; Bell et al., 2011). This interest has increased in recent years due to the availability of richer data collected with loyalty programs and technologies that can track consumers throughout the entire purchase event (Stilley et al. 2010; Hui et al., 2012; Hui et al., 2013). We propose that this feature of grocery shopping permits or facilitates licensing type effects by offering a channel that allows shoppers who bring their own bags to make indulgent choices. Thus our paper provides insight into a factor with potentially large ramifications on hedonic impulse purchases, together with consumers' tendency to purchase higher priced (often higher margin), organic products.

Finally, the complexity of the choice context invites other factors that could moderate, compete with, or override the influence of bringing one's bag. For example, a shopper may be

acting on their own preferences and goals if shopping for themselves, but could also alter their behavior to accommodate outside preferences if shopping for others. In particular, children have distinct influences on grocery basket composition (Mangleburg, 1990, Martensen and Gronholt 2008) including in the realm of health conscious choices (Prasad et al, 2008) and snack foods including indulgences (Marshall 2007). Thus having young dependents might increase purchases of organic items, increase *or* decrease purchase of hedonic items, and may simply overwhelm any influence the bags might have on purchases in these categories. Another major influence in grocery shopping is price (or budget-related) information. The salience of prices or payments can vary between consumers, and has been demonstrated to impact their likelihood of buying indulgent or “vice” foodstuffs (Thomas et al. 2011). In the empirical analyses and experiments that follow, we both test and control for the degree to which these factors might interact with our hypothesized effects.

### ***Overview***

We combined empirical and experimental methods to test how bringing one’s own bags to a grocery store influences purchase behavior. We first analyzed consumer purchasing data from a single location of a major grocery store chain to test our hypotheses, using linear probability models. In empirical study 1, we examined whether consumers are more likely to purchase organic versions of products, on the occasions they bring their reusable bags, as predicted by goal enhancement mechanisms. In empirical study 2, we tested the licensing hypothesis, namely whether consumers carrying bags are more likely to purchase hedonic items, controlling for the number of other items (i.e. the size of the shopping basket). Finally, in empirical study 3, we focused our test of the licensing effect by directly comparing two similar

categories, one hedonic (ice cream) and the other not (yogurt). After creating category-specific price indices, we tested for the licensing effect as well as any moderating effect of price.

While the ability to track the same household across transactions with or without reusable bags provides some test of causality, it cannot rule out the possibility of an external factor driving both bag behavior and purchase behavior. To address this, and to gain insight into the nature of the psychological effects driving the change in purchasing behavior, we conducted three experimental studies. In the first of these, we asked how bringing one's own bag might affect the way that participants envisioned or expected to make their own purchases. In experimental study 2, we examined the effect of bringing a bag on willingness to pay for organic and indulgent products that had to be evaluated simultaneously. In addition, echoing empirical study 3, we examined how this might be moderated by reference price salience. Experimental study 3 concluded by examining how managerial policies, such as requiring the use of one's own bags, might interact with our observed effects.

Our results demonstrate that the simple choice to bring your own grocery bags can alter behavior and provide insight into the multiple psychological mechanisms working together to create these effects. This mechanistic understanding has implications for firms' optimal strategy to encourage the use of reusable bags, and speaks to the managerial question of how various legal policies and incentive programs related to adoption of reusable bags already in place might direct shopper behavior.

## Empirical Studies Overview

The purpose of our empirical studies was to conduct the following three tests : i) the effect of bringing a reusable bag on the purchase of organic versions of products; ii) the effect of bringing a bag on the probability of purchasing hedonic items; and iii) the effect of bringing a bag and its interaction with price on the probability of purchasing items in two related categories, one hedonic and one not.

All three studies used cardholder data from a single location of major grocery retailer to track purchases by the same households over time. The data are from May 29, 2005 through March 31, 2007 for a single store in California and include information on whether or not the consumer brought their own bag(s) and/or purchased a reusable bag. There are a total of 2,071,302 transactions by 59,659 households. A histogram of the daily timing of the transactions can be found in Figure 3. Most transactions are made after 6 AM and 10PM. For the analysis, we dropped the 27,549 transactions outside of this time window when factors such as sleep deprivation could confound the effects of interest.

Insert Figure 1 about here

In analyzing this data, we needed to create controls for the possibility that consumers are more likely to bring bags when they plan to go shopping ahead of time, since planning might influence the probability of (unplanned) hedonic purchases. To track the degree to which a shopping trip might be anticipated, we used the time since the last shopping trip at that store. However, this variable is only a good indicator for the need to get more groceries if the consumer

does most of their shopping at the specific store under consideration. Therefore, for the analysis, we further restrict the sample to the set of households in the top ten percentile of total shopping trips, or those that made at least 80 trips over the 96 weeks of data. We also drop trips with over 100 items and households with more than 660 trips to exclude households making one trip per day (these are likely small businesses), as well as trips that are the second trip of the day.

Even with these restrictions, the remaining sample is quite large, including 5,987 households. Since these households are the frequent shoppers, they comprise almost half of the shopping trips in the data. This gives 936,232 total transactions for the analysis. Transaction-level summary statistics can be found in Table 3, and Table 4 shows the fraction of transactions containing different categories of hedonic items.

Insert Table 3 About Here

Insert Table 4 About Here

A final factor of note in this data is whether or not the households are likely have young children, and thus have competing priorities in their grocery purchases. To address this, we determined that of the 5,987 households under consideration, 3,628 do not make any purchases in the baby food/baby care category, while 1,733 households purchase products in these baby-related categories at least 1% of the time. Though we have no definitive data on whether there are children in the household, this at least provides a classification for two distinct sets of households based on their transaction history. Of note, since we can only reliably determine the presence of very young children in the household, those in the “no children” condition may in fact have older dependents. However, this would work against finding a significant effect of bringing a bag in

the analyses that follow, making our positive results more conservative confirmations of our hypotheses.

