Small Probabilistic Discounts Stimulate Spending: Pain of Paying in Price Promotions

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ABSTRACT We find that small probabilistic price promotions effectively stimulate demand, even more so than comparable fixed price promotions (e.g., "1% chance it's free" vs. "1% off," respectively), because they more effectively reduce the pain of paying. In three field experiments at a grocer, we exogenously and endogenously manipulated the salience of pain of paying via elicitation timing (e.g., at entrance or checkout) and payment method (i.e., cash/debit cards or credit cards). This modulated the attractiveness of probabilistic discounts and their ability to stimulate spending. Shoppers paying with cash or debit cards, for example, spent 54% more if they received a 1% probabilistic discount than a 1% fixed discount (experiment 2). A fourth experiment showed that consumers' sensitivity to pain of paying modulates the greater comparative efficacy of small probabilistic than fixed discounts. More broadly, the results elucidate a novel affective route through which price promotions stimulate demand—pain of paying.

Probabilistic price promotion (e.g., "*p*% chance it's free") is an increasingly popular marketing strategy. CitiFinancial® offered its cardholders an opportunity to receive purchases made at participating retailers for free during a contest period in 2015 ("CitiFinancial® Win Your Purchase" contest). In 2016, Kiehl's, an American cosmetic brand retailer and division of L'Oreal, entered purchases over $80 into a lottery that would pay customers back for their purchase. Probabilistic discounts are even used to sell pizza. Customers of 50/50 Pizza in Washington, DC, first hand over their cash or swipe their card to buy a pie and then spin a roulette wheel that determines if they will pay $9.99 or $0.99 for their pizza. Probabilistic price promotions are effective, even more than traditional "fixed" price promotions (e.g., "*x*% off"), in a variety of contexts (Mažar, Shampanier, and Ariely 2017).

We suggest the peculiar efficacy of probabilistic price promotions is due to their ability to reduce the "pain of paying," which allows them to effectively stimulate demand even when promotion levels are shallow (e.g., "1% chance it's free"). In three field experiments in a grocery store and one online experiment, we compare the appeal and efficacy of small probabilistic and fixed price promotions. We find that small probabilistic price promotions are more appealing and able to stimulate spending when the pain of paying is high, whether due to the context (e.g., paying in cash) or the consumer (e.g., for tightwads). Our findings elucidate why consumers are receptive to even small probabilistic price promotions. Furthermore, we identify pain of paying as a novel affective route, beyond acquisition utility and transaction utility, through which price promotions stimulate purchasing behavior.

THEORETICAL BACKGROUND

Price Promotions

Price promotion is an effective marketing strategy. It accelerates purchases and consumption (Ailawadi and Neslin 1998), encourages store and brand switching (Grover and Srinivasan 1992; Gupta 1988), leads consumers to buy greater quantity (i.e., through stockpiling; Blattberg, Eppen, and Lieberman 1981; Neslin, Henderson, and Quelch 1985), and reduces deliberation on purchase decisions (Aydinli, Bertini, and Lambrecht 2014). As a result, price promotion has become a staple marketing strategy. In 2017, an estimated 293 billion coupons were issued in the United States with a total value near $573 billion: $1,766 in savings for every

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American man, woman, and child (Nielsen Clearing House [NCH] 2017 Year-End Coupon Facts at a Glance).[1]

Previous research has suggested both rational and affective accounts of how price promotions influence buying behavior. A rational basis of price promotion is that through economic savings, it improves *acquisition utility*, the price-quality trade-off of a good for consumers (Thaler 1985). The same coffee provides greater value when its price is $2 than $4. This trade-off is also referred to as acquisition value, perceived value, and value consciousness, among other terms in the marketing literature (Zeithaml 1988; Lichtenstein, Netemeyer, and Burton 1990; Grewal, Monroe, and Krishnan 1998).

Price promotion is believed to create additional value for consumers at an emotional level. Consumers derive positive *transaction utility* when their internal reference price for a good is greater than its purchase price ("positive affect from getting a deal"; Thaler 1985; Grewal et al. 1998). Consider two consumers who buy a coffee for $2. If one expected to pay $2 and the other expected to pay $4, both would derive the same acquisition utility from the coffee. The consumer who expected to pay $4, however, would receive additional transaction utility from "saving $2" on her coffee and thus greater overall pleasure from her purchase.

We make the novel prediction that price promotion influences buying behavior through a third affective route—by reducing the psychophysical pain of paying (Prelec and Loewenstein 1998) associated with the purchase. We suggest that price promotions stimulate demand by reducing the pain of paying associated with the purchase of promoted goods. To the best of our knowledge, while the potential influence of price promotions on pain of paying has been alluded to in the marketing literature (e.g., Lee and Tsai 2014), this intuitive process has never been directly tested.

Pain of Paying

Pain of paying is the negative affect incurred by the expenditure of resources, usually money (Prelec and Loewenstein 1998). Prototypical examples include the discomfort that one feels while watching the price climb on a taximeter or at the filling station. Pain of paying is not a metaphor. Its salience modulates the amount of negative affect associated with spending money. It is associated with activation in the insula (Knutson et al. 2007), a brain region associated with anticipated physical pain and financial loss (Kuhnen and Knutson 2005; Wager et al. 2013), deactivation of the medial prefrontal cortex, a brain region associated with anticipated gain (Knutson et al. 2003), and is reduced with misattribution to placebo analgesics (Mažar et al. 2016).

