Ritesh Saini, Raghunath Singh Rao, & Ashwani Monga

Is That Deal Worth My Time? The Interactive Effect of Relative and Referent Thinking on Willingness to Seek a Bargain

Prior research on relative thinking has suggested that the willingness to seek a bargain depends not only on the absolute value of the bargain but also on the price of the product. For example, a discount of $10 seems more appealing on a product whose regular price is $20 than a product whose regular price is $60. By invoking the interactive role of consumers' reference prices, the authors delineate the specific conditions under which the same $10 discount can seem less appealing when the price is $20 than when it is $60. They present a formal model that simultaneously incorporates the effects of relative and referent thinking and yields novel predictions, which are supported in four laboratory experiments. Their results reveal that deviation from the reference price determines when relative thinking holds and when it gets reversed. Specifically, the relative-thinking effect holds when the actual price is the same as expected, it reverses when the actual price deviates from the expected price, but it emerges again when deviation from the expected price becomes extreme. The authors conclude with the theoretical and managerial implications of their findings for marketing activities, such as the allocation of sales promotion budgets.

Keywords: behavioral decision theory, sales promotions, consumer behavior

Consumers love bargains. The possibility of cheaper products urges people to drive to far-away outlet malls, the prospect of getting a discount makes them clip and save coupons, and the promise of instant savings at the time of purchase is reason enough to sign up for the store-specific credit card. How far are consumers willing to go for such bargains? Consider an example of two stores: Store A sells a shirt for $20, but Store B sells the same shirt for $10. Would a consumer shopping in Store A be willing to take a five-minute drive to Store B to save $10 on the $20 shirt? Furthermore, would the consumer take a five-minute drive to save $10 on a $60 shirt? Although traditional economic theories suggest that consumers should base their decision on how much they value the benefit of $10 versus the cost of a five-minute drive (Stigler 1987), behavioral research suggests that people demonstrate relative thinking; a $10 saving is more appealing on a price of $20 than on a price of $60 (Azar 2007; Thaler 1980; Tversky and Kahneman 1981). We employ a combination of analytical modeling and laboratory experimentation to delineate the conditions under which relative thinking can reverse.

From a theoretical standpoint, we help better understand the factors that determine the effectiveness of bargains, such as price promotions (Blattberg, Briesch, and Fox 1995). It is well known that the perception of a price depends on the price a consumer expects to pay—the internal reference price (Grewal, Monroe, and Krishnan 1998; Kalyanaram and Winer 1995; Winer 1986; for a recent review, see Mazumdar, Raj, and Sinha 2005). If reference prices change price perceptions, can they also influence the relative thinking of bargains offered on those prices? To understand this, we develop an analytical model that simultaneously incorporates the effects of relative and referent thinking into the prospect theory value function (Kahneman and Tversky 1979). We show that deviation of the actual price (on which the bargain is offered) from the reference price determines when relative thinking holds and when it gets reversed. Relative thinking emerges when the actual price is the same as the reference price; consumers become more willing to seek a bargain on a product that is priced low than on a product that is priced high. A complete reversal occurs when the actual price deviates from the reference price; consumers become less willing to seek a bargain on a product that is priced low than on a product that is priced high.

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Finally, when discrepancy from the reference price becomes extreme, the relative-thinking effect emerges yet again.

Our findings have direct relevance for marketers who implement bargains, such as giving a few cents off or providing "freebies" of specific monetary value. We provide new insights into how willingness to seek such bargains changes with the price of the product. The suggestion from research on relative thinking is to increase the impact of a sales promotion by offering it on a cheap rather than an expensive product. That is, given a fixed sales promotion budget aimed at increasing store traffic, a manager should apply discounts to low-priced rather than high-priced products. Indeed, that is what managers usually do when they offer heavily discounted "loss leaders" to entice customers into the store so that they might consider the more expensive "big-ticket" items. In this article, we identify several situations in which managers should do the opposite—that is, apply discounts on high-priced rather than low-priced products.

We delve deeper into the theoretical and managerial implications in our "General Discussion" section. However, we begin with an overview of relative and referent thinking. Then, following a research style of relying on multiple approaches (Geylani, Inman, and Ter Hofstede 2008), we combine mathematical analysis with behavioral studies. Specifically, we derive cause–effect relationships from an analytical model that formalizes the competing effects of relative and referent thinking and experimentally test whether consumers behave in accordance with our predictions.

Relative Thinking

The notion of relative thinking seeped into the marketing literature in terms of Weber's law: "A person can discriminate between two intensities of a physical stimulus only in proportion to the intensity of the stimulus itself, but not in absolute amounts" (Miller 1962, p. 57). Miller (1962) offered some evidence that suggested that this law also holds for pricing, such as retailers' perceptions that discounts need to be at least 20% of the original price to be effective. Others (Gabor and Granger 1964) also suggested the idea that consumers react to relative rather than absolute price changes, and it soon permeated into textbooks of consumer behavior (Engel, Kollat, and Blackwell 1968; Myers and Reynolds 1967). Soon after, Kamen and Toman (1970) showed that a price differential between brands could become more important at higher prices, offering this as evidence against Weber's law. Although their article evoked understandable criticism on both theoretical and empirical grounds (Gabor, Granger, and Sowter 1971; Monroe 1971), we find Kamen and Toman's (1970) intuition useful. With the benefit of new theories in the four decades since their article—prospect theory (Kahneman and Tversky 1979), relative thinking (Thaler 1980), and reference prices (Winer 1986)—we now offer a more comprehensive analysis. We find that relative thinking is not influenced simply by a change in price levels (Kamen and Toman 1970) but rather by whether and how prices deviate from a reference point.

The conceptualization of relative thinking, which was dominated by Weber's law until the 1970s, was refined after the advent of Kahneman and Tversky's (1979) prospect theory. Thaler (1980) interpreted relative thinking in terms of the prospect theory value function. He argued that because the loss portion of the function is convex, people exhibit diminishing sensitivity such that they are more sensitive to a saving of $5 if it is realized on a small loss (expenditure of $25 on a radio) than if it is realized on a large one (expenditure of $500 on a television). Tversky and Kahneman (1981) demonstrated this effect using hypothetical scenarios in which a jacket and a calculator were being purchased. Keeping the total expenditure on the two items constant, they found that participants expressed greater willingness to drive 20 minutes to save $5 on the calculator when it was priced at $15 than when it was priced at $125. In terms of mental accounting (Kahneman and Tversky 1984), people do not rely on a minimal account (i.e., absolute dollar saving) or a comprehensive account (i.e., saving over total expenditure). Instead, they focus on relative savings over the focal product, thus relying on a topical account (i.e., saving over the price of the calculator). The evidence in favor of relative thinking is conclusive (Azar 2007); this effect has been replicated in different settings with different types of participants (Mowen and Mowen 1986; Ranyard and Abdel-Nabi 1993). However, boundary conditions do exist. For example, relative thinking diminishes when the level of absolute saving is high (Moon, Keasey, and Duxbury 1999), when the percentage saving is small (Darke and Freedman 1993), or when it is difficult to evaluate the value of a sales promotion in relation to the focal product or its price (Nunes and Park 2003). In such cases, relative thinking decreases, and people rely on absolute thinking to make decisions. We add to this discussion on the limits of relative thinking. However, rather than focusing on how relative thinking can diminish and give way to absolute thinking, we explore the conditions in which it reverses because of referent thinking.

Referent Thinking

Prospect theory suggests that referent thinking plays a critical role when choices are made under uncertainty (Kahneman and Tversky 1979) and even when choices are riskless (Tversky and Kahneman 1991). The essence of the prospect theory value function is that carriers of value are not absolute states but rather are the gains and losses that occur relative to a reference point. Moreover, losses loom larger than corresponding gains (i.e., loss aversion), though the marginal value of both decreases with their size (i.e., diminishing sensitivity). This produces an asymmetric S-shaped value function, concave for the gains portion (which is above the reference point) and convex for the losses portion (which is below the reference point).

The notion that people think in terms of reference points has been adopted by pricing scholars in terms of a reference price (Hardie, Johnson, and Fader 1993; Monroe 2003; Winer 1986). That is, consumers evaluate actual prices by comparing them with an internal reference price—an expected price from memory—above which prices are typi-

cally judged as high and below which they are judged as low. These price expectations are usually based on knowledge about past prices of products (Kalwani et al. 1990). Drawing empirical generalizations from the extensive literature on reference prices, Kalyanaram and Winer (1995) report that the internal reference price has a consistent and statistically significant impact on consumer demand and that, consistent with prospect theory, consumers react more strongly to price increases from a reference point (i.e., losses) than to price decreases (i.e., gains).

Given that consumers usually have internal reference prices for products and that these prices have important implications for consumer demand, it is important to consider their impact on relative thinking. Note that relative thinking implicitly relies on external reference points, such as the product price suggested by a seller or even the reference point of zero expenditure. What has not been studied, however, is how relative thinking might be influenced by a person's internal reference price—the price he or she expects to pay. This is the focus of this article.