### **Empirical Study 1: Organic Purchases**

To test the presence of goal signaling or priming effects, we used item-level linear regressions in which the dependent variable was an indicator variable that the item is organic. Transaction-level regressions were not appropriate here since both the number and proportion of organic products purchased are confounded with the total number of items purchased, and whether the items have organic versions available. With item-level regressions, we could condition on the presence of organic options within the “category” on the day of purchase, using different definitions of the food category (e.g. more or less inclusive) to test for robustness. We included household fixed effects to control for heterogeneity, and dummy variable for the hour-of-day,  $h$ , and day,  $t$  (for all days in the data) to completely control for daily price variation and promotions as well as time-dependent purchasing patterns. Since the household fixed effects control for all differences across individuals in their propensity to bring bags and/or purchase organic items, the effect we are estimating is the mean effect of bringing a bag *on that purchase occasion*. The estimation equation is:

$$I_{ijth}(\text{organic}) = \alpha B_{ith} + \eta_t + \zeta_h + \xi_i + \epsilon_{ijt} \mid j \in C, \exists j' \in C \text{ s.t. } I_{j't}(\text{organic})=1, \quad (1)$$

where  $I_{ijth}$  is a dummy variable indicating that product  $j$  that is bought in a transaction on day  $t$  at hour  $h$  by consumer  $i$  is organic,  $B_{ith}$  is a dummy variable indicating whether the consumer

brought a bag, and we define  $I_{j,t}(organic) = \sum_i \sum_h I_{ijrth}$  as the measure for whether product j' is available on day t i.e. we condition on an organic alternative being available, categorizing products by subclass, subclass, and class, as defined by the grocery chain.

We performed this analysis separately for households with no baby category purchases and households with baby category purchases in at least 1% of their transactions as described earlier. Results can be found in Table 5.

Insert Table 5 About Here

It is clear from these results that the presence of a bag increases the probability that items purchased are organic, conditional on organic options being available.

### **Empirical Study 2: Hedonic Purchases**

To test the presence of the licensing effect, we used linear regression at the transaction level. The dependent variable to measure the priming effect was whether or not the transaction contained hedonic items, controlling for shopping basket size. The model is given by:

$$P_{ith} = \alpha B_{ith} + \beta_i X_{it} + \eta_t + \zeta_h + \xi_i + \epsilon_{ith}, \quad (2)$$

where  $P_{ith}$  is the probability that the transaction had any of the hedonic items shown in Table 4 and  $X_{it}$  is a vector of variables to control for the size of the shopping trip and whether or not the transaction was planned. These variables include dummy variables for the number of non-

hedonic items purchased (in ranges of five) and the days since the last shopping trip and its quadratic. As with the organic item-level regressions, the household fixed effects control for all differences across individuals in their propensity to bring bags, and in this case, to purchase hedonic items, and the time dummies again control for hour-of-day effects on shopping behavior and any daily promotional activity. We again split the sample into households with and without children. Regression results are shown in Table 6.

Insert Table 6 About Here

As can be seen from the regression results, there is a significant, positive coefficient on bringing paper or reusable bags, and only for households with no children. The results are also suggestive that households without children are less likely to purchase hedonic items if they also purchase more organic items, and that the effect is magnified when they bring bags. Households with children are less likely to purchase hedonic items with more organic items, but there is no effect of the bag.

### **Empirical Study 3: Price Effect On Hedonic Purchases**

In order to assess the relationship between price and the bag effect, we selected two similar categories, one of which is hedonic and another that is not: ice-cream and yogurt. To support this distinction, we examined data from a separate sample of 163 people from an online survey ( $M_{Age} = 28.88$ , 53 F) who were asked to rate the indulgence of several common grocery store foods on a scale of 1-7 (using the same measure described later in experimental study 2).

Ice cream ( $M = 6.43$ ,  $SD = .975$ ) was rated within-subject as significantly more indulgent than yogurt ( $M = 3.35$ ,  $SD = 1.566$ ;  $F(1,162) = 440.98$ ,  $p < .001$ ).

For the current data set, we created a price index based on the weighted per-volume transaction prices for each of these categories. We ran similar regressions as shown in equation (2), but the dependent variables are whether the transaction has a product in the focal category, and we included time since the last purchase in the category as an additional control variable. We included price and price interacted with the bag dummy as two further explanatory variables of interest. Results from the four separate regressions are shown in Table 7.

Insert Table 7 About Here

As we expected, the positive effect of a bag exists only for the hedonic category, and for households without children. Furthermore, this effect is mitigated at higher prices. Such findings reinforce the robustness of these effects in the naturally complex grocery store setting, but also indicate that the increased motivation to seek out indulgences can be overridden by competing goals.

These data provide evidence supporting the predicted effects of bringing one's own bags as 1) a motivator for additional environmental behavior, and 2) as a choice that induces reward-seeking consistent with the licensing effect. However, one central drawback of real world data is the presence of other potential explanations. For example, it is possible that the decision to bring reusable bags as well as the increases in purchasing organic and hedonic items are all due to some unobserved external condition that occurs with varying frequencies. We ran three behavioral studies with random assignment to rule out such alternative explanations and establish

the causality of the bag effects. In addition, to enhance our understanding and our ability to make predictions, these studies were designed to investigate the nature of the mechanisms driving the behavior observed in the empirical studies, and to explore additional factors that might influence when those effects are expressed.

### **Experimental Study 1: Consumer Generated Consideration Set**

Since the purchase of indulgent or hedonic products appears to be unplanned or at least a selective addition of those types of items to the cart, an initial experimental question was whether bringing one's bags might be causing a difference in the spontaneous consideration or awareness of certain product types. In addition, running an experimental study allowed us to gather and test concrete data on whether participants had children (e.g. dependents under the age of 18) in their household, as a complement to the purchase-based estimates of this fact from the empirical analyses.

#### ***Methods***

One hundred and eleven participants from a national pool (Ages 18-72, 69 female) took part in this study online via Amazon's Mechanical Turk (AMT), and were randomly assigned to one of two conditions (with shopping bags; no shopping bag information). Participants indicated their age as one of six ranges (e.g. 18-24, 24-34, etc), with the median age range as 24-34. Participants were also asked to indicate whether they had one or more children under the age of 18 currently residing in their household.

The instructions stated that the purpose of the study was to understand supermarket shopping behavior. Participants in the “with bags” condition read the following scenario:

Imagine that you are heading into a supermarket to do the grocery shopping for your household for the entire week. Picture yourself walking up towards the door, and selecting a shopping cart from the stand just outside. As you wheel the cart inside, imagine yourself [**putting your reusable shopping bags inside the cart and then**] looking around the entrance.

In the “without bags” condition, participants read the identical passage, with the exception of the bolded clause. All participants were shown a schematic of the grocery store (Figure 2A) and asked to list the ten items they would be most likely to purchase on this trip. Participants were asked to be as specific as possible about, numbers, sizes and brands of the items they listed.