We ground our pain of paying in price promotion theory in work identifying pain of paying as a self-regulatory inhibitor of consumer spending, which acts as a counterweight to the pleasure of acquisition (Zellermayer 1996; Prelec and Loewenstein 1998; Rick, Cryder, and Loewenstein 2008). Pain of paying is not fixed with respect to the price of goods. It varies across consumers, transaction mediums, and the size of the account from which resources are drawn to make a purchase (Morewedge, Holtzman, and Epley 2007; Soster, Gershoff, and Bearden 2014; Shah et al. 2016). Pain of paying is greater for "tightwads" than "spendthrifts," and this individual difference predicts indebtedness (Rick et al. 2008). Variance of its salience across payment methods stimulates consumers to spend more for the same goods with credit cards than with cash (e.g., Soman 2001). MBA students bid 113% and 76% more for Boston Celtics and Red Sox tickets, respectively, when the tickets were sold in auctions in which bidders paid with credit cards compared to auctions in which bidders paid in cash (Prelec and Simester 2001). Consumers also buy a larger volume of goods when paying with credit cards than with cash, even for regular purchases like groceries (e.g., Soman 2001, 2003; Raghubir and Srivastava 2008; Thomas, Desai, and Seenivasan 2011). Liquidity constraints aside, cash payments induce a higher pain of paying than credit card payments because the loss of money is realized immediately (vs. at a later future date), and the salience of the loss is not obfuscated by an abstract representation of the money (e.g., a plastic card or the wave of a watch or phone; Soman 2001).

Probabilistic Price Promotions

According to acquisition utility and transaction utility accounts of price promotion, different price promotions that offer the same expected economic savings should have the same appeal and efficacy in stimulating buying behavior (e.g., Grewal et al. 1998). A small probabilistic price promotion ("1% chance it's free") should have an effect as small as a comparable fixed price promotion ("1% off"). Our pain of paying in price promotion theory, however, predicts that small probabilistic price promotions might effectively increase the demand for promoted goods, even more than equivalent fixed price promotions.

1. https://www.nchmarketing.com/2017-Year-End-Coupon-Facts-Sheet.aspx.

When appropriately framed (Yang, Vosgerau, and Loewenstein 2013), probabilistic price promotions capitalize on three psychological biases: optimism, the psychophysics of value and chance, and scope insensitivity in emotional states. First, consumers are optimistic when judging whether uncertain outcomes will be resolved in their favor. They intuit that uncertain outcomes will be resolved more favorably than knowledgeable forecasts, logic, and experience suggests (Simmons and Nelson 2006; Norton, Frost, and Ariely 2007; Goldsmith and Amir 2010; Shen, Fishbach, and Hsee 2015). Goldsmith and Amir (2010), for example, found that consumers were as likely to purchase a candy bar when it was bundled with the receipt of an uncertain gift (either a more desirable soda or a less desirable bag of popcorn), as when it was bundled with the certain receipt of the more desirable soda. Consumers treated the probabilistic promotion as equal in value to the more desirable fixed promotion. Consumers in both cases, of course, were also more likely to purchase the candy than when it was bundled with the certain receipt of the less desirable popcorn. This optimistic bias suggests that the subjective likelihood of receiving small probabilistic promotions should be unrealistically high. Fixed promotions, by contrast, are certain and should not benefit from this bias.

Second, the psychophysics of value and chance are nonlinear. In prospect theory, the s-shaped value function reflects diminishing marginal utility for gains and losses. The inverse s-shaped probability weighting function reflects the overweighting of small probabilities and underweighting of large probabilities (Kahneman and Tversky 1979). The shape of these functions suggest that when fixed and probabilistic price promotions are small in magnitude, such as paying 99% of the cost of a $100 good for certain (1% off) versus having a 1% chance to receive the $100 good for free (i.e., an expected value of $99 in both cases), probabilistic price promotions will be perceived to have greater value. Indeed, Mažar and colleagues (2017) found in several experiments that the comparative advantage of probabilistic price promotions relative to equivalent fixed price promotions was greatest when both were small. Video store customers were more likely to prefer a probabilistic price promotion (*p*% chance it's free) to a fixed price promotion ($*x*% off) on their rental, for instance, when the size of the promotions was smaller than larger (e.g., when *p* and *x* were 10% vs. 90%).

Third, diminishing marginal sensitivity to quantitative attributes is exacerbated by emotionally evocative stimuli and affective states (e.g., Hsee and Rottenstreich 2004; Morewedge et al. 2010; Buechel, Zhang, and Morewedge 2017; Chang and Pham 2018). The probability weighting function of prospect theory, for example, exhibits more curvature for evaluations of affect-rich stimuli and evaluations made in affectively intense states (Rottenstreich and Hsee 2001; Buechel et al. 2014). When the pain of paying is salient, whether due to context or chronic states within consumers (e.g., when they are financially constrained or if they are tightwads), they should then be even more prone to overweight the difference between a small probability and zero (e.g., 1% vs. 0% chance it's free) and to underweight small reductions in prices (e.g., paying 99% rather than 100% of the MSRP).