Joint Effects of Relative and Referent Thinking

We develop an analytical model in which we incorporate the notions of reference price (Winer 1986) and relative thinking (Thaler 1980) simultaneously into the prospect theory value function (Kahneman and Tversky 1979; Tversky and Kahneman 1992). Referent thinking is related to the concepts of loss aversion and diminishing sensitivity. In our model, loss aversion implies that the impact of a fixed dollar saving will be greater if the actual price is higher than the reference price (i.e., the saving attenuates a loss) rather than lower (i.e., the saving enhances a gain), whereas diminishing sensitivity implies that the impact of a fixed dollar saving will diminish when deviation of the actual price from the reference price increases. Conversely, relative thinking is related only to the concept of diminishing sensitivity without any consideration of the reference price. That is, the impact of a fixed dollar saving will diminish when the actual price increases. The following example illustrates the joint effects of relative and referent thinking.

Consider a consumer who has a reference (i.e., expected) price of $40 for a product. If the consumer finds the actual price to be $60, prospect theory suggests that he or she will experience a loss. If the consumer finds the actual price to be $20, he or she will experience a gain. Consequently, a saving (e.g., $10) will be perceived as attenuation of a loss in the case of $60 but as enhancement of a gain in the case of $20. Because the loss portion of the value function is steeper than the gains portion, referent thinking suggests that the saving will be perceived as more attractive when the actual price is $60 than when it is $20. In contrast, relative thinking suggests that the saving will be perceived as less attractive when the actual price is $60 than when it is $20. We argue that the degree of deviation from the reference price determines which effect dominates. Specifically, if there is no deviation of actual price from the reference price, there is no effect of referent thinking, and the attractiveness of a saving is simply determined by its relative value with respect to the actual price. However, as actual price deviates from a reference price, the strength of both relative and referent thinking changes with it. The outcome of this dynamic is that, at moderate deviations, referent thinking dominates, thus reversing the relative-thinking effect. As the deviation becomes extreme, relative thinking reemerges again. We now formalize these effects.

Model

To better understand consumers' marketplace behavior, recent literature has considered reference utility, which is emphasized by prospect theory, in conjunction with consumption utility, which is emphasized by traditional economic models (Koszegi and Rabin 2006; Sugden 2003). Similar to Koszegi and Rabin (2006), we formulate a person's utility from a transaction in terms of the utility associated with the receipt of a good and the (dis)utility associated with the payment in money, with each utility further consisting of two utilities, consumption and reference:

$$(1)\quad u(q, p|q_r, p_r) = \underbrace{m_q(q) + v_q(q|q_r)}_{\text{Utility for receipt of good}} + \underbrace{m_p(p) + v_p(p|p_r)}_{\text{Utility for payment}}.$$

In Equation 1, m(.) represents the consumption utility that depends only on the outcome, whereas v(.) represents the reference utility that depends on the deviation from the reference level. Our focus is on the purchase decision of a specific product that has a given quality level but exhibits variation in prices. Thus, a consumer's choice would primarily be based on his or her valuation of the prices, which can be written as follows:

$$(2)\quad u(p|p_r) = m(p) + v(p|p_r).$$

The model considers a representative consumer who has an internal reference price, which is the expected price he or she has in mind, when visiting Store 1. Because the expected price is based on knowledge gained over time about product prices (Kalwani et al. 1990), we assume that it is stable and does not change when actual prices are observed at Store 1. However, the consumer observes the discrepancy, if any, between expected and actual price. Furthermore, when the consumer finds out the actual price at Store 1, he or she also becomes aware that another store (Store 2) is offering a monetary bargain on the same product, such as a few cents off or a free product of a specified dollar value. We model a scenario of two stores to fix the idea that a specific cost must be incurred to get a bargain. This cost is a loss in utility, which could arise, for example, from needing to drive from one store to another or to clip and save coupons. Our analysis examines the probability of a consumer incurring a cost to go to Store 2 to get a saving.

Consider that the consumer goes to Store 1 with a reference price, denoted by $p_r > 0$. Arriving at the store, the consumer sees the actual posted price, denoted by $p_a > 0$, which could be either the same as the reference price or different. This actual price can be denoted as $p_a = p_r + a$, where "a" denotes the deviation from the reference price. Thus, if $a > 0$, the item is selling at a higher-than-expected price. If $a \leq 0$, it is selling at a lower-than-expected or expected price.

Following Equation 2, we write the overall utility for the consumer if he or she buys at Store 1 as follows:

$$u(a, p_r) = m(p_a) + v(a). \quad (3)$$

We formulate the first term $m(p_a)$ in such a way that it exhibits the diminishing sensitivity characteristic of relative thinking. That is, a saving of $5 has a stronger influence on prices that are small than on those that are large; in other words, paying $495 is less painful than paying $500, but paying $20 is a lot less painful than paying $25 (Thaler 1980). We formulate the second term v(a) so that it incorporates the referent-thinking properties of the prospect theory value function. It strictly increases and exhibits loss aversion as well as diminishing sensitivity that is dictated by a reference point (Kahneman and Tversky 1979; Tversky and Kahneman 1992). We use the following parametric formulations for relative-thinking and referent-thinking utilities:

$$m(p_a) = -(p_r + a)^{\beta}, \text{ and} \quad (4a)$$

$$v(a) = \begin{cases} (|a|)^{\alpha} & \text{for } a \le 0 \\ -\lambda(|a|)^{\beta} & \text{for } a > 0 \end{cases}. \quad (4b)$$

In Equation 4a, in line with Thaler (1980), the price enters as a disutility in the value, and $0 < \beta < 1$ captures the diminishing sensitivity to marginal utility. In Equation 4b, in line with Tversky and Kahneman (1992), $a \le 0$ implies that $p_a \le p_r$ and thus is coded as a gain, while $a > 0$ implies that $p_a > p_r$ and thus is coded as a loss. Note that only the deviations from the reference price enter Equation 4b. Furthermore, $0 < \alpha \le \beta < 1$ captures the diminishing sensitivities associated with the value function, and $\lambda > 1$ is the loss aversion coefficient. Note that the diminishing sensitivity of price in $m(p_a)$, denoted by β, is the same as that of the loss domain in v(a) because prior research related to relative thinking has conceptualized the expenditure on a product as a loss in terms of the prospect theory value function (Thaler 1980).

Following Equations 4a and 4b, we write the overall utility associated with a purchase involving an actual price payment of p_a at Store 1 as follows:

$$u_1(a, p_r) = \begin{cases} -(p_r - |a|)^{\beta} + (|a|)^{\alpha} & \text{for } a \le 0 \\ -(p_r + |a|)^{\beta} - \lambda(|a|)^{\beta} & \text{for } a > 0 \end{cases}. \quad (5)$$

The consumer also has the option to go to Store 2 by incurring a cost (i.e., loss in utility), denoted by $c > 0$, which is drawn from a distribution F that has a strictly positive density f over $\Re$. We model the realization of cost to be stochastic to account for contextual factors in which a consumer might find him- or herself, for example, running late for work versus shopping leisurely and to account for consumer heterogeneity (e.g., because of income, consumers might differ in their propensity to incur costs to realize savings). We view the saving (x) to be realized by going to Store 2 as being certain. As we show separately, however, introducing uncertainty does not change our results (see the Web Appendix, Section A, at http://www.marketingpower.com/jmjan10). Moreover, we consider the saving smaller than the deviation from the reference price ($0 < x \le |a|$); a saving does not change the price from being higher than expected at Store 1 to being lower than expected at Store 2. This helps us present the pure case in which Stores 1 and 2 are qualitatively similar insofar as they are both either below the expected price or above it, and there is only a quantitative difference such that Store 2 offers a finite saving. As we show separately, however, the results do not change when $x > a$ (see the Web Appendix, Section B, at http://www.marketingpower.com/jmjan10). For now, we consider a consumer who realizes a saving of x by going to Store 2, so that the price is $p_a - x > 0$, where $0 < x \le |a|$. The overall utility is as follows:

$$u_2(a, p_r, x) = \begin{cases} -(p_r - |a| - x)^{\beta} + (|a| + x)^{\alpha} - c & \text{for } a \le 0 \\ -(p_r + |a| - x)^{\beta} - \lambda(|a| - x)^{\beta} - c & \text{for } a > 0 \end{cases}. \quad (6)$$

In Equation 6, in the domain of gain ($a \le 0$), the saving accrued at Store 2 enhances gains, whereas in the domain of loss ($a > 0$), the saving attenuates losses.

Case of No Deviation from Reference Price

Here, we consider the benchmark case in which the actual prices are the same as expected. Note that a same-as-expected perception depends on a consumer's view rather than numerical equivalence. For example, an actual price of $100.49 is numerically different from a reference price of $100.50, but a consumer is likely to perceive no deviation. The following analysis adopts the perspective of a consumer who perceives no deviation from a reference price (i.e., $a = 0$).