Insert Figure 2 about here

## ***Results***

Each individual was given a score based on the total number of hedonic or indulgent items they listed. Items were coded as indulgences if they were unambiguously identifiable as “desserts” (e.g. candy, ice cream, cakes, cookies) or “chips” (e.g. potato chips, corn chips), two major categories of foods with high salt, sugar and/or fat contents. Given our hypothesis that these effects were sensitive to whether the shoppers had young dependents, we examined the effects of bringing one’s own bag on this score for participants who self-reported (not) having

dependents under the age of 18 residing in their household. As indicated in Figure 2B, there were no main effects of bringing one's bag ( $F(1,107) = .760$ ) or of having dependents ( $F(1,107) = .940$ ). However, there was a significant interaction between these factors ( $F(1,107) = 4.776$ ;  $p < .05$ ). Participants with dependents did not show a significant effect of bringing their own bags ( $F(1,107) = 1.342$ ,  $p = .249$ ). Individuals without dependents listed significantly more indulgent items when they imagined bringing their own shopping bags ( $F(1,107) = 4.536$ ;  $p < .05$ ). These findings suggest that when shoppers who don't have children bring their own bags, they are more likely to include hedonic foodstuffs in their consideration set, or find hedonic foods more salient and/or accessible in memory, consistent with the empirical results.

This design does have some limitations. Though participants frequently listed items such as milk, they did not necessarily elaborate on whether the milk was organic, was sold in recyclable bottles, or had similarly "green" features. In fact, only 1% of the items listed across the entire study were explicitly indicated to be environmentally conscious in some way (e.g. organic, "rBST-free", etc.) Thus it was not possible to draw conclusions about whether the experimental manipulation influenced the likelihood of green purchases. In addition, from a mechanistic standpoint, it is unclear whether participants are generating items independently, or constructing tradeoffs between items to arrive at a final list. Finally, it would be useful to know if, in addition to increasing the accessibility or consideration of indulgent items, bringing one's bag specifically increased the perceived monetary value of those items.

To address these issues, we conducted a second experiment in which participants indicated their willingness-to-pay (WTP) for several products, including indulgent and organic foods, simultaneously. This measure of interest together with the findings of the third empirical

analysis raises the question of whether the availability of price information for the items under consideration could engender competing goals or otherwise override the effects of bringing a bag. We tested this possibility by adding conditions that vary the availability, and thus salience, of price information.

## **Experimental Study 2: WTP and Price Sensitivity**

### ***Methods***

Four hundred and twenty-one individuals ( $M_{\text{Age}}=46.5$ ; 216 F) were recruited from a commercial online U.S. national sample (via Survey Sampling International) to participate in this study. Given our findings that households with dependents are not influenced by bringing their own bags, in this study participants had indicated that they did not have children of ages 18 or below currently residing with them as part of the pre-screening process. Participants were randomly assigned to one of four conditions in a 2 (No Bags / Bags) x 2 (No Price / Price) between-subject design. As a check for attention, at the end of the survey, participants were asked to enter the name of one grocery item that they had rated during the survey. Forty-four individuals who were unable to successfully complete this task or who had left any of the survey measures incomplete were removed from the analysis. The remaining sample consisted of 377 participants ( $M_{\text{Age}}=47$ ; 200 F).

Participants were asked to imagine shopping in a grocery store. They were either told that they had brought their reusable grocery bags with them, or were given no information related to reusable bags (Appendix W1). They were further asked to imagine that while in the store, they viewed nine specific products. Three items from each of the following (a priori defined)

categories were presented simultaneously. “Baseline” products consisted of chicken, canned soup, and lettuce. “Organic” products were organic milk, sustainably farmed organic apples, and cage-free organic eggs. “Hedonic” (indulgent) products were a candy bar, potato chips, and ice cream. The nine products were shown together on the same page listed in a random order without the explicit category labels. Participants in the Price condition were given reference retail prices for each item. Participants in the No Price condition saw only the names of the items with no other information. All participants entered their willingness to pay by typing in a dollar amount for each product.

Following this, participants viewed the following description of an “indulgent” product :  
*“An ‘indulgent’ product is a treat, or a kind of luxury. Indulgences are pleasurable items that reflect more about what you want than what you need.”* They then rated each product on a scale from 1 [Not At All Indulgent] to 7 [Very Indulgent]. Finally, participants completed basic demographic measures (e.g. age, gender), and answered questions about their shopping behaviors, namely whether they were the primary grocery shopper for their household.

## ***Results***

It was not sufficient to simply measure changes in WTP for individual organic or indulgent products since both the bag and price manipulations could have main effects on overall willingness to spend on groceries. Thus our design included a third “baseline” category of commonly purchased groceries.

We averaged individual items’ indulgence ratings within each category to provide an overall category score. Using a repeated measures ANOVA, we found no between-subjects effect of bringing bags ( $F(1,373) < .001$ ,  $p = .98$ ), price salience ( $F(1,373) = .058$ ,  $p = .81$ ) or their

interaction ( $F(1,373) = .633$ ,  $p = .427$ ) on the indulgence rating patterns for the three categories. This analysis did show that there were significant differences among the three types of foodstuffs within-subject as illustrated in Figure 3A ( $F(2,746) = 425.303$ ;  $p < .001$ ). Pairwise comparisons confirmed that hedonic and organic products were considered significantly more indulgent than “baseline” products ( $p < .001$  for both). In addition, hedonic items were significantly more indulgent than organic ( $p < .001$ ), validating our assumption that they were seen as “treats”, particularly compared to the other two categories.

Insert Figure 3 about here

To investigate the effects of bringing one’s own reusable shopping bags and availability of price information on purchases of indulgent foods, we examined the difference in the average WTP between hedonic and baseline items, or “relative” hedonic WTP (Figure 3B). Note that the scores are negative, as WTP for hedonic items was generally less than for the baseline items. As a main effect, when the item prices were made available, they increased relative WTP for hedonic items ( $F(1,373) = 5.93$ ,  $p < .02$ ). In addition, bringing reusable bags resulted in a marginal trend of increasing relative WTP as well ( $F(1,373) = 3.083$ ,  $p = .08$ ). More central to our question however, was the significant interaction between the two factors ( $F(1,373) = 11.90$ ,  $p < .002$ ). Specifically, when no price information was available, having reusable grocery bags significantly increased relative WTP for hedonic items ( $F(1,373) = 13.97$ ;  $p < .001$ ), supporting our licensing effect hypothesis. However, when price information was listed next to each product, the presence of reusable bags had no influence on relative WTP ( $F(1,373) = 1.408$ ;  $p = .236$ ).