OVERVIEW OF EXPERIMENTS

In four experiments, we examined how exogenously and endogenously manipulating the pain of paying would influence the appeal and efficacy of a small probabilistic price promotion ("1% chance it's free") relative to a similar fixed price promotion ("1% off"). Experiments 1–3 were field experiments run with shoppers at a grocery store in North Carolina. Its floor space is 10,000 square feet. Mean basket size per shopper is $29.69.[2] The median household income of the surrounding neighborhood is $40,300 a year. Experiment 4 was a grocery shopping vignette study run online. We chose to situate our investigation in the category of food, as it is a category in which price promotions are frequently redeemed (e.g., 51% of all coupons redeemed in 2017; NCH 2017 Year End Coupon Facts at a Glance).

In experiment 1, we compared shopper preferences for a real 1% probabilistic versus a 1% fixed price promotion when pain of paying was more or less salient. In experiment 2, we compared the extent to which real 1% probabilistic and 1% fixed price promotions stimulated actual grocery spending among shoppers using more or less painful payment methods. In experiment 3 we manipulated the salience of pain of paying and examined how it influenced the size of fixed price promotion equivalent in appeal to a 1% probabilistic price promotion. In experiment 4, we directly tested the sensitivity of participants to pain of paying and examined how differences in their sensitivity modulated the extent to which fixed and probabilistic price promotions reduced the pain of paying for groceries. Our theory predicts that small probabilistic promotions should be most

2. In a pilot study ($N = 84$), we observed that shoppers who used cash (13%), debit card (42%), and credit card (45%) spent $15.77, $28.07, and $35.22 on average, respectively. Credit card users spent marginally more than did cash and debit card users ($t(82) = 1.84$, $p = .07$).

effective, and more effective than a fixed promotion of the same expected value, when the context or consumer makes the pain of paying salient.

EXPERIMENT 1: PRICE PROMOTION APPEAL

We first tested how modulating the pain of paying influences the relative attractiveness of probabilistic and fixed price promotions. Grocery shoppers chose between a 1% probabilistic and 1% fixed price promotion. We exogenously modulated the salience of pain of paying by eliciting their preferences at the beginning or end of their shopping trip (i.e., at the store entrance or checkout; Prelec and Loewenstein 1998) and endogenously modulated it by observing their payment method (i.e., cash and debit cards or credit cards; Soman 2003; Shah et al. 2016). Our theory predicts that shoppers would exhibit the strongest preference for probabilistic price promotions when the pain of paying is salient. Thus, we predicted that cash and debit card users would exhibit a stronger preference for the probabilistic price promotion at checkout (high salience) than at the beginning of their trip (low salience). Because credit card payments tend to mitigate the pain of paying (e.g., Soman 2003; Shah et al. 2016), we predicted that credit card users would be less sensitive to the timing of the preference elicitation. Finally, we predicted that cash and debit card users would exhibit a stronger preference than credit card users at checkout (high salience), but not at the store entrance (low salience).

Method

Participants. Store employees who were blind to the hypotheses recruited 86 grocery shoppers between 4pm and 6pm on two weekdays in a single week.

Procedure. Shoppers were offered a choice between 1% probabilistic price promotion and 1% fixed price promotion to apply to their entire purchase. In a low pain-of-paying salience condition, shoppers chose between promotions at the beginning of their shopping trip upon entering the store. In a high pain-of-paying salience condition, shoppers chose between promotions at the end of their shopping trip while standing in line to pay at checkout. The conditions were run in alternating 15-minute blocks with a 5-minute break between conditions.

All shoppers who chose the probabilistic price promotion rolled a 100-sided die at checkout to determine whether they would pay the full price for their groceries or $0. If they rolled the date of the experiment (e.g., the 16th), they paid $0. If they rolled any other number, they paid the full price. Shoppers who chose the fixed price promotion received 1% off their entire basket at checkout. A research assistant, blind to the hypotheses, recorded basket size and the payment method used on the receipt of each participant at checkout.

Results

Of the 86 shoppers, 14% paid in cash, 42% customers paid with a debit card, and 44% paid with a credit card. No participants were excluded from any analysis.

We analyzed choices of the probabilistic promotion on elicitation timing (entrance = 0; checkout = 1) and payment method (credit cards = 0; cash or debit cards = 1) with logistic regression. There was no main effect of elicitation timing (Wald's $\chi^2(1) = 1.62$, $p = .20$) or payment method (Wald's $\chi^2(1) = .17$, $p = .68$). More important, the regression revealed the predicted significant elicitation timing × payment method interaction (Wald's $\chi^2(1) = 5.28$, $p = .02$). We then conducted planned comparisons to test our predictions. As predicted, cash and debit card users were more likely to choose the probabilistic price promotion at checkout than at the store entrance ($\chi^2(1) = 4.17$, $p = .04$). By contrast, credit card users exhibited the same preference for the probabilistic price promotion at checkout and the store entrance ($\chi^2(1) = 1.65$, $p = .20$). Accordingly, preferences for probabilistic promotions at checkout were higher for shoppers paying in cash or with debit cards than for shoppers paying with credit cards ($\chi^2(1) = 7.94$, $p < .01$), but preferences did not differ by payment method when elicited at the store entrance ($\chi^2(1) = .17$, $p = .68$). For all frequencies, see table 1.

A 2 × 2 ANOVA revealed no difference between basket sizes by timing, payment method, or their interaction (all $F \leq .71$, all $p \geq .40$). We observed a directional but statistically nonsignificant difference in basket size between elicitation timing conditions ($M_{\text{entrance}} = \$31.53$, SD = 29.33; $M_{\text{checkout}} = \$26.35$, SD = 23.37).