From Equation 5, the utility of a purchase from Store 1 is as follows:

$$u_1(p_r) = -(p_r)^{\beta}. \quad (7a)$$

From Equation 6, the utility of a purchase from Store 2 is as follows:

$$u_2(p_r) = -(p_r - x)^{\beta} + (x)^{\alpha} - c. \quad (7b)$$

So the consumer would purchase from Store 2 if $u_2(p_r) > u_1(p_r)$—that is, if

$$c < (p_r)^{\beta} - (p_r - x)^{\beta} + (x)^{\alpha}.$$

Thus, the probability that the consumer buys from Store 2 is as follows:

$$\Pr(\text{Purchase at Store 2}/a = 0) = F\left\{\left[(p_r)^{\beta} - (p_r - x)^{\beta}\right] + \left[(x)^{\alpha}\right]\right\}. \quad (7c)$$

For a given x in Equation 7c, as p_r goes up, $[(p_r)^{\beta} - (p_r - x)^{\beta}]$ goes down as a result of diminishing sensitivity, and thus the probability of a purchase at Store 2 goes down. In the case under consideration, the reference price (p_r) is the same as the actual price (p_a). This implies that as the actual price goes up, the probability of a purchase at Store 2 goes down. This result reveals the relative-thinking effect and can be formally stated as follows:

P_1: A relative-thinking effect holds when Consumer A observes a low actual price and Consumer B observes a high actual price, but neither consumer perceives a deviation from the reference price. Specifically, the willingness to seek a promotional offer of a specific monetary value is higher for A than for B.

Case of Deviation from Reference Price

Here, we consider the case in which the consumer perceives the actual price as different from what he or she expected (i.e., $a \neq 0$). In line with Equations 5 and 6, if $a \leq 0$—that is, when faced with a lower-than-expected price at Store 1—the customer will go to Store 2 to receive a saving of x if

$$-(p_r - |a| - x)^\beta + (|a| + x)^\alpha - c > -(p_r - |a|)^\beta + (|a|)^\alpha$$

or if

$$c < [(p_r - |a|)^\beta - (p_r - |a| - x)^\beta] + [(|a| + x)^\alpha - (|a|)^\alpha].$$

Thus, if $a \leq 0$, the probability that the consumer will go to Store 2 is as follows:

$$(8)\quad \Pr(\text{Purchase at Store 2}/a \leq 0) = F\Big\{\underbrace{\Big[\big(p_r - |a|\big)^\beta - \big(p_r - |a| - x\big)^\beta\Big]}_{\text{Price Saving}} + \underbrace{\Big[\big(|a| + x\big)^\alpha - \big(|a|\big)^\alpha\Big]}_{\text{Gain Enhancement}}\Big\}.$$

Similarly, following Equations 5 and 6, if $a > 0$—that is, when faced with a higher-than-expected price at Store 1—the customer will go to Store 2 to receive a saving of x if

$$(9)\quad \Pr(\text{Purchase at Store 2} / a > 0) = F\Big\{\underbrace{\Big[\big(p_r + |a|\big)^\beta - \big(p_r + |a| - x\big)^\beta\Big]}_{\text{Price Saving}} + \underbrace{\lambda\Big[\big(|a|\big)^\beta - \big(|a| - x\big)^\beta\Big]}_{\text{Loss Attenuation}}\Big\}.$$

Note that in the domains of both gain (Equation 8) and loss (Equation 9), getting a monetary promotion of x at Store 2 leads to a perception of price saving. However, in the domain of gain, there is an additional benefit of enhancing the gain experienced from finding a lower-than-expected price at Store 1. Similarly, in the domain of loss, there is an additional benefit of attenuating the loss experienced from finding a higher-than-expected price at Store 1. To examine Equations 8 and 9 more closely, we define the following:

- $\Delta_1 \equiv (p_r - |a|)^\beta - (p_r - |a| - x)^\beta$ (price saving in the gain domain),
- $\Delta_2 \equiv (|a| + x)^\alpha - (|a|)^\alpha$ (gain enhancement in the gain domain),
- $\Delta_3 \equiv (p_r + |a|)^\beta - (p_r + |a| - x)^\beta$ (price saving in the loss domain), and
- $\Delta_4 \equiv \lambda[(|a|)^\beta - (|a| - x)^\beta]$ (loss attenuation in the loss domain).

In these expressions, the relative-thinking effect is denoted by $\Delta_1 - \Delta_3$, which captures how the benefit of x leads to different perceptions depending on whether the price at Store 1 is low or high. Conversely, the referent-thinking effect is denoted by $\Delta_4 - \Delta_2$, which captures how the benefit of x leads to different perceptions depending on whether the price at Store 1 is lower or higher than expected.

We now examine a few comparative statics. For every $|a| \leq p_r$ (i.e., a lower-than-expected price never falls below zero), diminishing sensitivity implies that $\Delta_1 \geq \Delta_3$. As $|a|$ goes up, the two prices, $(p_r - |a|)$ and $(p_r + |a|)$, grow farther apart. Formally, $\partial(\Delta_1 - \Delta_3)/\partial|a| > 0$. That is, the relative-thinking effect increases as the difference between prices increases. Conversely, diminishing sensitivity and loss aversion imply that $\Delta_4 \geq \Delta_2$. As $|a|$ goes up, both Δ_2 and Δ_4 go down, but Δ_4 goes down faster than Δ_2. Formally, $\partial(\Delta_4 - \Delta_2)/\partial|a| < 0$. That is, the referent-thinking effect decreases as the difference between prices increases. Analogously, as the difference between prices decreases (i.e., as prices move closer to the reference point), the relative-thinking effect decreases, but the referent-thinking effect increases.

This comparative static is at the heart of this article. Specifically, when the deviations from the reference price are relatively small, the referent-thinking effect captured by $(\Delta_4 - \Delta_2)$ dominates, causing a consumer faced with a higher price $(p_r + |a|)$ to be more likely to make the effort and realize a saving than a consumer faced with a lower price $(p_r - |a|)$. Conversely, when the deviations from the reference points are relatively large, the relative-thinking effect captured by $(\Delta_1 - \Delta_3)$ dominates, causing a consumer to be more likely to seek the bargain when the price is low $(p_r - |a|)$ than when it is high $(p_r + |a|)$. (A calibration of the value of $|a|$ denoted by $|a|^*$, below which the referent-thinking effect dominates the relative-thinking effect, is presented in the Web Appendix, Section C [http://www.marketingpower.com/jmjan10].) This discussion suggests that referent thinking can lead to a reversal of the relative-thinking effect as long as deviations from the reference point are of a small or moderate level. However, when these deviations become extreme, relative thinking will emerge again. These ideas are encapsulated in the following two propositions:

P_2: A referent-thinking effect holds when Consumer A observes a low actual price and Consumer B observes a high actual price but both perceive a moderate deviation from the reference price (A perceives the price as moderately lower than expected, but B perceives the price as moderately higher than expected). Specifically, the willingness to seek a promotional offer of a specific monetary value is higher for B than for A.

P_3: A relative-thinking effect holds when Consumer A observes a low actual price and Consumer B observes a high actual price but both perceive an extreme deviation from the reference price (A perceives the price as extremely lower than expected, but B perceives the price as extremely higher than expected). Specifically, the willingness to seek a promotional offer of a specific monetary value is higher for A than for B.

A Numerical Example

As we formulated in Equations 8 (low price) and 9 (high price), there is a relative-thinking effect (i.e., price saving at low versus high price) and a referent-thinking effect (i.e., gain enhancement at low price versus loss attenuation at high price). When deviation is moderate, referent thinking is dominant (i.e., willingness to seek a promotion is higher when price is high), but when deviation is extreme, relative thinking is dominant (i.e., willingness is higher when price is low). To illustrate the logic of this reversal, we present a numerical example in which we consider two consumers at Store 1—one facing a low price and one facing a high price.

We examine how the probability of going to Store 2 (to get a promotional offer) changes with deviation from the reference price. We consider a fixed discount (x = 5) being offered at Store 2. Given a reference price (p_r = 100), the price at Store 1 is either low or high. For example, at a small deviation (a = 5), the price at Store 1 is either 95 (low price) or 105 (high price), and at a large deviation (a = 95), the price at Store 1 is either 5 (low price) or 195 (high price). The cost of travel to Store 2 is assumed to be drawn from a uniform distribution u ~ [0, 8]. We assume that values of α, β, and λ are .50, .55, and 2.0, respectively. These values are only illustrative, but they are broadly consistent with empirical literature (Camerer and Ho 1994; Tversky and Kahneman 1992; Wu and Gonzalez 1996). Figure 1 depicts the results.

