

Retailer Pricing Strategy and Consumer Choice under Price Uncertainty

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Contribution Statement

Assuming consumers choose retailers based on their average price perceptions, previous research examined how different retailer pricing strategies (frequent discounting, deep discounting and everyday low pricing) influence these perceptions. In these studies, participants typically viewed competing retailer's product prices over multiple trials that simulated multiple shopping occasions. Then, in an unanticipated task, they retrospectively judged the average price for each retailer. We challenge the notion that consumers' average price perceptions drive their retailer choice in realistic situations where consumers choose among retailers without knowing current prices. Drawing on the experience-based choice and descriptive choice literatures we hypothesize and find that the choice share of the retailer that is cheaper more often is greater. Specifically, we demonstrate a choice advantage for a retailer that offers many small discounts or a consistently low regular price (EDLP retailer) over a retailer that offers infrequent deep discounts (depth retailer). Our findings show that the choice advantage for the retailer that is cheaper more often persists under partial feedback (where, after choosing, consumers learned only the price of the chosen retailer) and complete feedback (where they also learned the forgone retailer's price), and with choices made a day apart. The results are consistent with mental accounting principles and with consumer use of a price prediction strategy. Participants preferred the many small gains associated with the frequency retailer over the fewer larger gains associated with the depth retailer, and their predictions of prices for the next shopping trip explained their choices.

ABSTRACT

This research examines how consumers choose retailers when they are uncertain about store prices prior to shopping. Simulating everyday choice, participants made successive retailer choices where on each occasion they chose a retailer and only then learned product prices. The results of a series of studies demonstrated that participants were more likely to choose a retailer that offered an everyday low price or frequent small discounts over a retailer that offered infrequent large discounts. This choice advantage for the retailer that was cheaper more often manifested even when its average price was judged to be higher. The same results were obtained when choices were made a day apart, when price feedback was only given for the chosen retailer, and when it was given for both retailers. Participant's expectations of future prices but not their judgments of retailer's past average prices, predicted their subsequent retailer choice.

Keywords: Retailer pricing, price perception, experience-based choice, mental accounting

Imagine that each Friday you purchase fresh pasta from retailer A or retailer B. You have observed that both retailers offer the pasta at the same regular price, but that A offers large though infrequent discounts on it, while B offers small but frequent discounts on it.

Unfortunately, you don't know how much each retailer will charge on any given day unless you visit that store. If your goal is to minimize spending across shopping trips where will you shop this Friday? Will you choose the retailer for whom you believe the average price across shopping occasions is lower? Will you choose the retailer you believe offers larger discounts? Will you choose the retailer you think is cheaper more often? Or will you choose the retailer you expect will be cheaper this Friday?

Much research has demonstrated the importance of price in purchase decisions (Monroe 2003). A more fine grained analysis suggests that consumers' purchase decisions are driven by price perceptions rather than by actual prices. These perceptions are highly subjective and susceptible to contextual influences (Alba et al. 1999; Krishna 1991; Krishna et al. 2002; Zeithaml, 1988). Retailers use various pricing strategies to influence consumers' price perceptions, assuming that they will impact choice. Three prominent retail pricing strategies are *frequency discounting*, where retailers offer frequent but small discounts, *depth discounting*, where retailers offer infrequent large discounts, and *everyday low pricing* (EDLP) where retailers offer products at a constant low regular price (Hoch, Drèze, and Purk 1994). We study how these pricing strategies influence consumers' retailer choice decisions, their perceptions of retailer prices, and the relation between them. In contrast to existing research, we focus on settings in which consumers decide where to shop without knowing the retailers' current prices (i.e., they choose under price uncertainty) and where they only learn a retailer's prices when they visit it and see the prices in the store.

We show that consumers tend to choose the retailer that is cheaper on the most shopping occasions and not the one they believe on average to be cheapest. We discuss several reasons why this choice pattern manifests and provide evidence that consumers use past observed patterns to form predictions of which store will be cheaper on each occasion, and these predictions, rather than average price judgments, drive choice.

We next review and contrast two streams of literature to develop our predictions: research on retailer and brand price perceptions and research on experience-based and descriptive-based choice. Then, we present a series of studies that test our hypotheses and elucidate the relations between retailer pricing strategy, consumer price judgments, and choice under price uncertainty. Last, we discuss the findings' theoretical and practical implications.

RETAILER AND BRAND PRICE PERCEPTION

Several studies have examined how competing retailers' frequency, depth, and EDLP pricing strategies influence consumers' average or basket price perceptions when consumers have full price information (i.e., under price certainty) (Alba et al. 1994; Alba et al. 1999; Lalwani and Monroe 2005). In the typical paradigm, participants make decisions over multiple trials that simulate daily/weekly purchases of a product offered by two competing retailers or brands. On each trial they view each retailer's or brand's daily/weekly price for a given product and then choose one, based on these prices. Notably the choice task is not designed to examine the impact of pricing strategy on choice, since all prices are observed and participants presumably always choose the cheapest price. Rather the purpose of the choice task is to allow participants to sample from both pricing distributions. The choice task includes at least nine trials

(but usually more than 24) and product prices vary within retailer/brand. Once the choice phase is completed, consumers retrospectively judge each retailer's/brand's average price in a non-anticipated judgment task.

For example, in one study (Alba et al. 1999, Study 5), participants viewed the prices of one shampoo brand that received frequent small discounts (frequency brand) and another that received infrequent large discounts (depth brand), over 36 simulated periods. The average price of the two shampoos was the same. Participants first observed prices and chose a brand for each of the 36 trials. They then retrospectively judged each brand's average price. When each brand was priced at only two levels, a regular or a discounted price (a dichotomous price distribution), the depth brand was judged to have the lower average price (a depth effect). Conversely, when each brand was priced at many price points (a non-dichotomous price distribution), the frequency brand was judged to have the lower average price (a frequency effect).

Using the same procedure, Lalwani and Monroe (2005) found relative salience to be a key factor that determined perceived average price (for a general discussion of saliency effects see Taylor et al. 1979). For both dichotomous and non-dichotomous price distributions, when discount frequency was made more salient a frequency effect was found; but, when discount magnitude was made more salient a depth effect was found. Krishna and Johar (1996) also showed that perceived average prices for a single stream of prices will be lower for depth versus frequency deals, and explained this related finding based on the salience of deeper discounts.

All these findings suggest that, under full price information (i.e., price certainty), the relative salience of discount frequency and depth influence consumers' judgments of average price. However, what is not yet known from these findings is whether these average price perceptions influence retailer choice in the typical situation where a consumer must decide which

retailer to visit without knowing the prices for that day (i.e., price uncertainty).

The only study that examined consumer choice under price uncertainty was Alba et al.'s (1994) Study 3. In that study participants examined the prices of three sets of three different products, for a frequency and a depth retailer, where the total basket price for the retailers was the same. Participants judged which store offered lower prices overall and estimated the stores' total basket price. They next chose their preferred store given a goal to obtain good value. This reflected a choice under price uncertainty because it was prospective and made without knowledge of future price information. There was a consistent frequency effect for the two price judgments and for choice. Importantly however, because of the order in which the questions were asked (price judgments first and then choice), it is possible that participants' prospective choices were influenced by the act of having made prior price judgments, which may have heightened the salience of these judgments. Given the protocol used, we cannot tell whether participants would have chosen the frequency retailer if they had not previously been asked to judge average prices, or whether consumers' perceptions of a retailer's average price, under normal circumstances, influence their choices under price uncertainty.