Discussion

Pain of paying appears to play a critical role in the greater appeal of small probabilistic than fixed price promotions. Preferences for a 1% probabilistic price promotion were greater in contexts that made the pain of paying more salient. Shoppers paying in cash or with debit cards exhibited a stronger preference for the probabilistic promotion when asked at the checkout than at the store entrance. By contrast, credit card users exhibited no difference in prefer-

Table 1. Choice Share of Probabilistic Price Promotion by Payment Method and Elicitation Timing

	Elicitation timing		
Payment method	Entrance	Checkout	*M*
Cash/debit cards	65.0%$_a$ (13/20)	89.3%$_{b+}$ (25/28)	79.2% (38/48)
Credit cards	70.8%$_{a+}$ (17/24)	50.0%$_a$ (7/14)	63.2% (24/38)
M	68.2% (30/44)	76.2% (32/42)	

Note.—Preference for probabilistic price promotion in experiment 1 by condition, in both percentages and frequencies. Cells that do not share the subscript *a* or *b* differ with χ^2 at $p \leq .05$; cells that share the subscript + differ at $p = .09$.

ence for the probabilistic promotion when asked at checkout or at the store entrance. Similarly, at checkout, preferences for the probabilistic promotion were greater for shoppers who paid in cash or with a debit card than for shoppers who paid with a credit card. By contrast, at the store entrance there was no difference in preferences for the probabilistic promotion across shoppers using different payment methods.

It is useful to note that shoppers exhibited a stronger overall preference for the probabilistic price promotion than the fixed price promotion (72% vs. 28%; $p_{\text{binomial}} < .001$). This finding is consistent with Mažar et al.'s (2017) suggestion that consumers find probabilistic price promotions more attractive than fixed price promotions. Of course, we uniquely show that preferences between these promotions are moderated by the salience of pain of paying—an affective route that is perhaps more proximal to the end valuation of promotions than the earlier-stage psychophysical differences that Mažar and colleagues used to explain their findings.

EXPERIMENT 2: PRICE PROMOTION EFFICACY

We next tested how modulating the pain of paying influences the ability of small probabilistic and fixed price promotions to stimulate spending. We exogenously modulated price promotions by randomly assigning shoppers to receive either a 1% probabilistic or 1% fixed price promotion upon entering the store. We endogenously manipulated pain of paying by observing the payment method they used (i.e., cash and debit cards or credit cards; see, e.g., Soman 2003; Shah et al. 2016). Our theory predicts that probabilistic price promotions should be most effective when the pain of paying is highest. Because the pain of paying is greater when paying in cash or with debit cards than with credit cards (Prelec and Loewenstein 1998; Soman 2003; Shah et al. 2016), we predicted that shoppers paying in cash or with debit cards should spend more when assigned the probabilistic than the fixed promotion. Shoppers paying with credit cards should be less sensitive to the promotion they were assigned.

Method

Participants. Store employees who were blind to the hypotheses recruited 198 grocery store shoppers at the store entrance in alternating 15-minute blocks between 4pm and 6pm on four weekdays within a single week. All shoppers entering the store received one of two promotions, except for shoppers entering during 5-minute breaks between each promotional block. They received no promotion.

Procedure. At the store entrance, an employee handed each participating shopper a coupon for a 1% probabilistic price promotion or a 1% fixed price promotion. In the probabilistic price promotion condition, each shopper had a 1% chance to receive her entire purchase for free. These participants were told that a 100-sided die would be rolled at checkout. As in experiment 1, if they rolled the date of the experiment, they would pay $0. If they rolled any other number, they would pay the full price. In the fixed price promotion condition, participants were guaranteed a fixed 1% discount off their entire purchase at checkout. As in experiment 1, basket size and payment method of each shopper was recorded at checkout.

Results

Of the 198 shoppers recruited, 11% paid with cash, 35% paid with a debit card, and 53% paid with a credit card. Two food stamp benefit users (1%) were excluded from the analyses, resulting in a final sample of 196 participants. Price promotions were distributed evenly across cash and debit card users and credit card users ($\chi^2(1) = .15, p = .70$); 49% of cash and debit card users and 47% of credit card users received a 1% probabilistic price promotion. The remainder received a 1% fixed promotion.

Because basket size failed a normality assumption with a skewness of 1.77 (SE = .17) and kurtosis of 4.26 (SE = .35), each consumer's basket size was logarithmically transformed before all subsequent analyses were performed, which reduced the right skew of the data (skewness = −.76, SE = .17; kurtosis = 1.40, SE = .35). For ease of interpretation, however, we report untransformed mean values and standard deviations (for all raw means, see fig. 1).

We submitted log basket size to a 2 (price promotion: probabilistic, fixed) × 2 (payment method: cash or debit card, credit card) between-subjects ANOVA, which revealed a marginally significant main effect of price promotion ($F(1, 192) = 3.51$, $p = .06$) and a significant main effect of payment method ($F(1, 192) = 7.17$, $p < .01$). More important, as predicted, it revealed a significant price promotion × payment method interaction ($F(1, 192) = 7.41$, $p < .01$). Planned comparisons revealed that cash and debit card users in the probabilistic price promotion condition spent 54% more in their shopping trip ($M = \$33.38$, SD = 26.72) than did cash and debit card users in the fixed price promotion condition ($M = \$21.64$, SD = 23.02; $t(89) = 2.66$, $p < .01$). By contrast, credit card users in the probabilistic price promotion condition did not spend more ($M = \$32.47$, SD = 25.69) than did credit card users in the fixed price promotion condition ($M = \$30.20$, SD = 21.75; $t(103) = .77$, $p = .45$).