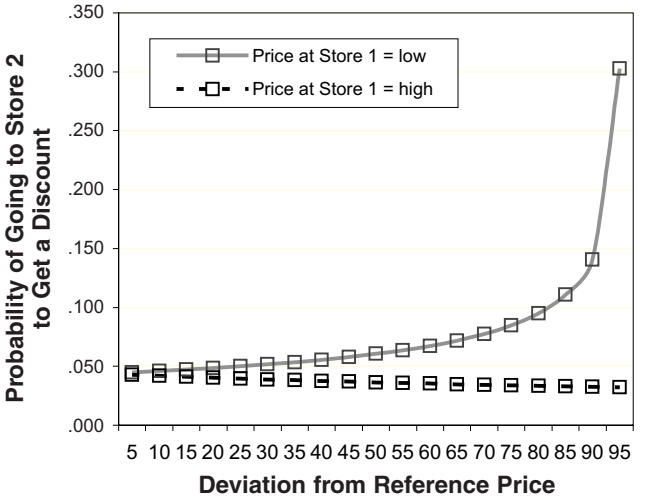
Figure 1, Panel A, shows the effects of relative thinking in isolation. Considering price savings at a low price (Equation 8) and at a high price (Equation 9), the probability of going to Store 2 is higher when the price at Store 1 is low (versus high). This result is consistent with prior research on relative thinking, as well as with P_1. What is also evident from the graph is that the relative-thinking effect strengthens as deviation from the reference price increases. Figure 1, Panel B, shows the effects of referent thinking in isolation. If we consider gain enhancement at a low price (Equation 8) and loss attenuation at a high price (Equation 9), the probability of going to Store 2 is higher when price at Store 1 is high than when it is low. In addition, this referent-thinking effect weakens as deviation from the reference price increases. Figure 1, Panel C, depicts the novel pattern due to the joint effects of relative and referent thinking. If we consider Equations 8 and 9 together, a reversal emerges, consistent with P_2 and P_3. Specifically, the relative-thinking effect dominates when deviation is extreme, but the referent-thinking effect dominates when deviation is relatively moderate.

This example provides the intuition behind our propositions. We now provide an empirical test through four experiments in which participants indicate how they would respond in certain situations. In the first two experiments, the scenario involves blankets, a product category that is infrequently purchased by our sample population of students. This makes it easy to manipulate both the reference price and perceptions of whether a certain price is lower or higher than expected. In Experiment 1a, we observe the manifestation of relative thinking when deviation from a reference price is absent (P_1) and the reversal of this well-established effect when deviation is moderate (P_2). In Experiment 1b, we replicate the reversal of relative thinking (P_2) and show that this is due to referent thinking becoming more dominant in participants' minds. Specifically, keeping prices constant (i.e., keeping relative thinking constant), we increase the salience of moderate deviation (i.e., increase referent thinking) and observe that the increase in salience further strengthens the reversal.

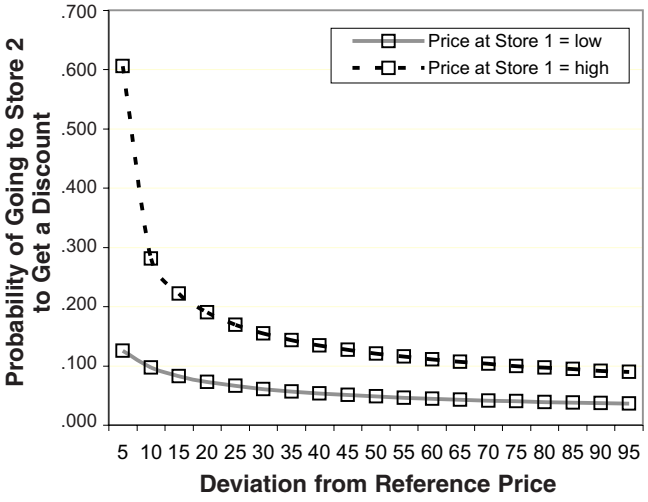
In the next two experiments, the scenario involves gasoline, a product category that is frequently purchased by our sample population. This ensures that participants have their own, real, internal reference price and that they will notice whether a certain price is lower or higher than expected. In

FIGURE 1
Simulation of Relative, Referent, and Joint Effects

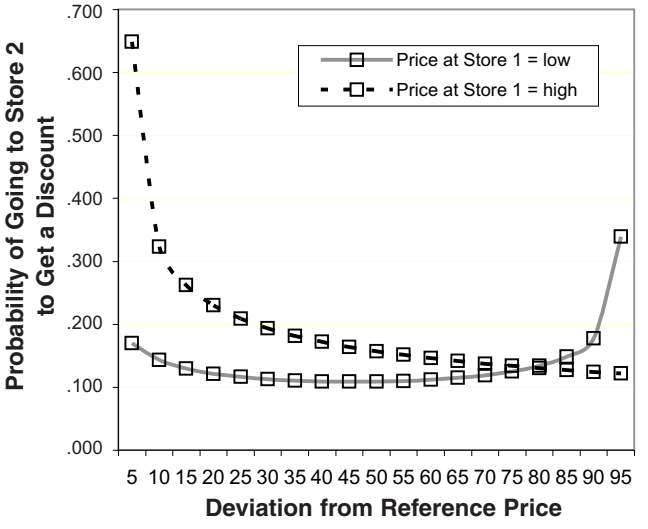
A: Relative-Thinking Effect



B: Referent-Thinking Effect



C: Joint Effect of Relative and Referent Thinking



Experiment 2a, we again observe the reversal to referent thinking when deviation is moderate (P_2) and a switch back to relative thinking when deviation is extreme (P_3). In Experiment 2b, we replicate these results using different prices and address other issues that arise from Experiment 2a.

Blanket Study: Experiment 1a

This experiment tests the predictions related to no deviation from reference price (P_1) and moderate deviation from reference price (P_2). We used a classic experimental paradigm (Nunes and Park 2003; Tversky and Kahneman 1981) in which participants are provided with the prices of two products at Store 1 and are told that Store 2 is offering a promotion on one. Keeping the total expenditure on the two products the same, we manipulate the price of the focal product (low versus high) to test whether a change in price at Store 1 changes the willingness to seek a promotion offered at Store 2. The key addition to this paradigm is that we manipulate deviation from a reference price to be either absent or present.

We adapted the scenario from one that Nunes and Park (2003) use, which involves the promotional offer of a free umbrella along with a blanket purchase. Nunes and Park show that relative thinking emerges when the dollar value of the umbrella is provided (because value of the promotion is commensurate with price of the blanket) but does not emerge when the dollar value is not provided (because promotion is incommensurate). Our focus is only on promotions of a stated monetary value, which have been shown to elicit relative thinking. Therefore, we considered only the commensurate scenario, but we modified it slightly. In particular, Nunes and Park mention a 15-minute drive, whereas we use a 5-minute drive because a separate group of participants indicated that a 15-minute drive was too high a cost to pay for a $10 umbrella. In addition, Nunes and Park use $25 as the low price of the blanket and $125 as the high price, whereas we use much closer prices of $25 and $75 so that deviation from a reference price ($50) is not considered too extreme.

With 38 participants who were not part of the main study, we verified that the deviation was viewed as moderate. In line with the deviation-present scenario (which we present subsequently), participants read that they expected the blanket price to be $50 but found it to be either lower ($25) or higher ($75). They then responded to the question, "Compared to the price that you expected to pay for the blanket, how did you perceive the blanket's actual price?" (1 = "extremely low," 3 = "moderately low," 5 = "same," 7 = "moderately high," and 9 = "extremely high"). Not surprising, the mean response was lower for $25 than for $75 (M = 3.68 versus 6.58; $F(1, 36) = 21.9$, $p < .001$). Note that both responses were within the moderate range (3 to 7) of the scale, suggesting that the deviations were not perceived as extreme. Moreover, the deviations were not so narrow that participants did not perceive them. From the midpoint of 5 (same price), 3.68 was significantly different ($t(18) = 5.65$, $p < .001$), and so was 6.58 ($t(18) = –2.38$, $p = .02$). Thus, as we intended, the manipulation evoked a moderate deviation from the reference price.

Design

We used a 2 (price: low, high) × 2 (deviation from reference price: absent, present) between-subjects design. The dependent variable was whether a participant chose to make the trip to the second store (offering a promotion) rather than buying the product from the first store. We predicted (i.e., P_1 and P_2) that participants would be more likely to make the trip for the low-priced product when deviation is absent (i.e., relative-thinking effect) but more likely to make the trip for the high-priced product when deviation is present (i.e., referent-thinking effect).