Our goal is to systematically examine the effects of retailer pricing strategies on consumers' retailer choice when consumers learn price information only after choosing a retailer. Participants in our studies first choose their preferred retailer (many times) and only then provide average price judgments. This procedure eliminates the possibility that asking questions about price perceptions artificially increases their salience and their reliance in choice. We predict that under price uncertainty, participants tend to choose the retailer that is cheaper most often. We provide evidence that consumers' expectations regarding the prices they are likely to encounter on the next shopping trip drives their choices and not the average price perceptions they form

based on observing retailers' past prices. We next describe the theoretical background for these hypotheses.

REASONS WHY CONSUMERS CHOOSE RETAILERS THAT ARE CHEAPER MORE OFTEN

Decision making research has long been interested in how people evaluate outcomes (Kahneman and Tversky 1979; Payne 2005; Thaler 1985) and how people choose between options for which the distributions of potential outcomes are uncertain and learned only from experience (Edwards 1962; Erev and Barron 2005; Estes 1961; Gonzalez and Dutt 2011). We propose that retailer choice under price uncertainty is a form of experience-based choice. In the standard experience-based choice paradigm participants choose one of two unlabeled buttons across a series of trials. On each trial, once participants choose a button (an option), they are shown a value (feedback) drawn at random with replacement from that button's payoff distribution. This value constitutes their payoff for that trial. Participants typically receive no prior information about the payoff distributions, and therefore base their choices only on the feedback they received in prior trials. The findings indicate that people tend to give small probability outcomes less weight than is normatively warranted (Barron and Erev 2003).

We contend that retailer choice under price uncertainty is conceptually similar to experience-based choice. When consumers choose a retailer under price uncertainty, they do not know the available retailers' price distributions and therefore can rely only on prices they encountered on prior shopping trips. We therefore posit that a similar pattern of results should manifest as in experience-based choice, such that consumers will tend to choose a retailer that is

cheaper more often over one that offers less frequent large discounts.

Research on experience-based choice indicates that small probability events may be under-sampled - participants experience these events less frequently than they actually occur (when only partial feedback is provided; Fox and Hadar 2006; Hertwig et al. 2004) - and/or that participants may underweight them in choice (Erev and Barron 2005; Hertwig et al. 2004; Ungemach et al. 2009). This leads small probability outcomes to impact choice less than is normatively warranted, and in the retailer choice context, would lead consumers to be less likely to choose the depth retailer, whose large discounts occur with small probabilities.

Prospect theory and theories regarding prediction of future outcomes offer additional insights as to why consumers should tend to choose a retailer that is cheaper more over one that infrequently offers much lower prices:

Mental accounting principles. When consumers choose a retailer under price uncertainty they likely assess its price by comparing it to the observed or expected price of the competing retailer. If the chosen retailer offers a lower price than the forgone retailer the outcome is coded as a "gain" and if it offers a higher price the outcome is coded as a "loss." Previous research demonstrates that losses loom larger than gains (Tversky and Kahneman 1991), and that consumers prefer options that offer a lower overall chance of incurring a strict loss (Payne 2005). Because the depth retailer will usually be more expensive, offering more frequent losses and less frequent gains, consumer will deem the depth retailer less attractive than the frequency or EDLP retailer. Furthermore, over shopping occasions the depth retailer offers few large gains while the frequency retailer offers many small gains, and the depth retailer offers many small losses while the frequency retailer offers few large gains. Given the shape of the value function (Kahneman and Tversky 1979), consumers should obtain more positive value from many small gains than a

few large gains, and should receive less negative value from a few large losses than many small losses (Thaler 1985; Tversky and Kahneman 1991). These mental accounting principles predict a general preference for the retailer that is cheaper more often.

Predicting future outcomes based on previously encountered outcomes. Humans tend to perceive patterns and correlations everywhere even if the patterns are not actually present, and even when perceiving them leads to erroneous inferences (Shermer 2011). For example, in an investment setting, Bloomfield and Hales (2002) found that MBA students used the prevalence of past trend reversals in the value of a security as an indicator of the likelihood of future reversals even when they were explicitly told that the sequences were random and that past outcomes provided no information about future outcomes. Whitson and Galinsky (2008) report that, when faced with uncertainty, people seek to gain control over the situation perceptually, by identifying patterns among stimuli, and by making predictions based on these perceived patterns. Likewise, in the experience-based choice context, Gonzalez and Dutt (2011) offer that if people assume that past sequences are representative of future sequences they will likely look for patterns in previously experienced outcomes (whether they exist or not), and use them to predict future outcomes. In our retailer choice context, use of a prediction strategy should produce a choice pattern whereby a retailer's choice share is proportional to the number of times the retailer provides the best outcome (probability matching: Erev and Barron 2005; Estes 1961; Humphreys 1939). This leads to a larger choice share for the retailer that more frequently offers lower prices. Although, when using this strategy, in some shopping trips, consumers may predict that the depth retailer will be cheaper than the frequency retailer and will therefore choose it, the frequency retailer will more often be predicted to offer the best outcome, and therefore will be chosen more often.

In summary:

H1: Consumers will choose a retailer that is slightly cheaper on the majority of shopping occasions more often than a retailer that is much cheaper on a small number of shopping occasions.

Note that none of the explanations described above implicates consumers' perceptions of average retailer prices as a factor that influences their choice under price uncertainty. In fact, we contend that in this realistic shopping context with price uncertainty, consumers do not naturally think about average prices. Rather we contend that they only generate and think about average price estimates if they are explicitly asked to do so, such as was done in the previous literature. We therefore predict that, even in situations where consumers later judge the frequency retailer to have a higher average price than the depth retailer they will still choose it more often. Recall that the previous research has demonstrated that average price perceptions for the frequency retailer are higher than for the depth retailer when retailer price distributions are dichotomous, yet we predict that in this same setting consumers will tend to choose the frequency retailer. To help us demonstrate this dissociation between average price perceptions and choice we primarily focus on dichotomous price distributions in our studies. However, we also generalize our choice results to situations where price distributions are non-dichotomous, where prior work has shown that price perceptions for the frequency and depth retailers depend on price discriminability:

H2a: When retailer price distributions are dichotomous, consumers choose the frequency retailer more often, yet judge it to have a higher average price.

H2b: When retailer price distributions are non-dichotomous, price discriminability

affects average price judgments but it does not affect choice. Consumers choose the frequency retailer more often, whether price discriminability is high or low. In contrast, judgments of average price are lower for the frequency retailer when discount frequency is made salient (low price discriminability) and are lower for the depth retailer when discount magnitude is made salient (high price discriminability).

Next, in Studies 1A, B, and C we demonstrate that participants tend to choose a retailer that is cheaper more often and we demonstrate the dissociation between average price perceptions and choice. Studies 2 – 4 show that these effects generalize to a wider range of settings and offer initial explanations for why they occur and evidence for what internal price representation instead drives choices if average prices do not. Next, we describe the studies that test these predictions. Table 1 provides a summary of the study characteristics and findings.