Discussion

A small probabilistic price promotion more effectively stimulated spending than did comparable fixed price promotion, but only for payment methods inducing a high pain of paying. Shoppers paying in cash or with debit cards spent 54% more in their shopping trip when given a probabilistic than a fixed price promotion of equal value. Moreover, the former spent as much as did shoppers paying with credit cards. By contrast, shoppers paying with credit cards did not spend more when assigned to either price promotion. Of course, on average, shoppers paying with credit cards spent more than shoppers paying in cash or with debit cards, but this particular effect might have been due to selection bias (e.g., shoppers who made larger purchases may not have had enough cash on hand, or money in their checking account, to pay in cash or with a debit card).

Figure 1. Cash and debit cards users, for whom the pain of paying was more salient, spent significantly more in their shopping trip when assigned a 1% probabilistic price promotion than a 1% fixed price promotion. Credit cards users, for whom the pain of paying was less salient, spent a similar amount in their shopping trip whether they were assigned the 1% probabilistic price promotion or the 1% fixed price promotion (experiment 2).

EXPERIMENT 3: PRICE PROMOTION EQUIVALENCY

In experiment 3, we tested how pain of paying influenced the size of the fixed price promotion that would match the appeal of a small probabilistic price promotion. All shoppers indicated their preferences between fixed price promotions varying in depth from 1% off to 30% off and a 1% probabilistic price promotion. We exogenously manipulated the salience of pain of paying by randomizing whether their promotion preferences were elicited before or after shoppers estimated their mean basket size (i.e., low and high salience, respectively). We endogenously manipulated pain of paying by observing the payment method that shoppers planned to use (i.e., cash and debit cards or credit cards; Soman 2003; Shah et al. 2016).

To examine how indifference points were affected by pain of paying, we compared the lowest promotion level (x%) at which a fixed price promotion was preferred to a 1% probabilistic price promotion for each of the four groups. We predicted that shoppers paying with cash or debit cards would require a higher fixed price promotion level to switch after estimating their basket size than before estimating it ($x\%_{after} > x\%_{before}$), because the pain of paying would be more salient. By contrast, we predicted that shoppers using credit cards would be less sensitive to the timing of their preference elicitation ($x\%_{after} \approx x\%_{before}$). An advantage of this method is that it allowed us to control for endogeneity between preference for promotions and basket size. We also asked shoppers to report their income level, and included it in the analyses as a control for potential differences in liquidity constraints affecting shoppers using different payment methods.

Method

Participants. We recruited 157 grocery shoppers between 4pm and 6pm on three weekdays in a single week to participate in a "price promotion survey" at the store entrance.

Procedure. Participants were informed that the grocery store was interested in customer preferences for price promotions. In one of two orders, shoppers estimated their average basket size and indicated their preferences between seven pairs of price promotions, with each pair consisting of a 1% probabilistic promotion and an *x*% fixed promotion, where *x*% ranged in depth from 1% to 30%.

In the low salience condition, shoppers first indicated their preferred option in each of the seven pairs of price promotions. For each choice pair, they indicated whether they would prefer a probabilistic price promotion ("1% chance to get your entire purchase for free") or a fixed price promotion ("*x*% off your entire purchase"). The probabilistic price promotion was always a 1% chance of paying $0 for their total basket. The fixed price promotion was manipulated within-subjects at seven levels (i.e., $x = 1\%$, 5%, 10%, 15%, 20%, 25%, or 30%), presented in random order. Next, shoppers estimated their average basket size for trips to the grocer in an open-ended format (in USD) and indicated the method of payment they planned to use in this shopping trip.

In the high salience condition, shoppers completed these two in the reverse order. They first estimated their average basket size, indicated their method of payment, and indicated their preferences between the probabilistic and fixed promotions. At the end of the experiment, shoppers indicated their annual income by using a 7-point categorical scale (see Results and Discussion for scale labels).

Results and Discussion

Of the 157 shoppers, 9% paid in cash, 41% with a debit card, and 48% paid with a credit card. Three shoppers (2%) failed to specify their payment method and were excluded from all subsequent analyses. With regards to annual income, 7% of shoppers had an annual income of $0–$15,000, 14% had an annual income of $15,000–$35,000, 18% had an annual income of $35,000–$50,000, 20% had an annual income of $50,000–$75,000, 15% had an annual income of $75,000–100,000, 10% had an annual income of $100,000–$150,000, and 13% had an annual income more than $150,000; 3% did not specify their annual income.

We used the smallest fixed price promotion (*x*%) that shoppers preferred to the 1% probabilistic price promotion to calculate preferences for the probabilistic price promotion. No value could be precisely identified for six participants who preferred the 1% probabilistic price promotion in all seven choice sets; they were (conservatively) excluded from subsequent analyses.