Procedure

Eighty-eight undergraduate students participated in this experiment for partial course credit. They were randomly assigned to the four conditions of a price (low, high) × deviation (absent, present) design. The following scenario refers to the condition in which price was high and deviation from the reference price was present:

> Imagine that some relatives are coming over tonight and you need to purchase some stuff for the guest room. So you set off to buy a desk lamp and wool blanket at your favorite store. When you arrive, you find that the price of the blanket is higher than what you thought such blankets usually cost. You expected the wool blanket to be priced at $50 but it is priced at $75.
>
> You are about to purchase the lamp for $25 and the blanket for $75 when the salesman informs you that the store is giving away a free travel umbrella (worth $10) with all blanket sales. Unfortunately, the store you are at is out of the umbrellas, but they are still available at another branch of the store that has the exact same blanket and lamp in stock. The other store is a 5-minute drive away.
>
> Would you make the trip to the other store?
>
> A) No, I will buy from this store.
>
> B) Yes, I will make the trip and get the free travel umbrella (worth $10).

In this scenario of a high-price, deviation-present condition, the blanket price of $75 was higher than the reference price of $50. In the low-price, deviation-present condition, the blanket price of $25 was lower than $50. In the deviation-absent conditions, $50 was not mentioned; regardless of whether the blanket price was manipulated to be $25 or $75, participants were told that it was consistent with what they expected.

At the end of the questionnaire, participants were asked to consider purchasing the travel umbrella mentioned in the scenario and to indicate the maximum that they would be willing to pay for it. We wanted to verify that the worth of the umbrella ($10) is perceived similarly by all participants, regardless of condition. Using willingness to pay as the dependent variable in an analysis of variance, we found no significant effects of price ($F(1, 84) = .84$, $p = .36$), deviation ($F(1, 84) = .43$, $p = .51$), or the interaction ($F(1, 84) =$

1.91, $p = .17$). Furthermore, the overall mean of $9.74 was not significantly different from the $10 value that we had stated ($t(87) = -.30$, $p = .76$).

Results

To examine the treatment effects from our experiment, we used effect coding for price (low = –1; high = 1) and deviation (absent = –1; present = 1). We then employed a binary logistic regression model to analyze the proportion of participants choosing to go to the second store that offered a promotion (coded as 1) rather than buying from the first store (coded as 0). The intercept term was significant ($\beta = -.77$, Wald = 9.39, $p = .002$), the main effect of price was not significant ($\beta = -.06$, Wald = .07, $p = .78$), and there was a significant main effect of deviation from reference price ($\beta = -.53$, Wald = 4.50, $p = .03$). More pertinent to our predictions, the price × deviation interaction was significant ($\beta = .61$, Wald = 5.89, $p = .01$). Additional analyses confirmed that the interaction reflected the expected pattern. Specifically, the relative-thinking effect emerged when deviation was absent: 60.9% (14/23) of participants chose to go to the second store in the low-price condition, but a lower percentage, 28.6% (6/21), chose to go in the high-price condition ($z = 2.15$, $p = .01$). However, this effect reversed, and the referent-thinking effect emerged, when deviation was present: 13.6% (3/22) of participants chose to go to the second store in the low-price condition, but a higher percentage, 31.8% (7/22), chose to go in the high-price condition. This effect was marginally significant ($z = 1.44$, $p = .07$). Figure 2, Panel A, depicts this pattern of results.

Discussion

This experiment demonstrates the predicted reversal. In line with P_1, when deviation from the reference price is absent, a promotional offer is perceived as more attractive when the product price is low than when it is high. In line with P_2, when deviation is present, the offer is viewed as more attractive when the price is high than when it is low.

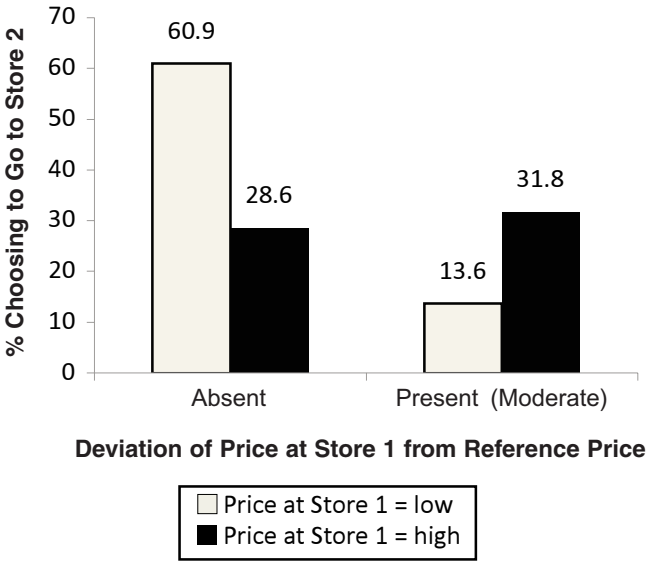
Our proposed reason for the reversal of relative thinking in the deviation-present condition is that referent thinking (i.e., losses outweigh gains) dominates relative thinking (i.e., low price dominates high price). The results support our argument. Specifically, in the deviation-present condition, the same promotional offer has a stronger effect in the loss domain (i.e., high-price condition) than in the gain domain (i.e., low-price condition). This effect does not emerge in the deviation-absent condition. However, this two-way interaction between deviation (absent versus present) and price (low versus high) can also be viewed from another perspective.

When we examine the low-price condition, we find that the presence (versus absence) of a deviation makes people significantly less likely to go to Store 2 (60.9% versus 13.6%; $z = 3.26$, $p < .001$). In the high-price condition, the presence (versus absence) of a deviation does not lead to a significant change (28.6% versus 31.8%; $z = .23$, $p = .40$). Given that changes do not occur in the loss domain (i.e., high price), can this be considered a refutation of loss aversion? We do not believe so. Loss aversion is not an absolute concept that pertains only to losses but rather a relative concept that pertains to the differential effect of a change in the loss versus gain domain (Kahneman and Tversky 1979). We observed such loss aversion in the deviation-present condition, in which a promotional offer had a stronger effect in the loss (versus gain) domain.

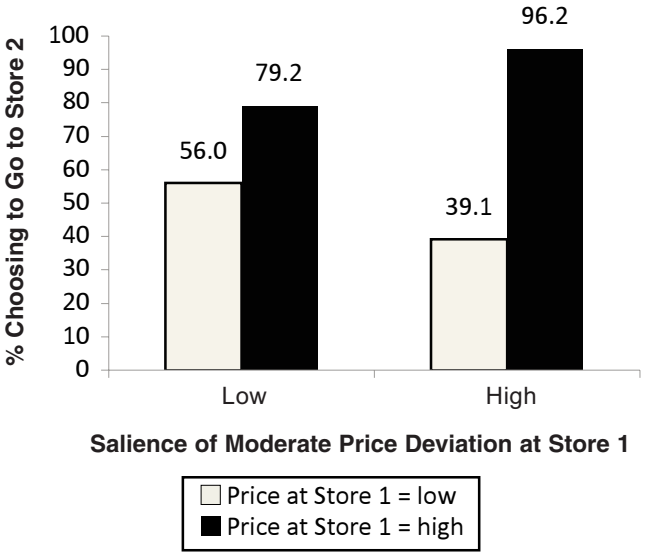
We are not sure why deviation led to an effect in the low-price condition but not in the high-price condition. This might be a manifestation of the significant main effect for deviation, which is evident in Figure 2. Specifically, because the presence (versus absence) of a deviation led to a general reduction in the chance of going to Store 2, this reduction increased the absent–present difference in the

FIGURE 2
Blanket Study: Percentage Choosing to Go to Store 2 to Get the Promotional Offer

A: Results for Experiment 1a



B: Results for Experiment 1b



low-price condition but eliminated the absent–present difference in the high-price condition. However, we cannot rule out other reasons. Therefore, it becomes important to subject our theory to further testing. In our next experiment, we examine whether the reversal replicates, and we try to understand the role of referent thinking in this reversal.

Blanket Study: Experiment 1b

We have argued that when deviation is moderate, referent thinking looms larger than relative thinking in people's minds, leading to a reversal of the well-established relative-thinking effect. If this is true, the reversal should strengthen when referent thinking is increased and relative thinking is held constant. In line with this logic, we considered the condition in which the key reversal occurs (i.e., moderate deviation) and manipulated the salience of the deviation by presenting it in either a single-information format (dollar value) or a dual-information format that would reinforce the deviation (dollar value plus percentages). We used this manipulation because it is well established that price differences are better highlighted if both absolute and percentage formats are used together in a "dual frame" (Heath, Chatterjee, and France 1995). Moreover, this manipulation is realistic because percentage formats are frequently used in the real world (DelVecchio, Krishnan, and Smith 2007). In this experiment, we use monetary discounts to verify whether we replicate the reversal that we found for umbrellas. In all other ways, the scenario was similar to the deviation-present condition in which we observed the key reversal.

Design

We used a 2 (price: low, high) × 2 (salience of deviation: low, high) between-subjects design. The dependent variable was whether a participant chose to make the trip to the second store.