The identical pattern was observed for WTP for organic foods (relative to the baseline ones) as shown in figure 3C. Specifically, there was a significant positive main effect of having price present ( $F(1,373)=16.02, p<.001$ ), and bringing reusable bags ( $F(1,373)=4.109, p<.05$ ). Again, the significant interaction ( $F(1,373)=4.109, p<.05$ ) indicated that when reference prices were absent the effects of reusable bags were significant ( $F(1,337)=8.52; p<.005$ ) and supported our hypothesis that bringing one's own bags would prime increased purchases of organic foods. However, when prices were present, this effect disappeared ( $F(1,373)=0, p=1$ ). We compared the relative hedonic and relative organic difference scores directly using a repeated measures ANOVA with presence of price and presence of reusable grocery bags as between-subject factors. This analysis confirmed that there was no difference between the types of effects of observed for hedonic and organic products – the interaction between product category, price, and presence of reusable bags was not significant ( $F(1,373)=.774, p=.379$ ). A control analysis, restricting the analysis to the 353 participants who affirmed that they were normally the primary shopper for their household, did not change the direction of the results, or their significance (Appendix).

These results suggest that bringing one's own bags increases both purchase consideration as well as relative WTP for indulgent or hedonic items, even when organic and/or healthy options are being considered. A similar increase is found in WTP for organic items as well, demonstrating that this environmentally positive action can influence these two categories concurrently. Our findings are sensitive to the salience or availability of reference prices, suggesting that consideration of costs could indeed interrupt the impact of bringing one's own bag, consistent with the empirical finding that the licensing effect is reduced when prices are high.

### **Experimental Study 3: Attribution and Willingness-to-Purchase**

Combining the empirical analysis and experimental studies up to this point yields strong evidence for parallel goal enhancing (priming and/or signaling) and licensing. We can use our understanding of these mechanisms to consider how policy and managerial choices might affect the observed behavior of shoppers who bring their own bags. For example, previous investigations of the licensing effect have shown that attribution of the trigger choice is an important mechanism (Khan and Dhar, 2006). The effect is removed, or dampened if the reasons for taking a “virtuous” action can be attributed to outside sources. This is a particularly relevant concern for retailers now, given that legislation mandating the use of one’s own bags, or instituting charges for bags from the store is slowly but increasingly being put into place (Galbraith, 2012).

While self-attribution is central to the mechanism of licensing effects, as discussed, it would not necessarily be expected to influence the ability of the bags to promote green goals and behaviors. Thus comparing the relative willingness to purchase hedonic and organic foods could provide theoretical as well as managerial implications, showing that these mechanisms can operate separately despite occurring at the same time and arising from the same physical stimulus. In particular, we predict that there should be no effect on the purchase of organic items between attribution conditions, but a decrease in the relative desire to purchase indulgent items when the presence of the bags is attributed to the store.

## ***Methods***

Sixty-nine individuals ( $M_{\text{Age}} = 29.9$ , 22 F) who indicated they did not have children under the age of 18 residing with them completed the study. As an additional control, participants were asked to list “dietary preferences (e.g. vegetarian) or restrictions (e.g. gluten-free, lactose intolerant) which influence the items that you buy when you shop.” Based on those responses, individuals who indicated constraints/considerations that interacted with the specific grocery items in the study were removed (Appendix W2), resulting in  $n=51$  sample size ( $M_{\text{Age}} = 29.9$ , 15F).

Individuals were once again asked to imagine that they were grocery shopping in a situation similar to experimental study 2. In the “Store” attribution scenario they were told to imagine the following: “Because this store is requiring people to bring their own bags, you have brought your own reusable bags with you.” In the “Self” attribution scenario, they read “You have brought your own grocery bags with you”. Participants then rated their willingness-to-purchase the same 9 food items from Study 2 (3 baseline, 3 organic, 3 hedonic) on a scale from 1 [Definitely Would Not Buy] to 7 [Definitely Would Buy]. As in experimental study 2, participants also gave indulgence ratings for each item and indicated basic demographic information.

## ***Results***

Examining the average perceived indulgence ratings for the items of the baseline, organic, and hedonic categories revealed no between-subjects effect of the attribution of bringing bags ( $F(1,49) = .101$ ;  $p = .752$ , Figure 4A), nor a significant interaction between attribution and category ( $F(2,98) = 1.730$ ;  $p = .183$ ). There were significant differences among the three

categories of foodstuffs within-subject ( $F(2,98) = 386.9; p < .001$ ). Direct contrasts confirmed that hedonic and organic products were considered significantly more indulgent than “baseline” products ( $p < .001$ ,  $p < .005$  respectively). In addition, hedonic items were again significantly more indulgent than organic ( $p < .001$ ).

Insert Figure 4 about here

We tested the effects of motivation attribution by comparing results for the hedonic and organic items to the to the baseline ones, echoing the design of experimental study 2. Specifically, we examined whether attributing the reason for bringing one’s own bag to the grocery store, as opposed to the self, might influence willingness to purchase for hedonic and organic items (Figure 4B). Participants in both attribution conditions were more willing to purchase the baseline category items than either organic or hedonic items. Thus the hedonic and organic category scores minus the reference willingness to purchase for the baseline category are negative. Participants in the Self group were more willing to purchase hedonic foods, compared to baseline ( $M_{\text{Self}} = -1.04$ ,  $SD = 1.24$ ), than participants in the Store group ( $M_{\text{Store}} = 1.96$ ,  $SD = 1.64$ ;  $F(1,49) = 4.891$ ,  $p < .05$ ). However, the reasons for bringing one’s own bag did not influence purchases of organic products ( $M_{\text{Self}} = -1.51$ ,  $SD = 1.55$ ;  $M_{\text{Store}} = -1.00$ ,  $SD = 1.91$ ;  $F(1,49) = 1.048$ ,  $p = .311$ ). Note that there was a significant interaction between these two effects ( $F(1,49) = 5.933$ ,  $p < .02$ ), demonstrating that the effects of attribution were indeed distinct for hedonic and organic categories.