Insert Table 1 about here

STUDY 1A: FREQUENT VERSUS DEEP DISCOUNT RETAILER

The main aim of the first set of studies was to test H1 and H2a. Study 1A examined consumers' retailer choice and average price perceptions for retailers using frequent versus deep discounts under price uncertainty. A second aim was to compare these findings to those obtained under price certainty (Alba et al. 1999; Lalwani and Monroe 2005). A third aim was to test whether participants only use average price judgments in choice decisions when these judgments are made salient prior to choice.

Method

Eighty seven students participated in return for course credit. The study used a $2 \times 2 \times 2$ mixed design with a within-subject factor (Pricing pattern: frequency vs. depth), and two between-subjects factors, to which participants were randomly assigned: Price certainty (price certainty vs. price uncertainty) and Task order (average price judgments made first vs. future choice task completed first). In this, and all of our studies, retailer location on the computer screen (left vs. right) was counterbalanced. Since location never influenced our results (all F 's < 1), we do not discuss this further.

Participants were told they would purchase a pack of Portobello mushrooms from one of two competing retailers over 100 weeks, and that their choice should be based only on price because the retailers sold mushrooms of the same quality. Participants were also asked to minimize their total spending over the 100 week period. To incentivize participants they were informed that the two with the lowest overall spending would receive additional compensation of 40 Israeli New Shekel (NIS; approximately \$10 at the time of the study).

Participants made 100 successive choices between a frequency and a depth retailer simulating one hundred weekly purchases. The mushrooms were priced by the frequency retailer at 9.89 NIS for 50 weeks and at a sale price of 7.89 NIS for the remaining 50 weeks. They were priced by the depth retailer at 9.89 NIS for 88 weeks and at a sale price of 1.56 NIS for the remaining 12 weeks. The average price for both retailers was 8.89 NIS. All participants saw the same price sequence which was constructed such that the frequency retailer had five sales randomly distributed in each ten-trial interval, and the depth brand had one sale randomly distributed every 10 trials and an additional two sales randomly distributed across the 100 trials. Only one retailer could offer a discount on a given trial. To avoid a recency effect on average price judgments, the depth retailer's last discount did not occur in the final five periods.

In each trial, participants in the price certainty condition first saw the retailers' prices and then chose between them. Participants in the price uncertainty condition first chose a retailer and after saw both retailers' prices for that week (these were revealed so that participants' price judgments made after the choice phase would be based on the same price information as in the price certainty condition).

Next, participants either judged the average price of each retailer and then chose which retailer they would visit for 10 future purchases, or they completed these two tasks in the reverse order. As in previous research, participants did not know in advance that they would be asked to make average price judgments (Alba et al. 1994, Alba et al. 1999; Lalwani and Monroe 2005).

Finally, to better understand what drives choices under price uncertainty we asked participants in the price uncertainty condition to describe in writing the strategy they used to make their 100 choices (see Alba et al. 1994 for use of a similar procedure).

Results

100 Successive choices. One participant whose choice share for the frequency retailer was more than three standard deviations below the mean was removed from this analysis. The results showed the same pattern with and without this participant.

The frequency retailer was chosen 76% of the time under price certainty (SD = 15%, median = 85%) and 72% of the time under price uncertainty (SD = 20%, median = 67%). Both values differ significantly from 50% ($t(50) = 12.5$; $p < .0001$, and $t(34) = 6.6$; $p < .0001$, respectively), but do not differ significantly from each other ($t(84) = -1.2$; *NS*). Although the choices shares under certainty and uncertainty were similar, participants chose very differently in the two conditions. Under price certainty, because participants knew each retailer's price before choosing, they almost always chose the retailer that was cheaper on a given trial ($P_{\text{Depth}} = 95\%$,

$P_{\text{Frequency}} = 97\%$). In contrast, under price uncertainty participants chose the depth retailer on only 21.4% of the occasions when it turned out to be cheaper, and the frequency retailer on 73.7% of the occasions when it turned out to be cheaper.

Perceived average price. We excluded 17 participants whose average price judgments fell outside the range of prices offered by each retailer from this and the following analyses.

Participants' average price judgments were submitted to an ANOVA with Price (certain vs. uncertain) and Task order (perceived average price first vs. allocation first) as independent variables and Pricing pattern (frequency vs. depth) as a repeated variable. Consistent with our prediction (H2a), there was a marginally significant depth effect ($M_{\text{Freq}} = 8.26$ vs. $M_{\text{Depth}} = 7.91$, $F(1, 66) = 3.2$; $p = .08$). No other effects were significant.

We next examined, in the price uncertainty condition, where prices were seen only after choice, the relation between average price perceptions and choices across the 100 trials. A regression analysis with the frequency retailer's choice share as the dependent variable and the perceived average prices of the two retailers as the independent variables revealed that neither the perceived average price of the frequency retailer ($\beta = .23$, $t(30) = 1.28$; *NS*), nor of the depth retailer ($\beta = .13$, $t(30) = 0.73$; *NS*) predicted the choice share of the frequency retailer.

Future choices. Future choice allocations to the frequency retailer (out of 10 total) were submitted to an ANOVA with Price (certain vs. uncertain) and Task order (perceived average price first vs. purchase allocation first) as independent variables. Participants allocated significantly more choices to the frequency retailer when the choice allocation task preceded the average price judgments than when it followed it ($M = 7.24$ vs. 5.57 , respectively; $F(1, 66) = 4.72$; $p < .05$). No other effects were significant.

To further test the relation between perceived average price and decisions under

uncertainty in this choice allocation task we ran a regression that examined the effect of a judged depth advantage variable (computed by subtracting the judged average price for the depth retailer from that of the frequency retailer) on choice allocations as a function of task order. The interaction was significant ($\beta = -.27$, $t(68) = -2.31$; $p < .05$). Judged depth advantage predicted choice allocations when the perceived average price judgments preceded the choice allocations ($\beta = -.61$, $t(29) = -4.17$, $p < .001$), but not when they followed it ($\beta = -.22$, $t(29) = -1.4$; $p = .16$).

Jointly, the ANOVA and regression results suggest participants did not spontaneously rely on judged average price for the choice allocation task, which like the 100 successive choices task, reflects a decision under price uncertainty. Had they done so, choice allocations should have been similar for the two different task orderings. These findings suggest that only when average price perceptions are made salient by the measurement task do they influence choice allocations such that the lower a retailer's average price the more often it is chosen.

Decision rule. If average price perceptions do not seem to naturally influence choice, a natural question then is what led participants to be more likely to select the frequency retailer? To obtain some insights into this we examined participants' descriptions of the strategy they used to make their 100 choices. These descriptions were classified by two independent coders to one of the following four categories, involving different internal price representations: a prediction strategy (e.g. "*I tried to identify a pattern and to predict which retailer would be cheaper on the next trial*"), an averaging strategy (e.g. "*I estimated the average price of each retailer and chose the lower one*"), a frequency strategy (e.g. "*I chose the retailer that offered cheaper prices more often*"), or a depth strategy (e.g., "*I chose the retailer that offered fewer discounts, but the discounts were more substantial*"). Finally, we also coded for other strategies (e.g., "*I chose by the color of the retailer boxes*"). Of those in the price uncertainty condition ($N = 35$), 10 reported

using a prediction strategy, 1 an average price strategy, 11 a frequency strategy, 2 a depth strategy, and 11 were classified as "other."