We examined the influence of pain of paying on preferences for the probabilistic promotion in a 2 (salience: low, high) × 2 (payment method: cash or debit card, credit card) ANOVA, which revealed no significant main effects of salience or payment method (all $F < 1$, all $p \geq .47$). More important, the analyses revealed a significant salience × payment method interaction ($F(1, 144) = 4.65$, $p < .05$). As predicted, planned comparisons revealed that cash and debit card users were willing to forgo a larger fixed price promotion to receive the probabilistic promotion when the salience of pain of paying was high (median = 10%; $M = 8.32\%$, $SD = 4.43$) than low (median = 5%; $M = 6.50\%$, $SD = 3.35$; $t(72) = 2.01$, $p < .05$). By contrast, shoppers paying with credit cards were unwilling to forgo a larger fixed promotion whether the salience of the pain of paying was high (median = 5%; $M = 7.16\%$, $SD = 4.75$) or low (median = 5%; $M = 8.83\%$, $SD = 6.69$; $t(72) = 1.25$, $p = .22$). It is worthwhile to note that this interaction remained significant if we included basket size and income level as covariates, ANCOVA ($F(1, 141) = 4.15$, $p = .04$), but again, no significant main effects were observed (all $F \leq 1$, all $p \geq .36$). Neither estimated basket size or income level was a significant covariate (all $F(1, 141) \leq 1.72$, all $p \geq .19$).

In short, when the promotion level of probabilistic and fixed promotions was 1%, most participants again preferred a small probabilistic price promotion to a comparable fixed price promotion. The attractiveness of the probabilistic price promotion only increased when the salience of the pain of paying was high—among cash and debit card users first reminded of how much they were about to spend. The results provide further support for our hypothesis that small probabilistic price promotions are attractive and efficacious because of the relief they provide from the pain of paying.

EXPERIMENT 4: PRICE PROMOTION PAIN REDUCTION

In our final experiment, we directly tested the efficacy of small probabilistic and fixed price promotions in reducing the pain of paying for groceries. Participants in an online panel reported the average basket size of a shopping trip at their preferred grocer. We exogenously manipulated whether they considered how much pain of paying they would feel when paying for groceries if they received a 1% probabilistic price promotion or a 1% fixed price promotion. We endogenously manipulated sensitivity to pain of paying by measuring their score on the spendthrift-tightwad scale (ST-TW; Rick et al. 2008). As tightwads are more sensitive than spendthrifts to pain of paying, we predicted that the relative advantage of probabilistic promotions in reducing pain of paying would be larger for tightwads than for spendthrifts.

Method

Participants. We requested 200 workers from Amazon Mechanical Turk; 200 participants (41% female; $M_{age} = 35.36$ years, SD = 10.75) completed the experiment. No participant who completed the experiment was excluded.

Procedure. All participants first reported the name of the store where they most regularly purchase groceries. They then estimated the average basket size ($USD) of each of their trips to that grocer.

Participants were then randomly assigned, between-subjects, to a fixed price promotion or probabilistic price promotion condition. Each participant imagined that a store employee handed her a coupon upon entering the store. In the probabilistic price promotion condition, the coupon gave her a 1% chance to receive her entire basket for free (i.e., "1% chance to get your entire purchase for free"). In the fixed price promotion condition, the coupon guaranteed her a 1% discount off her entire basket (i.e., "1% off your entire purchase").

Next, we used an established scale of pain of paying (Thomas et al. 2011; Soster et al. 2014) to directly measure the pain of paying associated with that shopping trip, "Sometimes, a promotional campaign can influence how consumers feel about spending money. How would you feel about spending money on this shopping trip?" Participants responded on a 5-point scale, with lower values indicating greater negative affect, the midpoint indicating neutral affect, and higher values indicating more positive affect (i.e., 1 = ☹; 3 = 😐; 5 = ☺). Finally, participants completed the four-item ST-TW scale (Rick et al. 2008). Note that higher values of the ST-TW scale indicate lower sensitivity to pain of paying.

Results

We regressed pain of paying for the shopping trip on price promotion (0 = fixed, 1 = probabilistic price promotion), ST-TW score, and their interaction. The regression revealed a positive main effect of probabilistic price promotion ($\beta = .83$, $p < .01$), and a positive main effect of ST-TW score ($\beta = .50$, $p < .001$). More important, there was a significant price promotion × ST-TW score interaction ($\beta = -.55$, $p < .05$).

As depicted in figure 2, a floodlight analysis revealed that the probabilistic price promotion was more effective than the fixed promotion at reducing the pain of paying for groceries for ST-TW scores below the Johnson-Neyman point of 18.69. This point is of importance. It lies almost exactly at the threshold at which Rick et al. (2008) classify consumers as spendthrifts (i.e., ST-TW scores ≥ 19). Put differently, for participants sensitive to the pain of paying, the probabilistic price promotion more effectively reduced the pain of paying for groceries than did the fixed price promotion. However, among spendthrifts who are less sensitive to pain of paying, the pain of paying for groceries did not differ between promotion conditions. Average basket size was not a significant predictor of pain of paying ($M = \$134.80$, SD = 252.05; $p = .24$), but the results do hold when controlling for it.