## General Discussion

Efforts to combat climate change and address environmental issues have gained prominence across the United States and on the global stage. One domain of these efforts has been in curbing the use of plastic grocery bags, by encouraging the use of one's own shopping bags. Here we study some of the effects of adopting this behavior on shopping patterns. We find that bringing bags can encourage purchases of similarly environmentally friendly items. We also find that this action can spur increased purchases of hedonic or indulgent foods such as desserts and snack chips. However, shoppers only seem to “treat themselves” to these indulgences when they can comfortably take credit for having brought their own bags – attributing the bags to store policy reduces their effect. In addition, effects on both indulgent and organic products can be crowded out by competing motivations; they are eliminated by situations that make costs highly salient, and also in situations where the shopper has young dependents.

The increase in purchase of “green” or organic foods when shoppers bring their own bags is notable in that it is causal – the empirical tests of repeat transactions across the same households together with the random assignment experiments indicate that our results are not simply due to some shoppers being more green than others. Still, the direction of this finding might be understood as an intuitive effect. Less obvious is that it is accompanied by a rise in indulgent purchases. Previous research on the licensing effect demonstrated that making a virtuous choice in one domain can allow individuals to indulge when faced with their next choice (Khan and Dhar 2006). There are several reasons why the act of bringing a bag is a virtue, in terms of the environmental benefits, the social approval of the action, and even the small positive

reinforcement from the stores itself, making this a viable mechanism for the effects observed here.

Notably our findings extend our theoretical as well as practical understanding of the scope in which licensing might operate. In the foundational studies, the decisions being made were entirely unrelated, and participants were offered forced-choice tradeoffs between virtues and vices. We show that effects consistent with licensing can operate in an externally valid single context, where the decisions can be orthogonal, but are still consciously related to the same overall shopping event. In addition, after the first virtuous action, we find that participants can increase indulgent choices regardless of, or in addition to, making other virtuous choices. For example, in experimental study 2, in the “bring bags” condition there is no indication that a higher WTP for hedonic items harms the organic items. In fact, in both the empirical studies and experimental study 2, preferences for both indulgences and “green” items increase simultaneously.

Though the decisions about organic and hedonic foods did not appear to compete, our studies revealed that other considerations such as household composition could interact with our overall findings. In particular, shoppers with young dependents may have dominant criteria, goals, or demands that redirect their choices (Mangleburg 1990; Prasad, 2008), including consideration of the children’s own preferences (Marshall, 2007; Martensen 2008). As our results generally suggest mechanisms that act on the consumer’s personal goals or self-perceptions, they may not hold when more importance is placed on other’s wants and needs.

A second potential competing factor arises from price, costs, or budgeting. In experimental study 2, providing individuals with benchmark price information eliminated the effect of the bag manipulation. One explanation for this result could be that the prices gave

participants specific anchors for their WTP estimates, and that a fixed proportion of adjustment off of those anchors was strong enough to override differences due to the bag manipulation. Another possibility suggested by previous research is that awareness of costs induces a pain-of-paying that reduces hedonic purchasing in grocery environments (Thomas et al. 2011). Attention to prices could also evoke competing goals related to thriftiness or budgeting. Practical evidence for this issue is found in empirical study 3, which showed that the effect of bringing bags on hedonic purchases was weaker at higher prices. Fundamentally shoppers with their own bags are much more willing to treat themselves when barriers to doing so are low, that is, when the price is right.

### **Managerial Implications**

The natural question evoked by these findings is “What should grocery retailers do?” The monetary implications of our findings are not negligible. In our grocery store data, the average premium paid for organic foods across categories (weighted by the number of purchases of items and calculated relative to the alternative products in each subclass) is 14.8%. Assuming firm markup is a constant proportion of cost, firm profits would also increase by 14.8%. Since bringing a bag increases the probability of a purchased item being organic by 0.58%, this implies a 0.0858% increase in revenues and profits from the households without children. In our item-level regressions, we see that 59.4% of the items are bought by households without children (as we define them), leading to a 0.051% increase in overall profits. For a \$550 billion industry, this equates to \$280 million.

In addition to the effect on organic purchases, we find that consumers are more likely to

purchase hedonic items, which can also have high margins. On the average shopping trip, consumers spend \$45.12. Under the reasonable assumption that indulgent items are additional, unplanned purchases (rather than consumers deciding to purchase hedonic items in lieu of other items), the 1.41% increase in the probability of purchasing a hedonic item, and the additional assumption that the hedonic items cost on average \$2.00, this implies a 0.0625% increase in revenues from households without children, 3.71% overall which equals \$204 million. The combined effects total almost \$500 million.

Currently, many stores encourage the practice of using reusable bags by providing reusable bags for purchase, giving bags away, or including minor financial credits. In contrast, policy changes requiring the use of ones own bags generally take the form of punishment by charging for the use of bags in the store. Our results strongly suggest that the influence of bringing one's bags on hedonic purchases is sensitive to which of these strategies is adopted. In particular, our final experimental study finds that if consumers are aware that they have brought grocery bags because they were told to, their desire to purchase indulgences weakens. The psychological effects of bringing reusable bags are likely to be strongest in situations where their use is not mandatory or exogenously determined. Thus policies that to encourage bag use that emphasize the social and environmental benefits of the bags, but also emphasize the shopper's agency in choosing to use them will have the strongest impact on behavior in both organic and hedonic domains.

These shifts in behavior also suggest ways of encouraging green decisions as well as ones that could have health benefits. In stores where adoption of reusable bags is growing, our results suggest that promoting offerings like organic or sustainably farmed fresh foods as indulgences should increase their purchase rates. Furthermore, they also suggest that consumers might be

more willing to consider environmentally friendly brands of hedonic products if emphasis is placed on their indulgent qualities beyond their green virtues.

Our effects are relevant for several additional factors of significant interest to managers. One example is store layout. Hui, Bradlow and Fader (2009) find that licensing type effects significantly influence grocery store choices in a way that actually changes shopping paths. Since many grocery stores have their fresh produce sections near the entryway, this could entice individuals primed by their own bags to increase organic or healthful choices initially, which might then additionally increase consideration of subsequently encountered indulgent choices. Another location-based element of interest would be the checkout register. When shoppers reach this point, the presence (or absence) of their own bags is made salient again. In some cases, reusable bags are available for purchase. At this time, shoppers are simultaneously exposed to relatively low cost “impulse” or unplanned items. Our results predict that consumers might be open to considering relatively inexpensive environmentally positive products at this time, including non-food items.