Discussion

The results of Study 1A support our predictions by demonstrating a clear tendency to choose the retailer that is cheaper more often in the initial successive choice task and in the later choice allocation task (H1). Further, we show that a frequency effect in choice occurs concurrently with a depth effect for judged average price (H2a).

Past research assumed that consumers' perceptions of retailers' average price influences their retailer choice. Four findings of Study 1A suggest this is not the case under price uncertainty. First, although the frequency retailer was chosen more often, it was judged to have a higher average price. Second, the correlation between average price judgments and choice share in the 100 successive choices task was not significant. Third, perceived average price judgments only influenced future choice when the judgment task preceded the choice task, and fourth, only one participant reported using a decision rule that involved relying on average prices.

Since average price perceptions did not drive choice, what did? Since prices for both retailers were fully revealed in both conditions, the sampled and the actual price distributions did not differ in this study and therefore under-sampling of deep discounts cannot explain the findings. Participants' reported decision rules provide evidence that some are making predictions about which store will be cheaper on a trial by trial basis and others simply stated they went with the retailer that they perceived to be cheaper more often. Both of these strategies would result in a frequency effect in choice. Note that while in both cases participants discuss selecting a store they expect to be cheaper, we cannot tell whether they are driven by more frequent lower prices or more frequent lower deals since they co-occurred here. We examine this next.

STUDY 1B: EDLP (CONSTANT PRICE) VS. DEPTH PRICING

Study 1B builds from 1A by examining whether the results replicate with a different retailing pricing strategy, everyday low pricing (EDLP) and in the more realistic case when there is partial feedback and consumers only see the prices of their chosen retailer but not of the foregone retailer. Many of today's most successful retailers, such as Walmart and Costco, profess to use an EDLP strategy where they offer low prices consistently. Are these retailers so attractive to consumers because consumers believe they offer lower prices on average than other retailers? Or, as the results of study 1A suggest, are they attractive because consumers believe their prices are cheaper more often than those of the competitors?

In the real world it may be difficult to determine the relative contribution of these two factors since many EDLP retailers are both cheaper on average and more often than their competitors. To disentangle these factors, we examine choice under uncertainty between an EDLP retailer (that offers a constant low price) and a depth retailer, while keeping the average price of the retailers the same. Importantly, this study also allows us to further understand why consumers choose frequency retailers over depth retailers. Consumers may choose frequency retailers because they are cheaper more often or because they discount more often. If consumers choose frequency retailers because they are cheaper more often, they should choose an EDLP retailer (that does not discount at all but frequently offers lower prices than the depth retailer) over a depth retailer. However, if consumers choose frequency retailers because they discount more often they should choose the depth retailer because only it offers discounts.

Method

Ninety five students participated in exchange for 10 NIS (~\$3). The study used a 2×2 mixed design with Pricing pattern as a within-subject factor (EDLP vs. Depth), and Feedback as a between-subjects factor (partial vs. complete), to which participants were randomly assigned.

The EDLP retailer priced a pack of Portobello mushrooms, at 8.39 NIS for all 100 weeks. The depth retailer priced this product regularly at 9.89 NIS for 70 weeks and discounted it at 4.89 NIS on the remaining 30 weeks. The average price offered by both retailers was 8.39 NIS. The same price sequence was presented to all participants. The discounts were distributed uniformly throughout the 100 trials. Participants made all 100 successive choices (trials) under price uncertainty. Participants were provided either with complete or partial feedback. Last, participants judged the average price of both retailers.

Results

100 Successive choices. Participants chose the EDLP retailer on 66% of the trials in the partial feedback condition (SD = 19%, median = 63%) and on 64% of the trials in the complete feedback condition (SD = 14%, median = 65%). These values, which do not significantly differ from each other ($t(93) = -0.67$; *NS*), are both significantly greater than 50% (Partial feedback: $t(46) = 5.7$; $p < .0001$, Complete feedback: $t(47) = 6.9$; $p < .0001$).

Sampling error and perceived average price. The data of 11 participants whose average price judgment of the EDLP and/or depth retailers fell outside the price range offered by the retailers were excluded from subsequent analyses.

Because some participants were provided with partial feedback in this study we tested for sampling error. In real life, where people typically receive feedback from only the chosen retailer (partial feedback), the price distributions consumers experience may differ markedly from the

retailers' actual price distributions because of sampling error. In particular, it follows from the binomial distribution that low frequency prices tend to be under-sampled whereas high frequency prices tend to be over-sampled, and that this sampling error is more pronounced the smaller the sample size and the lower the frequency of a price point. This characteristic of the binomial distribution implies consumers may under-sample discounts offered by depth retailers. In other words, due to sampling error, fewer visits to a store decreases the likelihood that consumers will experience a discount, especially when the discount frequency is low, as is the case with a depth retailer. This notion puts depth retailers in a far more inferior position than previous research has observed. Our findings confirm this expectation. Because sampling error could occur only for the depth retailer in the partial feedback condition, we tested for it in this condition only. The average sampled price for the depth retailer was significantly higher than the actual average price ($M_{\text{DepthSampled}} = 8.65$, $M_{\text{DepthActual}} = 8.39$, $t(1, 43) = 2.86$; $p < .01$).

Next, we submitted participants' judged average prices to an ANOVA with Feedback (partial vs. complete) as an independent variable and Pricing pattern (EDLP vs. depth) as a repeated variable. The analysis revealed a significant depth effect ($M_{\text{Depth}} = 7.87$, $M_{\text{Const}} = 8.56$, $F(1, 81) = 24.9$; $p < .0001$). The main effect of Feedback and the interaction were not significant. Thus, although the average of the sampled prices was higher for the depth retailer than for the EDLP retailer, participants perceived the depth retailer to have a lower average price.

Discussion

These results suggest that the frequency effect in choice observed in study 1A was driven by participants' tendency to choose the retailer they believed was cheaper more often and not by their tendency to choose the retailer they believed discounted more frequently. If retailer choice

was driven by discount frequency, then the depth retailer should have been chosen most often since only it offered discounts. We also show that the tendency to choose the retailer that is cheaper more often occurs for both partial and complete feedback. Consistent with the results of Study 1A, we find that participants chose the EDLP retailer more often, yet judged its average price to be higher.

STUDY 1C: CONSTANT PRICE VS. FREQUENCY PRICING

Participants in study 1B tended to choose an EDLP retailer over a depth retailer. Although we proposed that this is because the EDLP retailer was cheaper more often, it may also be because its prices did not vary. To rule this out we next pitted a retailer that offered a constant price against a frequency retailer¹ (whose frequent discounted price was lower than the price of the constant retailer). The average price of both retailers was the same. If participants in study 1B tended to choose the EDLP retailer because it was cheaper more often they should now tend to choose the frequency retailer. If however, they chose the EDLP retailer because it offered a constant price, they should now choose the constant price retailer.

Method

Thirty one students participated for course credit. The design and procedure were slightly modified from those used in study 1B. First, the depth retailer was replaced by a frequency retailer that offered the product regularly at 9.89 NIS for 30 weeks and discounted it to 7.75 NIS on 70 weeks. Second, because we did not find any effects of feedback (partial vs. complete) on

¹ We thank an anonymous reviewer for suggesting this study.

choice or average price judgments in study 1B, we provided only partial feedback in this study, and finally, as in study 1A, we asked participants to describe the choice strategy they used to make their 100 choices.