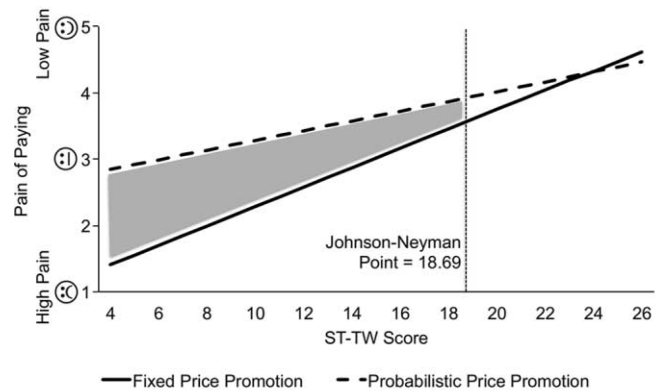

Figure 2. A 1% probabilistic price promotion was more effective than a 1% fixed price promotion at reducing the pain of paying for groceries among those more sensitive to pain of paying (i.e., participants with lower ST-TW scores). By contrast, both promotions were similarly effective at reducing the pain of paying for groceries among those less sensitive to the pain of paying (i.e., participants with higher ST-TW scores; experiment 4). Note that tightwad scores range from 4 to 11, "unconflicted" consumer scores range from 12 to 18, and spendthrift scores range from 19 to 26 (Rick et al. 2008).

Discussion

Experiment 4 provides direct evidence that small probabilistic price promotions are appealing and effective because they provide relief from the pain of paying. A small probabilistic price promotion effectively reduced the pain of paying for all participants, and was relatively more effective than a comparable fixed price promotion for participants who were more sensitive to the pain of paying.

While this research focuses on small probabilistic promotions, and we use fixed promotions as a normative benchmark, a reasonable question for marketing strategy is whether small fixed promotions also stimulate spending by reducing the pain of paying. Small fixed rewards can sometimes have no hedonic impact if they fall beneath a minimum perceptual threshold (e.g., Morewedge et al. 2007). This question could not be answered by the data from experiment 2, where we could only observe the relative ability of fixed rewards to stimulate spending by comparison to probabilistic promotions. Because there was no control condition, we could not observe the absolute ability of small fixed promotions to stimulate spending (i.e., relative to no promotion). The structure of the pain-of-paying scale in experiment 4, however, allows its results to provide some insight into this question. The effectiveness of the 1% fixed price promotion depended considerably on individual differences in susceptibility to pain of paying, but the overall condition mean ($M = 3.03$; SD $= 1.07$) was not significantly different from the neutral point on the pain-of-paying scale (i.e., 3.0; $t(97) = .28$, $p = .78$). In other words, while the 1% fixed promotion did not make paying for groceries a pleasurable experience, for most consumers, it did appear to nullify the pain of paying for their groceries.

GENERAL DISCUSSION

Small probabilistic price promotions are attractive and effective because they reduce the pain of paying associated with promoted goods. In three field experiments with shoppers at a grocery store, we compared the attractiveness and efficacy of small probabilistic and fixed price promotions. The salience of pain of paying moderated the appeal and effectiveness of price promotions, and their performance relative to fixed promotions. In experiments 1 and 3, probabilistic price promotions were more attractive than comparable fixed price promotions when the pain of paying was salient due to payment method (i.e., cash or debit cards) and elicitation timing (e.g., at checkout).

In experiment 2, we found that a 1% probabilistic price promotion more effectively stimulated spending than a 1% fixed price promotion for shoppers paying in cash or with debit cards. The efficacy of the probabilistic promotion among this group was substantial. Shoppers paying with cash or debit cards who received the probabilistic price promotion spent 54% more than did those who received the fixed price promotion and spent as much as did shoppers who paid with credit cards assigned either promotion. By contrast, neither promotion was more effective at stimulating spending among shoppers paying with credit cards.

In experiment 4, with an online sample, we directly tested the efficacy of a 1% probabilistic price promotion at reducing the pain of paying associated with the purchase of groceries and compared its efficacy to that of a 1% fixed price promotion. The probabilistic price promotion effectively reduced the pain of paying for all participants and was more effective than the fixed promotion for participants who were sensitive to pain of paying.

It is important to note that probabilistic promotions do not appear to change consumer sensitivity to pain of paying, induce a reward or risk-seeking motive (e.g., Wadhwa, Shiv, and Nowlis 2008) or an affective mind-set in which consumers use a different processing style to evaluate promotions (e.g., Hsee and Rottenstreich 2004; Chang and Pham 2018). Put differently, probabilistic promotions did not prompt consumers to base their evaluations more on feelings than did fixed promotions, nor did they lead consumers to entirely ignore the pain of paying. If that were true, we would only expect to observe a main effect of promotion type (i.e., fixed vs. probabilistic) on the attractiveness and efficacy of promotions. The attractiveness of probabilistic and fixed promotions should not have depended on context, payment method, or individual differences between consumers. By contrast, we observed interactions with a variety of contextual and consumer-related variables that manipulated of the salience of pain of paying in all of our studies. The presence of these interactions suggests that when the pain of paying is amplified, the greater efficacy of probabilistic promotions at reducing pain of paying becomes clearer, because the degree to which probabilistic and fixed promotions reduce pain of paying becomes more differentiated.

Our findings make a theoretical contribution by demonstrating a novel affective determinant of the attractiveness and efficacy of price promotions. Since the probabilistic and fixed price promotions used in our experiments had the same expected value (i.e., a 1% reduction), their effects on acquisition value and transaction value should be equivalent. Yet small probabilistic promotions were more appealing and effective in stimulating spending. Moreover, their appeal and efficacy was modulated by canonical manipulations of the pain of paying including payment method, timing, and sensitivity to pain of paying. Together, the results show that the value of price promotions is not only determined by their impact on acquisition utility and transaction utility. It is also affected by the extent to which they reduce the pain of paying.