Procedure

Ninety-eight undergraduate students were randomly assigned to the experimental conditions. The price was either low ($25) or high ($75), and the salience was either low (dollar values) or high (dollar values plus percentages). For example, the following states the high-price, high-salience condition (the only difference in the low-salience condition was that "50%" was not mentioned):

> Imagine that some relatives are coming over tonight and you need to purchase some stuff for the guest room. So you set off to buy a desk lamp and wool blanket at your favorite store. When you arrive, you find that the price of the blanket is 50% higher than what you thought such blankets usually cost. You expected the wool blanket to be priced at $50 but it is priced at $75.
>
> You are about to purchase the lamp for $25 and the blanket for $75 when the salesman informs you about a special discount being offered at another branch of the same store, which is a 5-minute drive away. The other branch has the exact same blanket and lamp. Although the lamp is at the same price, there is a $15 discount on the blanket.
>
> Would you make the trip to the other store?
>
> A) No, I will buy from this store.
>
> B) Yes, I will make the trip and get the $15 discount.

Results

We used a binary logistic regression model to analyze the proportion of participants choosing to go to the second store. The intercept term was significant ($\beta = 1.08$, Wald = 11.57, $p = .001$), the main effect of price was significant ($\beta = 1.18$, Wald = 13.80, $p < .001$), but the main effect of salience was not significant ($\beta = .30$, Wald = .88, $p = .34$). More pertinent to our predictions, the price × salience interaction was significant ($\beta = .64$, Wald = 4.02, $p < .05$). Additional analyses confirmed that the interaction reflected the expected pattern. Specifically, the referent-thinking effect emerged when salience was low, replicating the pattern from the main study: 56.0% (14/25) of participants chose to go to the second store in the low-price condition, but a higher percentage, 79.2% (19/24), chose to go in the high-price condition ($z = –1.72$, $p < .05$). The same was true, but to a much greater extent, when salience was high. Of the participants, 39.1% (9/23) chose to go to the second store in the low-price condition, but a higher percentage, 96.2% (25/26), chose to go in the high-price condition ($z = –4.32$, $p < .001$). Figure 2, Panel B, depicts these results.

Discussion

This experiment examined whether the reversal of the well-established relative-thinking effect is indeed driven by the domination of referent thinking. Keeping relative thinking constant, we increased the salience of referent thinking and found that, as we predicted, the reversal strengthened. Consistent with the losses-outweigh-gains premise of referent thinking, the same promotion was viewed as more attractive in the loss domain (i.e., high price) than in the gain domain (i.e., low price). Moreover, this effect strengthened when the referent thinking was made more salient. In addition, we find that the reversal occurs not only for promotional offers, such as free umbrellas (Experiment 1a), but also for monetary discounts (Experiment 1b).

In these experiments, however, referent thinking arises only after the deviation from the reference price is made explicit. In our next experiment, we tested whether the referent-thinking effect will similarly emerge when the deviation from a reference price is more implicit—that is, when the reference price is already well entrenched in people's minds.

Gasoline Study: Experiment 2a

This experiment used a different context to test for referent thinking when deviation is moderate (P_2) and to examine the resurfacing of relative thinking when deviation is extreme (P_3). We used the category of gasoline because our sample population—undergraduate students in a large, driving-culture city—are frequent purchasers of gasoline, and therefore their reference prices are likely to be well formed. For the three months preceding this study, the average price per gallon of regular gasoline in the area was

$2.58, according to historical data compiled by the Energy Information Administration (2008) division of the U.S. government. In our experiment, we manipulated prices to be $1.79 versus $3.29 for the moderate condition and $.79 and $8.29 for the extreme condition. We chose these prices after discussions with a group of students about prices that might be perceived as moderate and extreme. The moderate prices are roughly equidistant from the reference price of $2.58 (though not exactly, because we wanted to end prices in "9," which is common for gas prices). The extreme prices are not equidistant, because the intention was to have them well beyond the zone in which they might be considered moderate. (We discuss this issue further at the end of this experiment.)

The gasoline setting was realistic to the participants, who were frequent purchasers of gasoline. However, this realism required us to employ a different experimental setup from the one used in the blanket studies. In particular, we did not use a combination of products (e.g., blanket and lamp together) but rather gasoline alone. The reason was that though people often buy several products together at regular stores, gasoline is usually purchased by itself at gas stations. Thus, while the total expenditure on blanket and lamp was kept constant in the previous studies, in the current study, the total expenditure on gasoline varied with the manipulation of gas prices. However, note that a change in expenditure would not explain the results we expect, because our prediction does not pertain to a simple main effect but rather to an interaction between price and deviation. The familiarity of participants with gasoline purchase also prevented us from including the deviation-absent condition, which we had in the blanket experiments. Given that participants would have real expectations about gasoline prices, it would have been difficult to make them imagine that the prices we mention do not deviate from their expectations. Therefore, we focused only on the moderate- and extreme-deviation conditions rather than the deviation-absent condition that we tested in our previous studies.

Design

We used a 2 (price: low, high) × 2 (deviation from reference price: moderate, extreme) between-subjects design. The dependent variable was whether a participant chose to make a trip to a gas station offering a discount rather than go to the one that is closer. Consistent with P_2, our prediction was that when deviation from the reference price is moderate, participants will show the referent-thinking effect; that is, they will be more likely to make the trip when the price of gasoline is high than when it is low. In addition, consistent with P_3, we predict that when deviation from the reference price is extreme, participants will show the relative-thinking effect; that is, they will be more likely to make the trip when the price of gasoline is low than when it is high.

Procedure

Two hundred fifty-four undergraduate students participated for partial course credit. Using an illustration and statements, participants were asked to consider the purchase of a full tank of gasoline from either one hypothetical gas station (KELL), which is on the way from the university to their homes, or another gas station (GETGO), which offers discounted gasoline but involves a ten-minute detour. The price at KELL was manipulated to be $1.79 or $3.29 in the moderate conditions and $.79 or $8.29 in the extreme conditions. The saving to be realized by going to GETGO was fixed at $.20 per gallon. Participants were randomly assigned to one of the four conditions and asked to choose which gas station they would go to: KELL or GETGO.

Results

We used a binary logistic regression model to analyze the proportion of participants choosing to go to GETGO, which offered a discount, rather than buying gasoline from KELL. The intercept term was significant ($\beta = -.53$, Wald = 15.40, $p < .001$), the main effect of price was not significant ($\beta = -.01$, Wald = .01, $p = .91$), and there was a marginally significant effect of deviation from reference price ($\beta = -.23$, Wald = 2.95, $p = .08$). More pertinent to our predictions, the price × deviation interaction was significant ($\beta = -.52$, Wald = 14.81, $p < .001$). Additional analyses confirmed that the interaction reflected the expected pattern. Specifically, the referent-thinking effect emerged when deviation from the reference price was moderate: 30.8% (20/65) of participants chose to go to the second store in the low-price condition, but a higher percentage, 55.2% (37/67), chose to go in the high-price condition ($z = 2.83$, $p = .002$). This reversal of the relative-thinking effect was consistent with P_2 and the results of Experiments 1a and 1b. Furthermore, consistent with P_3, the relative-thinking effect emerged when deviation was extreme: 44.3% (27/61) of participants chose to go to the second store in the low-price condition, but a lower percentage, 21.3% (13/61), chose to go in the high-price condition ($z = 2.70$, $p = .003$). Figure 3, Panel A, depicts this pattern of results.