Results

100 Successive choices. Participants were more likely to choose the frequency retailer over the constant retailer. On average, the frequency retailer was chosen on 58% of the trials (SD = 17%, median = 62%) which is significantly greater than 50% ($t(30) = 2.6; p < .02$).

Sampling error and perceived average price. Because sampling (choices) could result in sampling error only for the frequency retailer, we tested for sampling error in this condition only. Consistent with properties of the binomial distribution, where sampling error is not expected for frequently experienced discounts, this difference was not significant ($t < 1$).

The judged average price of the frequency retailer was not significantly different from the judged average price of the constant retailer ($M_{\text{Freq}} = 8.46, M_{\text{Const}} = 8.43, F(29) = .28; NS$).

Decision rule. Participants' descriptions of their choice rule in the successive choice task were classified by two independent coders to one of the same categories as in study 1A. Eighteen participants reported using a prediction strategy, 1 used an average price strategy, 1 used a frequency strategy, and 11 were classified as "other."

Discussion

The results of study 1C provide further evidence that consumers tend to choose the retailer that is cheaper more often. The findings of study 1c together with those of study 1b indicate that retailers that offer constant prices are chosen more often only when they are cheaper

more often than their competitors. As in studies 1A and B, the retailer with the greater choice share was not judged to have a lower average price. Interestingly, although the frequency retailer's price distribution was dichotomous, and this retailer offered the lowest price, its judged average price was not significantly lower than that of the constant retailer. This may be because the discount price offered by the frequency retailer was not a sufficiently low anchor to sway average price judgments downward, consistent with prior work showing that the salience of deep discounts may be a key factor influencing average price judgments (Krishna and Johar 1996). Last, as in study 1A, many participants reported using a prediction strategy, which should, and did, result in a higher choice share for the frequency retailer, and only one based their choice on average prices. Jointly, the results of studies 1A, B, and C indicate that the likelihood of being cheaper drives choice share while discount magnitude drives judgments of average price.

These studies also provide preliminary evidence that while average price may not be the internal reference price that drives retailer choice under price uncertainty, expected price on a given occasion may be. These studies' results are also consistent with the notion that consumers compare the chosen retailer's price with that of the foregone retailer, code lower prices as gains, and because segregating multiple small gains provides more value than fewer larger gains, tend to choose the retailer that they perceive offers more frequent lower prices. Next, we examine whether the observed effects replicate over a broader set of conditions and attempt to obtain stronger evidence for what drives the observed effects.

STUDY 2: NON-DICHOTOMOUS PRICE DISTRIBUTIONS AND PRICE DISCRIMINABILITY

In studies 1A-C retailers' prices were either constant or dichotomous. However, in real-life consumers may also encounter more complex, non-dichotomous price distributions. In study 2, we generalize our findings to non-dichotomous price distributions. We expect a frequency effect for choice under price uncertainty. In line with Lalwani and Monroe (2005), we expect judgments of average price to be lower for the frequency retailer when discount frequency is made salient (low price discriminability), and to be lower for the depth retailer when discount magnitude is made salient (high price discriminability). Importantly, showing that, under uncertainty, price discriminability does not influence choice but does influence perceived average prices would further support our claim that perceived average prices do not underlie choice under uncertainty.

Method

Fifty-nine students participated in return for 10 NIS (~\$3). The study used a 2×2 mixed design with a two-level within-subject factor (Pricing pattern: frequency vs. depth), and an additional between-subjects factor (Price discriminability: low vs. high), to which participants were randomly assigned. The procedure was similar to the choice under price uncertainty condition of the previous studies.

The product was 1 Kg of avocados. Price distributions were non-dichotomous and only partial feedback was given. The price distributions in the low discriminability condition were composed of decimal numbers, as in the previous studies. In the high discriminability condition these prices were multiplied by 100 as in Lalwani and Monroe (2005, Study 2). Participants in the high discriminability condition were asked to imagine purchasing avocados in the Dori currency worth 1% of a NIS (1 NIS = 100 Dori).

In the low discriminability condition, the frequency retailer's price was 9.89 NIS for 50

weeks and was on sale for the remaining 50 weeks at prices that ranged between 6.79 and 9 NIS. The depth retailer's regular price of 9.89 NIS was offered for 80 weeks and a sale price that ranged between 4.19 and 5.60 NIS, was offered for the remaining 20 weeks. Both retailers' average price was 8.89 NIS. Within each condition the same price sequence was presented to all participants. The discounts were distributed uniformly throughout the 100 trials. In the high discriminability condition, the comparable prices in the low discriminability price distributions were multiplied by 100. In this study retailers could simultaneously offer a sale. Consequently, the frequency retailer's price was cheaper on 39% of the trials, the depth retailer's price was cheaper on 20% of the trials, and both retailers offered the same price on 41% of the trials.

Results

100 Successive choices. Two participants whose proportion of choosing the frequency retailer was more than three standard deviations above the mean were removed from the analysis.

As in study 1A there was a significant frequency effect: the frequency retailer was chosen on 57% of the trials (SD = 9%, median = 55%). This value is significantly greater than 50% ($t(56) = 5.6; p < .0001$). Choice of the frequency retailer did not differ across the two price discriminability conditions (low discriminability: $M_{\text{Freq}} = 58\%$, $t(29) = 4.1; p < .001$); High discriminability: $M_{\text{Freq}} = 56\%$, ($t(26) = 3.9; p < .001$)), which did not differ from each other ($t(57) = 1.33; NS$). Thus, the frequency effect is robust to the discriminability of price distributions.

Sampling error and perceived average price. The data of one participant whose average price judgment of the frequency retailer fell below its lowest price offered was excluded from further analyses. Sampled and judged average prices in the high discriminability condition were divided by 100 to allow comparison with those in the low discriminability condition.

We submitted the average of the sampled prices to an ANOVA with Price discriminability (low vs. high) as an independent variable and Pricing pattern (frequency vs. depth) as a within subjects variable. None of the effects were significant.

Next, we submitted participants' average price judgments to the same ANOVA. Perceived average price was significantly lower in the high than in the low discriminability condition ($M_{\text{High}} = 8.11$, $M_{\text{Low}} = 8.43$, $F(1, 56) = 5.3$; $p < .03$). This may be because high discriminability increases discount salience and therefore “lowers” perceived average price. Although the Price discriminability x Pricing pattern interaction was not significant ($F(1, 56) = 1.0$; *NS*), additional analyses revealed a marginally significant frequency effect in the low-discriminability condition consistent with H2b ($M_{\text{Freq}} = 8.27$, $M_{\text{Depth}} = 8.60$, $F(1, 56) = 3.8$; $p = .056$), and similar perceived average prices for the frequency and depth retailer in the high-discriminability condition ($M_{\text{Freq}} = 8.07$, $M_{\text{Depth}} = 8.15$, $F(1, 56) = 0.2$; *NS*). The main effect of Pricing pattern was not significant ($F(1, 56) = 2.6$; $p = .11$).