Because participants in our field experiments selected their own payment methods, it is important that we acknowledge several important caveats. Factors other than the pain of paying differ across cash, debit, and credit card payments and users. These may have influenced the direction or magnitude of the effects. Shoppers paying in cash or with debit cards may have been more subject to liquidity constraints, lower income, tighter budget constraints, or may have been explicitly attempting to regulate their spending. Indeed, we did not observe differences in basket sizes among the four conditions in experiment 1, where our theory would suggest that a promotion should increase basket size among the cash and debit cards users who selected the probabilistic promotion at the store entrance. This is likely to reflect insufficient statistical power to detect an effect with such a small sample ($n = 13$; Cohen 1992) but may also be a result of a selection effect as well. While payment methods were manipulated in conjunction with other randomly assigned manipulations of pain of paying (e.g., elicitation timing), it would be good for future research to examine this question in contexts where payment method can be randomly assigned. Given the efficacy of probabilistic promotions demonstrated in experiment 2, it is also interesting to consider whether shoppers in experiments 1 and 3 who preferred fixed promotions chose promotions to constrain their spending. Experiment 4 demonstrates that consumers are aware of the relief that probabilistic promotions can provide from the pain of paying. Perhaps consumers strategically avoid probabilistic promotions when attempting to rein in discretionary spending.

An interesting theoretical question for future research is to chart whether pain of paying is a unique contributor to the total utility garnered from price promotions, or if it takes an established path in its contribution. Price is a central component of both acquisition utility (i.e., price-quality trade-off) and transaction utility (Grewal et al. 1998). It is possible that pain of paying affects both the calculation of acquisition utility and the benefits received from transaction utility. Alternatively, the affective component of transaction utility is generally characterized as an increase in positive affect rather than as a reduction in negative affect (e.g., the pleasure of getting a deal). Thus, a reduction in the pain of paying associated with a product may only contribute to its acquisition utility. Indeed, this latter possibility is further supported by the role that pain of paying plays in the facilitation of self-control, counterbalancing rather than facilitating spending (Prelec and Loewenstein 1998; Soman 2001, 2003; Thomas et al. 2011). Given the importance of price promotions to marketing theory and strategy, we think parsing the route by which pain of paying influences the total utility associated with a promoted good is a worthwhile future question to examine.

A practical implication of the results for marketing strategy is its identification of when and for whom probabilistic promotions are most valuable. Our findings suggest that probabilistic promotions are likely to be particularly effective for consumers most acutely affected by the pain of paying, whether due to payment timing (e.g., Prelec and Loewenstein 1998), payment method (e.g., Soman 2003; Shah et al. 2016), budget constraints (e.g., Morewedge et al. 2007; Soster et al. 2014), or individual differences in sensitivity to pain of paying (Rick et al. 2008). A second implication for marketing strategy is insight into maximizing the effectiveness of small price promotions when allocating marketing budgets. Companies perceive a need to offer large discounts in order to stimulate demand among discount-insensitive consumers, which consume a considerable portion of marketing budgets. Our results suggest that even small probabilistic price promotions may efficiently stimulate demand more than comparable and even larger and more costly fixed promotions, particularly for segments and circumstances in which the pain of paying is likely to be high. Of course, there are likely to be boundary effects on the greater efficacy of probabilistic than comparable fixed price promotions as promotion levels increase in size. We explored these in an ancillary experiment ($N = 202$) in which participants from an online panel estimated their average basket size for trips to their local grocer and then indicated how a price promotion offered during their next trip would affect the pain of paying by using the same 5-point scale as in experiment 4. In a between-subjects design, we randomly assigned them to consider one of four price promotions, either a 1% or 5% promotion that was fixed or probabilistic.

As before, we found that people assigned a 1% probabilistic price promotion anticipated less pain of paying than those assigned a 1% fixed price promotion. We also found that participants assigned a 5% fixed price promotion anticipated less pain of paying than did those assigned a 1% fixed price promotion. However, the pain of paying did not differ between participants assigned a 1% or 5% probabilistic price promotion, and as promotion levels increased to 5%, the difference in pain of paying between fixed and probabilistic promotions converged. We did not modulate pain of paying in this experiment, and probabilistic promotions were again effective at reducing pain of paying. Yet these results suggest that the cases in which probabilistic price promotions stimulate spending more than fixed price promotions may be limited to cases in which promotions levels are shallow (cf. Mazar et al. 2017). A detailed description of the method, analyses, and statistics appears in the appendix (available online).

One potential benefit of probabilistic price promotions left for future research is their ability to sustain future purchase intentions. Traditional fixed price promotions can lower internal reference prices for the promoted products (Grewal et al. 1998), the sensitivity of consumers to price reductions (Inman, McAlister, and Hoyer 1990), and their evaluations of product quality (Shiv, Carmon, and Ariely 2005). Consumers may be less likely to draw negative inferences about the price and value of the product from probabilistic price promotions because the price of the good—if consumers do not "win"—remains the same.

Conclusion

We find that even very small probabilistic price promotions can be attractive and effective. Their value to consumers is derived from their ability to reduce the pain of paying for promoted goods, even more so than comparable fixed price promotions. Our results yield practical insights for marketing strategy and identify a unique, emotional mechanism through which price promotion increases the total utility of promoted goods. In addition to increasing acquisition and transaction utility, pain of paying reduction appears to be a third route through which price promotions create value for consumers.

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