Discussion

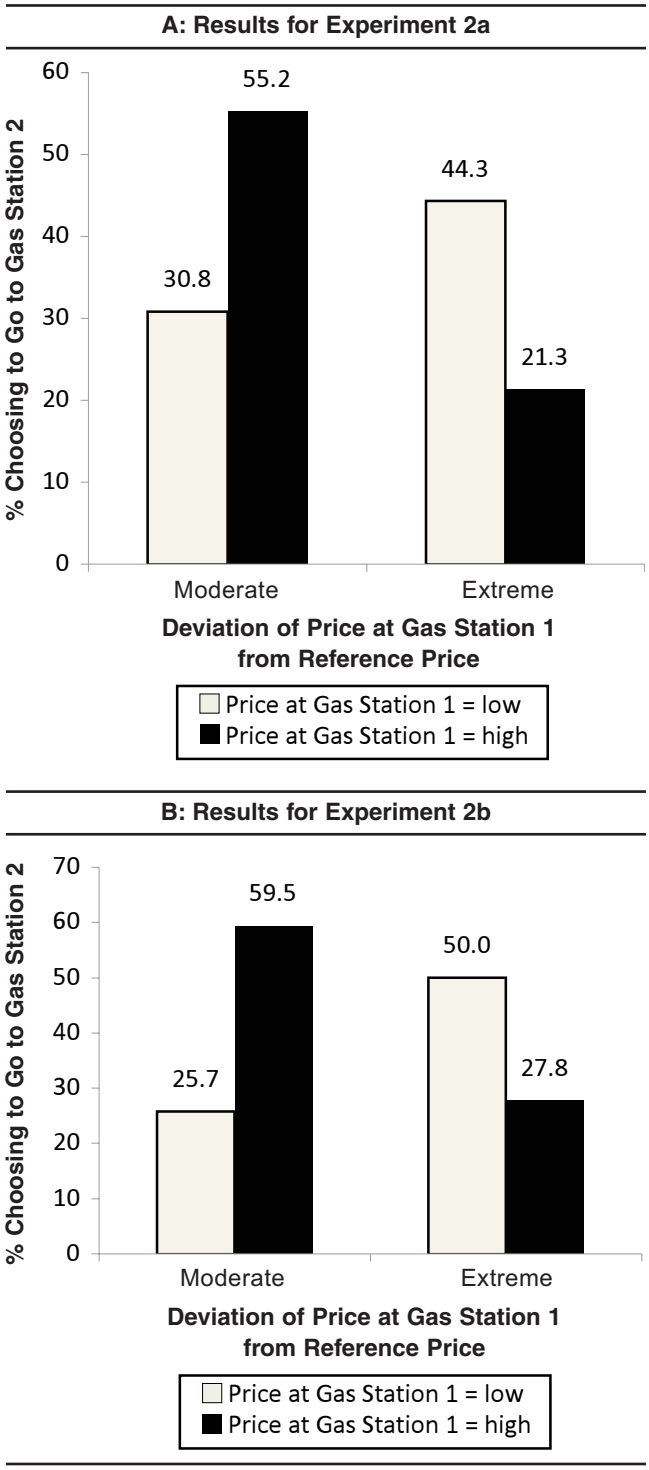
This experiment demonstrates the predicted results. In line with P_2, when deviation from the reference price is moderate, the relative-thinking effect is reversed, such that a promotional offer is perceived as more attractive when the product price is high than when it is low. Furthermore, in line with P_3, when deviation is extreme, there is a return to relative thinking, such that the offer is perceived as more attractive when the price is low than when it is high.

A few issues remain. First, we considered a reference price of $2.58, based on the Energy Information Administration's (2008) three-month prices for the area. Because gasoline is a frequently purchased category, we assumed that people's price expectations would be in line with actual prices. However, we did not check this assumption. Moreover, although the moderate price deviations ($1.79 and $3.29) were roughly equidistant from the reference price, the extreme price deviations ($.79 and $8.29) were not. Our final experiment addresses these issues.

Gasoline Study: Experiment 2b

Because gas prices decreased by the time this experiment was conducted, we could not use the reference price that we

FIGURE 3
Gasoline Study: Percentage Choosing to Go to Gas Station 2 to Get Promotional Offer



used previously. For the three months preceding the current study, the average price per gallon of regular gasoline in the area was $1.79 based on the data compiled by the Energy Information Administration (2008). To check whether price expectations are close to $1.79, we could have asked participants to indicate current price expectations at the end of our main experiment. However, their responses would have been influenced by our price manipulations. So, we conducted a pretest with a separate group of 27 participants, who were asked to indicate, "In dollars and cents (x.xx), what is the price per gallon that you expect to pay for regular gas nowadays?" Participants' responses were not significantly different from the reference price of $1.79 (M = 1.76; t(26) = –.66, p = .51). The minimum reported price was $1.59, and the maximum was $2.25. Using this as a rough gauge, we chose prices that are equidistant from the reference price: $1.54 and $2.04 for the moderate condition and $.59 and $2.99 for the extreme condition.

Design

As in Experiment 2a, we used a 2 (price: low, high) × 2 (deviation from reference price: moderate, extreme) between-subjects design. The dependent variable was whether a participant chose to make a trip to GETGO or just buy from KELL.

Procedure

One hundred forty-two undergraduate students were randomly assigned to the four conditions and asked to indicate whether they would go to the other gas station (GETGO) to receive a discount. Finally, to check whether prices were perceived as moderate and extreme, respectively, participants were asked, "Compared to the price that you expect to pay for regular gas nowadays, how do you perceive KELL's price?" (nine-point scale: 1 = "extremely low," 3 = "moderately low," 5 = "same," 7 = "moderately high," and 9 = "extremely high").

Results

For the manipulation check, we observed a significant effect of price (F(1, 138) = 221.02, p < .001), a nonsignificant effect of deviation (F(1, 138) = 1.35, p = .24), and a significant two-way interaction (F(1, 138) = 33.07, p < .001). The interaction suggests that the manipulated prices were perceived to be in a significantly narrower range in the moderate-deviation condition (M = 3.89 versus 6.22; F(1, 138) = 42.14, p < .001) than in the extreme-deviation condition (M = 2.12 versus 7.39; F(1, 138) = 209.59, p < .001). Moreover, although the range in the moderate-deviation condition was narrower, participants perceived a deviation nevertheless. That is, from the midpoint of 5, 3.89 was significantly different (t(34) = –4.20, p < .001) and so was 6.22 (t(36) = 5.29, p < .001). Therefore, the manipulations evoked moderate and extreme deviations, respectively.

We then used a binary logistic regression model to analyze the main dependent variable—the proportion of participants choosing to go to the second store. The intercept term was significant (β = –.40, Wald = 5.15, p = .02), the main effect of price was not significant (β = .12, Wald = .46, p = .49), and the main effect of deviation from reference price was not significant (β = –.06, Wald = .14, p = .70). More pertinent to our predictions, the price × deviation interaction was significant (β = –.60, Wald = 11.11, p = .001). Additional analyses confirmed that the interaction reflected the expected pattern. Specifically, the referent-thinking effect emerged when deviation from the reference price was moderate: 25.7% (9/35) of participants chose to

go to the second store in the low-price condition, but a higher percentage, 59.5% (22/37), chose to go in the high-price condition (z = 2.89, p = .001). This reversal of the relative-thinking effect was consistent with P_2 and our previous experiments. Furthermore, consistent with P_3, the relative-thinking effect emerged when deviation was extreme: 50.0% (17/34) of participants chose to go to the second store in the low-price condition, but a lower percentage, 27.8% (10/36), chose to go in the high-price condition (z = 1.91, p = .028). Figure 3, Panel B, depicts these results.

Discussion

Experiment 2b relied on a different reference price and different manipulated prices from Experiment 2a. However, the results were the same. Contrary to relative thinking, the discount was more attractive on a high price than on a low price when deviation from the reference price was moderate. Moreover, relative thinking reemerged when deviation became extreme.

General Discussion

Although traditional economic theories suggest that the willingness to seek a bargain should be based on the value of the bargain relative to the cost of acquiring it, behavioral research suggests that people show relative thinking; that is, they are more willing to seek the bargain if the product price is low than if it is high. We specify the conditions under which people do the opposite—that is, when they are more willing to seek the bargain if the product price is high than if it is low. Our predictions arise from an analytical model in which we incorporate the ideas of reference price (Winer 1986) and relative thinking (Thaler 1980) simultaneously into the prospect theory value function (Kahneman and Tversky 1979). The results from four experiments are supportive. Relative thinking emerges when consumers face same-as-expected prices, it reverses when prices deviate moderately from expectations, but it reemerges when the deviation becomes extreme. We also show that the key reversal under moderate deviation occurs because referent thinking dominates relative thinking.

This research has its limitations. In particular, the process underlying the observed behavior needs to be better understood. We showed that deviation from the reference price is the root cause, first through mathematical formulation and a numerical simulation and then using four experiments. We also showed how the key reversal is due to the domination of referent thinking. Specifically, we found that the relative-thinking reversal strengthens when salience of referent thinking is increased. What could be more convincing, however, is to show how the loss aversion associated with referent thinking actually mediates the reversal of relative thinking. However, such direct evidence for the loss-aversion process might be difficult to obtain. The reason for our skepticism is some preliminary evidence indicating that the consideration of loss aversion might be happening without people even being aware of it.

Around the time we conducted Experiment 2a, we conducted another study in which all four conditions of Experiment 2a were described to 74 participants. They predicted the number of respondents that would have chosen to go to the gas station offering a discount. Although the relative-thinking effect is counter to economic theory, it was not counter to participants' intuition. Most of them, 74.3% (55/74), predicted a relative-thinking trend; the higher the price of gasoline in the four conditions, the less alluring they thought the discount would be. Averaging across participants, we found that the predicted percentages for extremely low price, moderately low price, moderately high price, and extremely high price were 66.3%, 53.7%, 44.1%, and 28.3%, respectively. Therefore, the participants predicted a relative-thinking effect even for the moderate-price conditions (53.7% > 44.1%), whereas we found the reverse. Indeed, only 2.7% (2/74) of the participants predicted the trend that we actually found: relative thinking for extreme prices but referent thinking for moderate prices. Apart from attesting to the counterintuitiveness of our theorizing, these results reveal that people might not be aware of how their decisions can be influenced by referent thinking. However, further research could help clarify the process underlying our results.