Discussion

These results demonstrate that the frequency effect in choice under uncertainty is robust to the complexity and discriminability of price distributions. Consistent with previous research conducted under price certainty, we found a frequency effect for perceived average price in the low discriminability condition under price uncertainty and partial feedback. While we did not find a depth effect for perceived average prices in the high discriminability condition (Lalwani and Monroe, 2005) there was also no frequency effect. As in Lalwani and Monroe (2005), the depth retailer's discounts swayed average price judgments more in the high than in the low discriminability condition. Finally, the fact that discriminability influenced retailer choice and

price judgments differently further indicates that different factors drive these two and that average price judgments do not seem to drive choice.

STUDY 3: A ONE DAY GAP BETWEEN CHOICES

In our studies, in prior studies on price perception (Alba et al. 1994; Alba et al. 1999; Lalwani and Monroe 2005), and in studies on experience-based choice (Erev and Barron 2005; Gonzalez and Dutt 2011), participants' experience was operationalized as a series of choices made in (relatively) rapid succession. Yet in real life, consumers' decision of which store to visit is typically made on a daily, weekly, or monthly basis. There are several reasons why temporally separated experience-based decisions may differ from rapid successive decisions done in a lab. First, in the lab, prices associated with the most recent choices may more strongly influence successive choices because they may be more accessible in working memory. Second, the encoding of prices in long term memory may be more likely when choices are separated due to the more deliberate and less speedy nature of these choices. However, it is also possible that because of interfering information from other sources consumers find it more difficult to remember prior prices as the time lag between decisions increases, causing them to rely more heavily on heuristics to govern future choices, such as the frequency heuristic (Alba et al. 1994; Alba et al. 1999; Pansky and Algom 2002). Finally, respondents may choose more automatically when choices are made in rapid succession. Under a more deliberate mindset consumers making a single choice a day may call upon more complex internal price representations to govern their choices. Due to these potential differences between successive and separated choices and to provide external validity to the findings of studies 1 and 2, in study 3 we asked participants to

make a series of 15 daily choices between an EDLP retailer and a depth retailer. In addition, to better examine which internal price representations drive choice, participants in this study provided three price judgments: average price judgments, as in previous studies, which retailer offers cheaper prices more often, which we propose may be the representation that drives retailer choice under price uncertainty, and each retailer's cheapest price, which we used as a proxy for perceived discount depth.

Method

We recruited 60 U.S. MTurkers to complete 15 daily surveys in return for a payment of eight dollars. Fifty-five participants completed the 15 days of the survey (62% female; $M_{\text{age}} = 34.7$, $SD = 11.9$). Pricing pattern (EDLP vs. depth) was manipulated within subjects.

Participants were asked to make 15 daily purchases of a fresh 12" cheese pizza made by a particular brand sold by two competing grocers. Participants were instructed that they should base their choices solely on price and that the price charged by each grocer may change on a daily basis. They were incentivized to choose what they believed to be the cheaper grocer by being informed that the four participants with the lowest overall spending would receive an additional five dollars in compensation.

The EDLP retailer priced the product at \$8.39 every day. The depth retailer priced the product at \$9.89 for 10 days and at a discounted price of \$4.89 for the remaining 5 days. The average prices for the EDLP and the depth retailer were \$8.39 and \$8.22, respectively. A single price sequence was formed with the depth retailer's discounts randomly distributed across the 15 days. All choices were made under price uncertainty and only partial feedback was provided.

After participants had completed their purchase on the 15th day they judged each retailer's average price, and indicated the cheapest price offered by each retailer, as well as

which retailer they thought was cheaper more often on a 10 point scale (1 = Retailer A (denoting the depth retailer), 5 = both retailers were similar, 10 = Retailer B (denoting the EDLP retailer)).

Results

Fifteen choices. Participants revealed a clear tendency to choose the EDLP retailer. Specifically, the EDLP retailer was chosen on 73% of the trials (SD = 21%, median = 85%). This value is significantly greater than 50% ($t(54) = 8.2; p < .0001$). Figure 2 depicts the EDLP retailer's choice share along the 15 days of the survey. This result provides strong external validity for our earlier findings.

Insert figure 2 about here

Sampling error and perceived average price. Because sampling (choices) could result in sampling error only for the depth retailer, we tested for sampling error in this condition only. While the actual average price for the depth retailer was \$8.22 (and lower than the EDLP price) the average experienced price, was significantly higher - \$9.16, ($t(54) = 6.64; p < .0001$).

Because the average experienced price for the two retailers differed markedly in this study (EDLP – 8.39 vs. Depth – 9.16), to reveal possible biases in participants' average price judgments, we compared the experienced and the judged average prices for each retailer. Participants' perceived average price for the EDLP retailer was \$8.40, which did not significantly differ from the experienced price of \$8.39 ($t(54) = 0.35; NS$). For the depth retailer, the perceived average price was \$9.11, which also did not significantly differ from the experienced average price of \$9.16 ($t(54) = -0.38; NS$). Thus in this study with dichotomous price distributions the depth discount was not judged to have lower average prices. This may be because in this study the depth discount was rarely experienced (it was experienced once on average), and possibly

also because the average number of days since it was last experienced before participants provided their judgment of the average price was four days, leading to a weak memory trace.

To examine which internal price representations most strongly impact choice, we regressed participant's choice share for the EDLP retailer on the difference between the actually experienced average prices of the two retailers (actual average price), the difference between the perceived average prices of the two retailers (perceived average price), the difference between the two retailers in the perceived cheapest price (discount magnitude), and participants' judgment of which retailer was cheaper more often (cheaper more often). Only the difference between the actually experienced average prices of the two retailers ($\beta = -.32$, $t(50) = -2.7$; $p < .02$), and the judgment of which retailer was cheaper more often ($\beta = .37$, $t(50) = 2.6$; $p < .02$) were significant predictors of choice share. Specifically, the lower the experienced average price of the EDLP retailer compared to the depth retailer the more likely consumers were to choose the EDLP retailer. Also, the more the EDLP retailer was perceived as cheaper more often the more likely participants were to choose it over the depth retailer.

Given the high correlation between the actually experienced average prices and the perceived average prices of the two retailers it is not surprising that in the presence of the difference between actually experienced average prices, the difference in judged average prices did not predict choice ($\beta = -.18$, $t(50) = -1.1$; *NS*). To examine the extent to which multicollinearity affects our ability to reliably interpret the regression results we calculated VIF (Variance Inflation Factor) and tolerance values. The VIF and Tolerance values for the difference between the experienced average prices of the constant and the depth retailer were 1.97 and 0.51, respectively; the VIF and Tolerance values for the difference between the perceived average prices of the constant and the depth retailer were 3.81 and 0.26, respectively.

These values suggest that though multicollinearity exists in our data, it is not extremely high and we thus consider the above described results as sufficiently reliable.

Finally, the finding that the difference between the EDLP and the depth retailers in the perceived cheapest price did not predict choice, ($\beta = -.06$, $t(50) = -0.5$; *NS*), indicates that the magnitude of the discount offered by the depth retailer did not predict choice.

Discussion

The findings of study 3 replicate and provide external validity to those of studies 1 and 2 by showing that when a day long gap separates choices, consumers still are more likely to choose the retailer that is cheaper more often, and by showing that average price judgments do not underlie choice. Rather, the results of the regression analysis show that consumers are more likely to choose a retailer that they perceive to be cheaper more often.