### **Concluding Remarks**

Here we demonstrate how taking an environmental action can influence subsequent consumer behavior in actual grocery shopping behavior and in controlled experimental studies, providing results of managerial importance. We establish causality using repeated transactions across households in our empirical analysis, and experimental studies that include open-ended responses and WTP. Both types of studies suggest factors which may moderate or override the effects of bringing one’s own shopping bags, specifically the presence of children in the

consumer's household and the increased salience or magnitude of price. We find that price salience overrides the effects of bags overall in the experimental studies, but that in the more nuanced grocery environment, it mitigates indulgent purchases without overwhelming or eliminating them. Taking these results as a whole, it seems that shoppers indulge themselves most when situational factors help them feel more deserving and less guilty about doing so.

This paper provides significant contributions to the literature by demonstrating real world downstream goal-enhancing/priming and licensing effects of a choice that can arise from social, moral and/or political motivations. However, the licensing elements of these results are highly dependent on that motivation arising from the shoppers making a choice for themselves, rather than being directed into it by others. We also shows that these effects can occur concurrently in a complex choice environment in which several other factors are also at play. These findings have important implications for practice, in terms of the product offerings that might be provided, the positioning of such offerings in the store, and any environmental promotional activity in which stores might engage.

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**TABLE 1**

International (2000-2010) Retail Bag Regulations, Based on Retail Bags Report to the Legislature (2010, p.28-51)

<b>Geography (International)</b>	<b>Year</b>	<b>Ban§</b>	<b>Fee§§</b>
Argentina*	2008	X	
Australia*	2003	X	X
Bangladesh	2002	X	
Belgium	2007		X
Bhutan	2005	X	
Canada*	2007	X	X
China (mainland)	2008	X	X
England	2007	X	X
Eritrea	2005	X	
Ethiopia	2008	X	X
France	2010	X	
Hong Kong	2009		X
India*	2002	X	
Ireland	2002		X
Israel	2008		X
Italy	2009	X	
Kenya	2008	X	
Macedonia	2009	X	
Mexico*	2009	X	
Rwanda	2005	X	
Somaliland*	2005	X	
South Africa	2003	X	
Spain	2009		X
Taiwan	2003	X	
Tanzania	2006	X	
Uganda	2007	X	
Uruguay*	2009	X	
Wales*	2007	X	X
<b>Total</b>		<b>22</b>	<b>13</b>

§ Ban: outlaws specific retail plastic bags (e.g., imposes a minimum thickness rule).

§§ Fee: charges shoppers for retail plastic bags. The amount of the fee can be specified by governments or by individual stores. Note that a ban and a fee can coexist (e.g., China bans bags under 0.025mm thick and requires stores to charge consumers for bags over 0.025mm thick).

\* State/county/city-level regulations.

**TABLE 2**

National (2001-2011) Retail Bag Regulations, Based on Retail Bags Report to the Legislature (2010, p.28-51)

<b>Geography (International)</b>	<b>Year</b>	<b>Ban§</b>	<b>Fee§§</b>	<b>Other§§§</b>
Albany, NY	2008			X
Austin, TX	2007			X
Chicago, IL	2008			X
Edmonds, WA	2009	X		
Fairbanks, AK	2010		X	
Fairfax, CA	2008	X		
Kauai, HI	2011	X		
Lake Country, IL	2007			X
Los Angeles, CA	2008			X
Madison, WI	2009			X
Malibu, CA	2008	X		
Marshall, IA	2009			X
Maui, HI	2011	X		
Nassau, NY	2008			
New York, NY	2008			X
Outer Banks, NC	2009	X		
Paia, HI	2008	X		
Palo Alto, CA	2009	X		
Phoenix, AZ	2007			X
Rockland, NY	2008			X
San Francisco, CA	2007	X		X
Solana Beach, CA	2008			X
Suffolk, NY	2007			X
Tempe, AZ	2008			X
Tucson, AZ	2009			X
Washington, DC	2010	X	X	
Westchester, NY	2008			X
Westport, CT	2009	X		
Total				

§ Ban: outlaws specific retail plastic bags (e.g., imposes a minimum thickness rule).

§§ Fee: charges shoppers for retail plastic bags. The amount of the fee can be specified by governments or by individual stores. Note that a ban and a fee can coexist (e.g., China bans bags under 0.025mm thick and requires stores to charge consumers for bags over 0.025mm thick).

§§§ Other: requires stores to provide alternative bags, imposes recycling requirements on stores, or stores adopt their own voluntary measures.

\* State/county/city-level regulations.

**TABLE 3**

Transaction Summary Statistics (N=936,232)

Variable	Mean	Std. Dev.	N
Expenditure (gross)	\$45.12	\$50.79	936,232
Number of items	13.19	14.12	936,232
Days since last transaction	4.066	8.776	930,317

**TABLE 4**

Fraction of Transactions with Different Hedonic Categories (N=1,267,685)

Transaction has:	Mean	Std. Dev.
Candy	0.050	0.217
Cookies	0.016	0.125
Chips	0.084	0.278
Ice-cream	0.028	0.164
Any of these hedonic items	0.178	0.382

**TABLE 5**

Bag coefficient for item-level conditional regressions.

<b>DV: Item is organic</b>	<b>Without children</b>	<b>With children</b>
Organic in subclass		
Coef.	0.0058**	0.0009
S.E.	0.0027	0.0039
N	320,821	241,584
R-squared	0.8448	0.8326
Organic in subclass		
Coef.	0.045*	0.0006
S.E.	0.0023	0.0034
N	418,497	302,391
R-squared	0.8142	0.8111
Organic in class		
Coef.	0.0045**	0.0028
S.E.	0.0015	0.0023
N	785,584	537,035
R-squared	0.7489	0.7612

Standard Errors in Parentheses. Regressions include household FE and time dummies.

**TABLE 6**

## Transaction-level regressions

	Without children		With children	
	(1)	(2)	(3)	(4)
<b>DV: Txn has hedonic item</b>				
Bag	0.0141*** (0.0050)	0.0166*** (0.0052)	0.0011 (0.0077)	0.0001 (0.0084)
Number of organic items		-0.0016 (0.0012)		-0.0037*** (0.0011)
Bag x number of organic items		-0.0060 (0.0048)		0.0021 (0.0052)
N	535,088	535,088	272,723	272,723
R-squared	0.1637	0.1637	0.1559	0.1560

Standard Errors in Parentheses. Regressions include household FE, time since last transaction and its quadratic, and dummies for day, time-of-day, and number of non-hedonic items.