The results of this study also demonstrate more strongly than those of the previous studies an important disadvantage of using a depth discounting strategy. When consumers' choices are spaced out over time, they are made under price uncertainty, and the sample size is small, the prices consumers experience for the depth retailer may be far less attractive than its actual prices. Moreover, the results again demonstrate a clear advantage of being cheaper more often and suggest that choice may be driven by participants' belief regarding the relative frequency with which a retailer is cheaper.

STUDY 4: PREDICTED PRICES

The results of the previous studies have consistently shown that consumers are more

likely to choose frequency (or EDLP) over depth retailers; at the same time, their judgments suggest that their average price perceptions do not underlie their choices. Which price perceptions do? Consistent with the results of study 3, when asked in studies 1A and 1C, most participants indicated they predicted which retailer would be cheaper on the following trial and chose the one they thought would be cheaper on the next trial (prediction strategy) or most of the time (frequency strategy). In this study we directly examine whether predicted prices drive choice by asking participants every 20 trials to either predict each retailer's next price, or report their average price, and correlating these judgments with the following choice. Note that a prediction strategy entails that in shopping trips where consumers expect the frequency retailer to be cheaper they will be more likely to choose it and when they expect the depth retailer to be cheaper they will be more likely to choose it. We predict that overall this will lead to an aggregate tendency to choose the frequency retailer, since it is expected to be cheaper than the depth retailer on more of the trials.

Method

Fifty six students participated for course credit. The study used a 3×2 mixed design with a two-level within-subject factor (Pricing pattern: frequency vs. depth), and a between-subject factor (Inter-choice price judgments: none, predicted retailer prices, or average retailer prices) to which subjects were randomly assigned.

The Frequency retailer priced a pack of Portobello mushrooms at 9.89 NIS for 40 weeks and at the sale price of 8.95 NIS for the remaining 160 weeks. The depth retailer priced it at 9.89 NIS for 160 weeks and at the sale price of 6.14 NIS for the remaining 40 weeks. The two retailers had the same average price of 9.14 NIS. All participants saw the same price sequence

which was constructed such that the depth retailer offered a discount price every fourth, fifth, or sixth trials (randomly determined), and the frequency retailer offered a discount price in all other trials. Thus, a discount was offered by one of the two retailers on every trial.

Before making every 20th choice (i.e., 20, 40, 60, ..., 200), one randomly selected set of participants was asked to predict the next price offered by each retailer; another was asked to estimate the average price (up to that point) offered by each retailer, and members of the last, control set were not asked to make any judgments throughout the series of 200 choices.

The procedure was similar to that used in the previous studies. Participants were provided with complete feedback in every condition. After completing the choice task, participants judged each retailer's average product price.

Results

200 Successive choices. There was a significant frequency effect. The frequency retailer was chosen on 75% of the trials (SD = 5%, median = 75%). This value is significantly greater than 50% ($t(55) = 34.4; p < .0001$). Importantly, choice of the frequency retailer did not differ across the three inter-choice price judgments conditions (Control: $M_{\text{Freq}} = 74\%$, $t(19) = 22; p < .0001$); Predicted retailer prices: $M_{\text{Freq}} = 75\%$, ($t(17) = 25.6; p < .0001$); Average retailer prices: $M_{\text{Freq}} = 76\%$, ($t(17) = 15.3; p < .0001$)), which were not significantly different from each other ($F(2, 53) = .3; NS$).

Perceived average price. The data of seven participants whose average price judgments fell outside the price range offered by at least one of the retailers were excluded from subsequent analyses. Judged average prices were submitted to an ANOVA with Inter-choice price judgments (none, predicted retailer prices, or average retailer prices) as an independent variable and Pricing pattern (frequency vs. depth) as a repeated variable. As in the prior studies, there was a depth

effect ($M_{\text{Freq}} = 9.06$ vs. $M_{\text{Depth}} = 8.79$, $F(1, 44) = 4.9$; $p = .03$). No other effects were significant.

Inter-choice judgments and subsequent choice. We examined whether each of the 20 inter-choice judgments successfully predicted subsequent choice. A successful prediction occurred when participants chose the retailer they predicted would offer the cheaper price on the next trial (in the predicted price condition) or the one they thought offered a lower average price up to that point (in the average price condition). Ties between retailer judgments (predicted or average price) were excluded from this analysis. We calculated the proportion of successful predictions per participant (out of ten trials, excluding ties). Predicted retailer price judgments were more predictive of subsequent choice than average retailer price judgments ($M_{\text{Prediction}} = 81.3\%$, $M_{\text{Average}} = 55.3\%$, $t(34) = -2.58$; $p < .02$).

Insert figure 4 about here

Discussion

As in the previous studies, these results show that under price uncertainty participants are more likely to choose the frequency retailer over the depth retailer. Importantly, these results contrast two price perceptions that may underlie choice: average price perception, implicated in past research, and predicted prices, which participants described as their choice strategy in the previous studies, and as implicated by the literatures on prediction and experience-based choice. We find evidence that predicted prices seem to underlie choice under uncertainty and average price perceptions do not.

GENERAL DISCUSSION

We examined how retailer pricing strategy influences consumers' retailer choice and price perceptions under price uncertainty. Simulating everyday choice, in a series of studies participants made retailer choices where on each occasion they chose a retailer and only then learned product prices, with either partial or complete feedback. Participants consistently tended to choose the retailer that was cheaper more often, even when they judged this retailer to be more expensive on average. Most participants indicated using a prediction strategy where they chose the retailer they believed would be cheaper on each shopping occasion or was cheaper more often.

A tendency to choose the retailer that was cheaper more often was observed under conditions of dichotomous price distributions with complete feedback (study 1A), and was found for low and high discount discriminability conditions for more complex non-dichotomous distributions (study 2). Studies 1a and 1b illuminate why consumers tend to choose the frequency retailer. These studies show that being cheaper more often, and not offering frequent discounts, drive choice. Study 3 extended our findings from a setting in which participants made multiple successive choices to a more realistic environment where they made one choice per day and replicated the earlier findings. Finally, study 4 demonstrated that predicted prices seem to underlie choice under price uncertainty while average price judgments do not.

The superiority of offering frequently lower prices was demonstrated with different price distributions, product categories, different time lags between choices, across different participant populations (Americans adults and Israeli undergraduate students) and surveying methods (laboratory experiments and an online survey). The managerial implications are clear. Under price uncertainty, when consumers goal is to maximize savings, they will tend to choose the retailer they believe is cheaper more often.

Our results also extend previous price perception research. We show that average price judgments following successive choices made under price uncertainty, are generally, quite similar to those which follow successive choices made under price certainty.

More importantly though, our findings demonstrate that consumer beliefs regarding the propensity with which each retailer is cheaper, in general, or on a trial-by-trial basis, and not average price perceptions, drives retailer choice under price uncertainty. Several findings support this conclusion. First, in every study the retailer that was cheaper more often was chosen more often. Second, participants reported using choice strategies linked to the propensity of being cheaper and not average prices (studies 1A and 1C). Third, the results of study 3 indicate that consumer choice is driven by perceptions of which retailer offers cheaper prices more often. Finally, the results of study 4 demonstrate the contribution of trial-by-trial price expectations.