**TABLE 7**

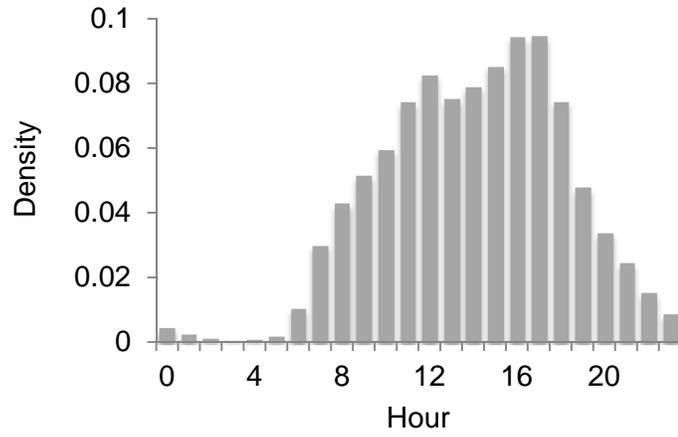
## Transaction-level regressions

<b>DV: Txn has category</b>	<b>Without children</b>		<b>With children</b>	
	<b>Ice-cream</b>	<b>Yogurt</b>	<b>Ice-cream</b>	<b>Yogurt</b>
Bag	0.1729*** (0.0672)	0.0153 (0.0285)	0.0364 (0.1025)	0.0152 (0.0462)
Price	-0.0141*** (0.0029)	-0.0349 (0.0040)	-0.0029 (0.0040)	-0.0050 (0.0057)
Bag x Price	-0.0422*** (0.0176)	-0.0082 (0.0224)	-0.0089 (0.0268)	0.0052 (0.0362)
N	448,017	419,441	240,336	239,449
R-squared	0.1259	0.2717	0.1219	0.2908

Standard Errors in Parentheses. Regressions include .0151863 household FE, time since last transaction and its quadratic, time since last purchase in the category, and dummies for day, time-of-day, and number of non-hedonic items.

**FIGURE 1**

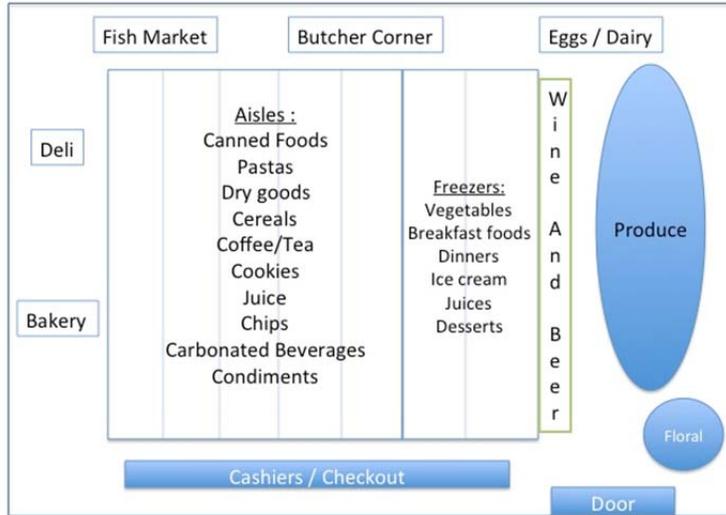
Transaction Purchase Times (Hour 0 = the first hour of the day.)



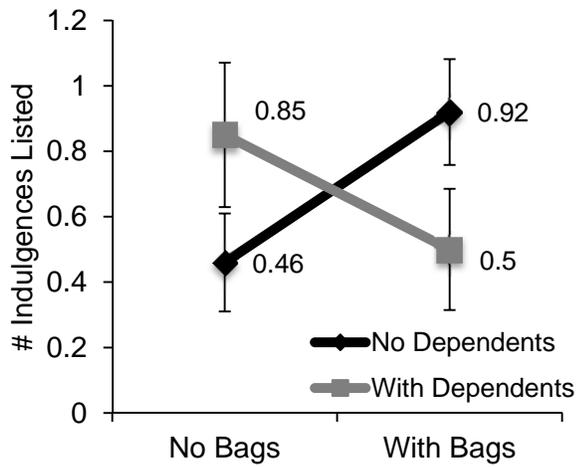
**FIGURE 2**

Experimental study 1 design and results A) Grocery store layout viewed by all participants. B) Number of indulgent items listed across conditions. Reference bars reflect S.E.

A.



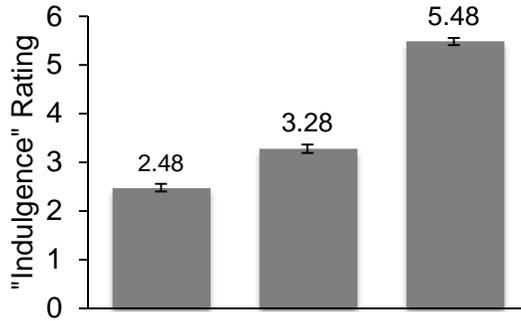
B.



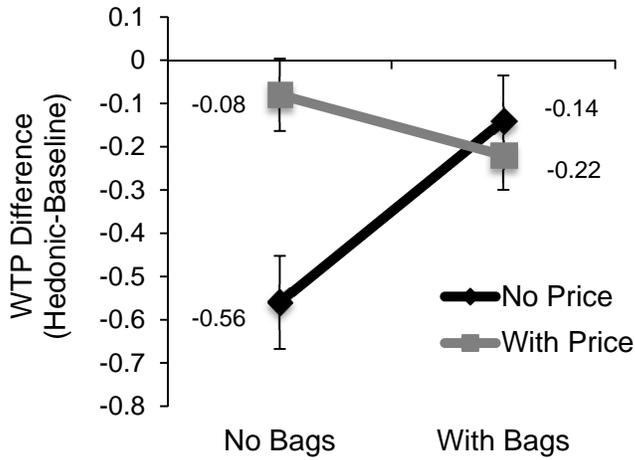
**FIGURE 3**

Experimental study 2 results. A) Indulgence ratings across categories B) WTP for hedonic items (as compared to baseline) C) WTP for organic items (as compared to baseline). Reference bars reflect S.E.