We offered several explanations for why consumers choose the retailer offering cheaper prices more often. Our findings are consistent with the mental accounting explanation at the aggregate group level. In all studies, participants' tendency to choose the retailer that was cheaper more often suggests that they preferred the retailer that was more likely to yield a positive outcome, and that they preferred to accrue many small gains over a few large ones. Future research could seek stronger evidence for these accounts through individual level analyses. For example, if the valuation of outcomes contributes to the tendency to choose the frequency retailer, participants with a more concave/convex value function should reveal a stronger frequency effect. Similarly, individual measures of loss aversion should positively correlate with the tendency to choose the frequency retailer. Importantly, consumers who more linearly value outcomes or are less loss averse may not reveal any strong preference for either frequency or depth retailers.

Our findings also provide direct evidence for the prediction account at both the individual and aggregate levels. The results of study 4 show that participants were quite accurate in their price predictions, and that those explained subsequent choice. In addition, participants' descriptions of their decision rule in studies 1A and 1C show that many participants explicitly mentioned using a prediction strategy. Finally, we show a significant effect of sampling error, which, as we have mentioned, has important practical implications. In studies 1B (one condition), 1C, and 3, in which participants were given partial feedback, the results indicate that participants under-sampled the discounts of the depth retailer, something that may have reduced this retailers' attractiveness. However, the existence of a frequency effect in the studies in which participants were given full feedback (studies 1A, one condition in study 1B, and 4) suggests that sampling error alone does not drive consumers' tendency to select the retailer that is cheaper more often. While sampling error doesn't seem to drive the frequency effect, underweighting of small probability outcomes may. Future research may estimate individuals' weighting function (Abdellaoui, L'Haridon, and Paraschiv 2011) and examine its correlation with the magnitude of the frequency effect.

Our research also contributes to the experience-based choice literature by providing external validity to one of its main findings. To our knowledge, all previous experience-based choice studies have examined repeated choice under uncertainty by having participants make multiple consecutive choices in a single sitting. In study 3 we find, with a day's lag between choices and a few choices to make, a tendency for participants to select an option that offers many small gains (relative to the competing option) over a competing option that offers infrequent large gains.

Although we tried to simulate every day experience-based choice, the current paradigm

still clearly represents a simplification of real life purchasing. For example, while we asked participants to purchase a single item on each shopping trip, consumers typically purchase a basket of goods on each trip. When shopping for a basket of goods, factors that influence price perceptions and choice are more complex (Büyük Kurt 1986). For example, to determine a retailer's overall price level a consumer may rely on the total basket price, or on a representative sample of product prices, or even on the price of a single product. Tracking prices of a number of items is a far more challenging task than tracking the price of a single item and consumers may thus use different strategies and rely on different representations to simplify this task. For example, instead of choosing the retailer that offers cheaper prices on a single item more often they may choose a retailer that offers discounts on more items in the basket. Alternatively, consumers may decide to simplify their task by relying only on their perceptions of the total basket price. Past modeling papers have assumed that consumers have rational expectations of future prices for a basket of goods (Lal and Rao 1997) and have shown that price expectations for a basket of goods can influence choice (Bell and Lattin 1998). More behavioral research is needed to understand how consumers form these price perceptions for a basket of goods, how that varies with basket size (Bell and Lattin 1998), and whether those perceptions vary across segments of consumers who differ in their proneness for different types of deals (Pechtl 2004).

Future research should also examine how robust our findings are to other characteristics of shopping behavior. In all of our studies participants had a purchase goal of minimizing spending, participants were required to make a purchase on each visit, and they were not allowed to stockpile. If, for example, we had changed participants goal to having fun, had allowed them to defer purchase on each occasion, or had allowed them to stockpile we may have found a shift in their tendency to choose the depth retailer. It seems likely that any manipulation that would

increase the utility of finding a product at an extremely low price, without incurring the cost of having to buy the product at a relatively expensive price, would bias choice in favor of the depth retailer. Future research could examine this prediction.

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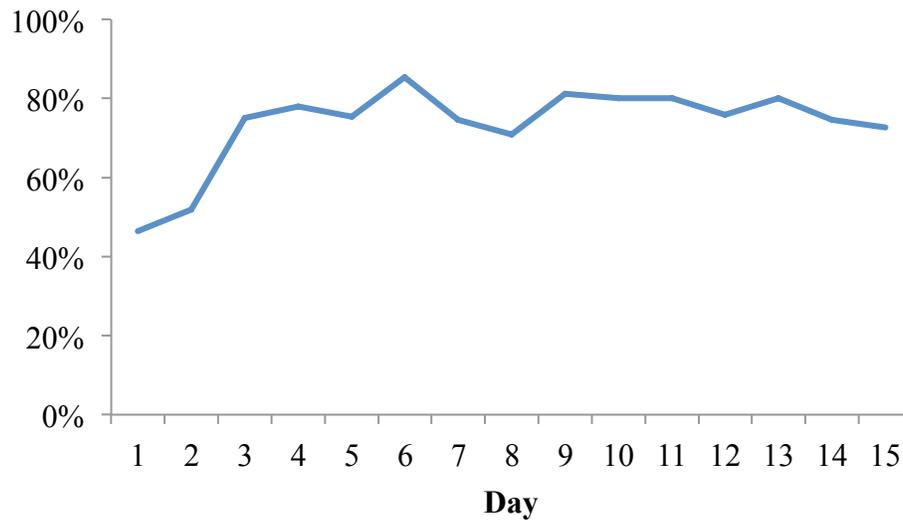
TABLE 1: SUMMARY OF STUDIES

Study	N	Freq./Constant dist.		Depth dist.		Feedback	Freq./Constant
							Retailer choice share
1A*	36	Reg: 9.89 (.5)	Disc: 7.89 (.5)	Reg: 9.89 (.88)	Disc: 1.56 (.12)	Complete	72%
1B	47	Reg: 8.39 (1)		Reg: 9.89 (.7)	Disc: 4.89 (.3)	Partial	66%
	48	Reg: 8.39 (1)		Reg: 9.89 (.7)	Disc: 4.89 (.3)	Complete	64%
1C	31	Const: Reg: 8.39 (1)	Freq: Reg: 8.89 (.3)		Disc: 7.75 (.7)	Partial	58%
2	32	Reg: 9.89 (.5)	Disc: 6.79-9 (.5)	Reg: 9.89 (.8)	Disc: 4.19-5.60 (.2)	Partial	60%
	27	Reg: 9.89 (.5)	Disc: 6.79-9.00 (.5)	Reg: 9.89 (.8)	Disc: 4.19-5.60 (.2)	Partial	56%
3	55	Reg: 8.39 (1)		Reg: 9.89 (.666)	Disc: 4.89 (.333)	Partial	73%
4	56	Reg: 9.89 (.2)	Disc: 8.95 (.8)	Reg: 9.89 (.8)	Disc: 6.14 (.2)	Complete	75%

* An additional 51 participants completed Study 1 under price certainty. The choice share of the frequency retailer was 76% under price certainty.

Number of participants (N), distribution characteristics (Freq./Constant and depth), type of feedback (partial and full), whether there was a prior, and choice share of the Freq./constant distribution for each of the studies.

FIGURE 1: PROPORTION OF EDLP CHOICES (STUDY 3)



The choice share for the EDLP retailer was 46% on day 1 and increased to 73% on day 15. This pattern resembles that found in previous experience-based choice studies where the choice proportion on trial 1 is about 50% and quickly stabilizes on a higher choice proportion for one of the available options (e.g., Barron and Erev 2003).