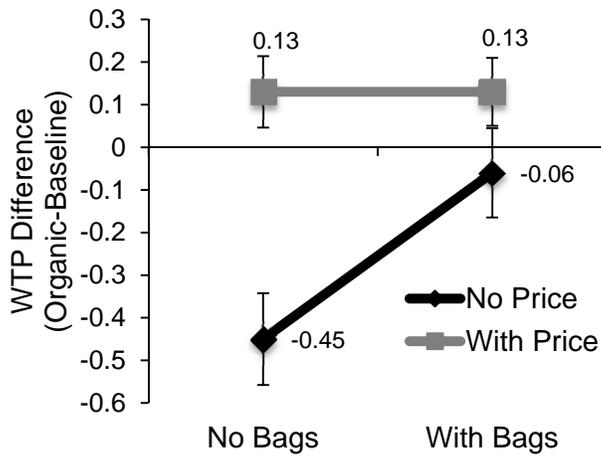
A.



B.



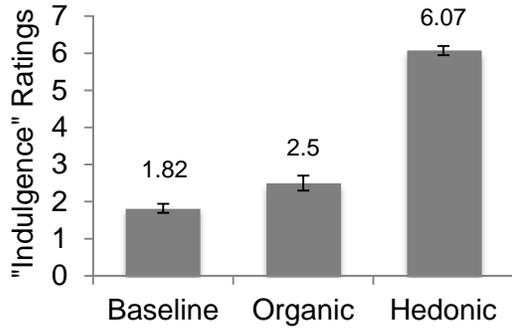
C.



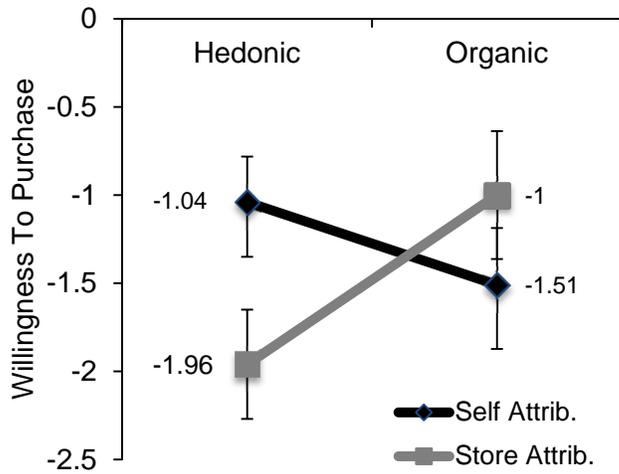
**FIGURE 4**

Experimental study 3 results. A) Indulgence ratings for the 3 grocery categories. B) Willingness-to-purchase for hedonic and organic foods (with baseline subtracted), shown by attribution condition. Reference bars reflect S.E.

A.



B.



## APPENDIX

As part of Study 2, participants were asked to respond to questions related to their normal grocery shopping habits to gain a better understanding of whether the experimental results might be dependent on a particular individual profile. In response to the question “Are you the person in your household who generally does the grocery shopping?” 353 of the 377 participants indicated “yes”. Restricting the data to just this group yielded results with the same significant patterns as the primary analysis. Specifically, for the hedonic products (minus baseline), there was a main effect of price information, such that WTP was higher on average when prices accompanied the product descriptions ( $F(1,349) = 5.653$ ;  $p < .02$ ). The main effect of bringing a bag was not significant ( $F(1,349) = 2.347$ ;  $p = .126$ ). However, there was still a strong interaction of bringing a bag and price information ( $F(1,349) = 10.507$ ,  $p < .002$ ) such that bringing a bag increased WTP for hedonic products for the no price condition, but had no effect on the with price condition.

The organic products (minus baseline) also retained the patterns observed for the full sample. Price information significantly increased WTP ( $F(1,349) = 14.728$ ;  $p < .001$ ). While bringing bags showed a marginal main effect of increasing WTP ( $F(1,349) = 3.427$ ,  $p = .065$ ), the interaction between the two main manipulations was significant ( $F(1,349) = 5.269$ ;  $p < .05$ ). Comparing hedonic and organic products directly in a repeated measures ANOVA found main effects of bags ( $F(1,349) = 4.11$ ;  $p < .05$ ), and of price ( $F(1,349) = 14.15$ ,  $p < .001$ ) but no significant interaction between product type, bringing bags, and the presence of price information ( $F(1,349) = .262$ ;  $p = .609$ ).

## APPENDIX W1

### ***Experimental Study 2 Instructions: With Bags***

For this part of the study, we'd like you to imagine yourself in the following situation, and then to try to answer the following questions as if this situation was happening for real. There are no right or wrong answers - we want to learn more about how individuals like you act in normal everyday situations.

Imagine that you are about to enter a grocery store.

You are going to do the shopping for your household for the entire week.

Picture yourself walking up towards the door, and grabbing a shopping cart from the stand.

Imagine putting your reusable shopping bags inside the cart as you wheel it inside and then looking around the entrance at the various displays and aisles.

As you are going through the store with your shopping cart, you see the following items offered for the prices listed. Please indicate the most you would be willing to pay for each of these products (in dollars and cents).

### ***Experimental Study 2 Instructions: No Bags***

For this part of the study, we'd like you to imagine yourself in the following situation, and then to try to answer the following questions as if this situation was happening for real. There are no right or wrong answers - we want to learn more about how individuals like you act in normal everyday situations.

Imagine that you are about to enter a grocery store.

You are going to do the shopping for your household for the entire week.

Picture yourself walking up towards the door, and pulling a shopping cart from the stand.

Imagine wheeling the cart inside, and then looking around the entrance at the various displays and aisles.

As you are going through the store with your shopping cart, you see the following items offered for the prices listed. Please indicate the most you would be willing to pay for each of these products (in dollars and cents).

## APPENDIX W2

In experimental study 3, participants listed dietary preferences, which were used to classify/restrict the data. Responses were excluded from analysis if they directly interacted with, or prevented consideration, of the nine food items in the study. Reasons indicated are listed only once below, but could appear in data multiple times.

Included in Analysis	Excluded from Analysis
None / No / etc.	Gluten-free
“I like fish, I like bison but ... I only buy stuff on sale...”	Vegan
“Heart healthy”	Vegetarian
“Protein based”	No carbohydrates/ no sugar
“Allergic to nuts and fish”	Diabetic
	Pre-diabetic
	Low-calorie and low carbohydrate
	Lactose intolerant
	Pescatarian
	“Not vegetarian, but don’t eat a lot of meat”