Another aspect worth discussing is the pervasiveness of our laboratory-tested phenomena in the real world. To maintain strict control, we kept Experiments 1a and 1b purely hypothetical; we even dictated the reference price of the participants. Experiments 2a and 2b had more realism because participants needed to rely on their real-world price expectations of gasoline. We believe that though these laboratory settings were restrictive, the phenomena we study are broad, and thus our results should apply to a variety of situations in the marketplace. For example, people frequently make decisions regarding whether to buy gasoline from one gas station or to keep driving to find a better price. Such decisions are determined, in part, by their price expectations. In the current research, we cover the entire spectrum of deviations from expected prices—zero, moderate, and extreme—and show how people might react differently. Moreover, our results have wide applicability in terms of the magnitude of saving. Previously, we assumed that potential saving would be less than the price deviation. However, our results also extend easily to cases in which the saving is greater than the deviation (see the Web Appendix at http://www.marketingpower.com/jmjan10). Finally, our results apply not only to situations in which different prices are available across different stores (e.g., gas stations) but also to situations in which prices are changed within the same store. For example, store managers frequently lower prices of loss leaders to increase store traffic. These products are usually staples that consumers buy frequently. For example, a grocery store manager offers discounts on relatively cheap products (e.g., soft drinks) so that consumers visit the store and then buy their entire basket of groceries. Our results are applicable to such situations as well because, as we discuss subsequently, the manager's sales promotion strategy should vary with the degree to which consumers perceive a price deviation. Before we discuss these managerial implications, however, we present the implications of our results for theory.

Implications for Theory

Pricing. We help better understand the factors that determine the effectiveness of bargains, such as price promotions (Blattberg, Briesch, and Fox 1995), by showing how deviations of prices from the reference price can change bargain attractiveness. This finding adds to prior research on the role of reference prices in shaping consumer perceptions (Hardie, Johnson, and Fader 1993; Kalyanaram and Winer 1995). We show that the influence of an internal reference price stretches beyond the perception of a price; it also changes the perceptions of promotions that are offered on that price. This opens the door to study of the role of other factors that are known to influence reference prices. For example, it has been shown that reference prices can change with confidence levels (Thomas and Menon 2007). If confidence changes reference prices, it is also likely to change the deviations that underlie our effects and, thus, the switch between relative and referent thinking.

Relative thinking. Prior research (Azar 2007; Tversky and Kahneman 1981) suggests that the same promotion will be valued more when the base price of the focal product is low than when it is high. That is, people rely on mental accounts that are topical rather than minimal or comprehensive (Kahneman and Tversky 1984). In our blanket studies, we kept constant the minimal-account features (i.e., dollar value of promotion) and the comprehensive-account features (i.e., total price of blanket and lamp). Consistent with topical accounting, we found that decisions were influenced by the focal product associated with the promotion (i.e., blanket). However, in contrast to relative thinking, decisions were influenced not only by the blanket price but also by the deviation of that price from the expected price.

Our results help provide a new interpretation of prior results, such as participants' decisions varying with the base price of a calculator (Tversky and Kahneman 1981). Because calculators are not frequently purchased and because the scenario did not contain detailed information that might have suggested the calculator's reference price, participants are unlikely to have considered reference prices, let alone the deviations from them. Consequently, consistent with our model, they showed relative thinking. However, people usually have reference prices from which they may perceive deviations and exhibit the reverse of relative thinking.

Formalizing behavioral effects. This research responds to Ho, Lim, and Camerer's (2006) call to action to incorporate psychological findings into marketing models. We offer a mathematical exposition of how two behavioral tendencies—referent and relative thinking—can be jointly incorporated into the prospect theory value function to better explain consumers' bargain-seeking behavior. As Ho, Lim, and Camerer argue, a behavioral regularity affords wider applicability if it is precisely specified in a formal model. Three opportunities come to mind. First, although we studied promotions that are commensurate only with prices, our analytical model can act as a basis for examining promotions that are commensurate with products (Nunes and Park 2003). Specifically, if people perceive package size (e.g., of a shampoo bottle) as either smaller or larger than the reference size they have in mind, they are likely to react differently to product promotions (e.g., "25% more shampoo"). Second, although our model is focused on promotions, it can act as a starting point for studying surcharges. For example, the price of a furniture item, and how it deviates from the reference price, is likely to dictate how a fixed charge for delivery is evaluated. Third, our model involves a cost that is incurred to receive a benefit. In the domain of consumer search, it is known that people treat costs of time and money differently (Monga and Saini 2009; Okada and Hoch 2004; Saini and Monga 2008). Therefore, our model can be expanded to assess how willingness to seek bargains might vary with costs of time versus money. It can also help study how people react when even benefits are given in terms of time, such as an online store offering faster book delivery than another online store.

Implications for Practice

Allocation of sales promotion budgets. Given a fixed budget aimed at increasing traffic to a store, should a manager offer discounts on the cheaper products or on the expensive ones? Relative thinking suggests that the budget would be better spent on cheap than on expensive products. Indeed, this is what managers usually do when they have heavily discounted loss leaders to attract customers into the store, who might then consider the more expensive big-ticket items. We argue that this strategy will work well if the store is selling products at prices that consumers expect. However, if the store is selling some products at higher-than-expected prices and some at lower-than-expected prices, it might make sense to offer promotions on the former, even if they are priced higher than the latter. The manager should revert to the strategy of offering promotions on low-priced items if the actual prices in the store are extremely discrepant from expected prices. This strategy should also be used if the products being sold are completely new or seldom bought because consumers will not have clear reference prices for them. For such products, relative thinking will hold supreme.

The foregoing suggestions of promotion budget allocation hinge on the extent to which prices deviate from a reference price. However, deviations might be viewed differently by different market segments. Consider a reference price of $75 and a deviation of $25 from it, with one brand being sold below the reference price and another being sold above the reference price. This $25 deviation might be considered extreme by people in a low-income demographic; such consumers might find a discount more attractive if it is offered on the low price (i.e., relative thinking). However, the same deviation might be considered only moderate by people in a high-income demographic, who might find a discount more attractive if it is offered on the high price (i.e., referent thinking). Consequently, stores should consider their target market segment when deciding on the products on which to offer discounts.

Effectiveness of promotion on store brands versus national brands. When making decisions about sales promotions, it is useful to know the results a competitor would

get if it were to follow suit and implement the same promotion. Consider the competition between store brands and national brands in the same product category. The proliferation of store brands, also known as private labels, has led to widespread research on this topic (Ailawadi, Pauwels, and Steenkamp 2008; Dhar and Hoch 1997), particularly on the efficacy of discounts offered on store brands relative to national brands (Allenby and Rossi 1991; Blattberg and Wisniewski 1989; Sethuraman, Srinivasan, and Kim 1999). Our research offers some tentative insights. Given that the price of store brands is usually lower than that of national brands, the reference price for the category is likely to lie between the two. So, if the deviation from the reference price is only moderate (i.e., store brand is moderately below and national brand is moderately above), a sales promotion on the national brand would be more effective than the same promotion on the store brand (i.e., referent thinking). However, if the deviation from the reference price is extreme (i.e., store brand is far below and national brand is far above), a sales promotion on the store brand would be more effective than the same promotion on the national brand (i.e., relative thinking).

Framing of sales promotions. Having decided on a monetary discount, should a manager present it in dollar terms ($X off) or percentage terms (Y% off)? It is known that absolute numbers and percentages are processed differently (Chen and Rao 2007; DelVecchio, Krishnan, and Smith 2007). What our results suggest, however, are the specific conditions in which one format might make a bargain more or less appealing. Consider a dealer offering a discount on cars. If the price of the cars is higher than the reference price for that class of cars, presenting the discount in terms of absolute dollar savings would attenuate the loss of getting a higher-than-expected price, which would have a strong impact (because the loss portion of the value function is relatively steep); therefore, it would make sense to encourage referent thinking ($X off). However, if the price of the cars is lower than the reference price, presenting the discount in terms of absolute dollar savings would only enhance the dollar gain of getting a lower-than-expected price, which would have a relatively weak impact (because the gain portion of the value function is relatively flat); it might be better to encourage relative thinking instead (Y% off).

Because the previously described framing of promotions is predicated on reference prices, it is important to examine how reference prices might change. One such instance is within the same chain of stores. For example, a Gap store in an outlet mall is likely to evoke much lower reference prices than a Gap store in a regular shopping center. Thus, a price that is perceived as lower than expected at a shopping-center Gap might even be viewed as higher than expected at the outlet mall Gap. Just as deviations from a reference price can change with reference prices, they can also change with actual prices. For example, retailers are compelled to change prices for certain commodities and seasonal fruits because their procurement costs vary considerably from one season to another. This would lead to changes in deviations from reference price, which might suggest different promotional strategies in different seasons of the year. That is, when prices are perceived as higher than expected, it might make sense to encourage referent thinking ($X off), and when prices are perceived as lower than expected, it might make sense to encourage relative thinking (Y% off).

In conclusion, sales promotions are an integral part of the promotion mix, and the factors determining their effectiveness are of interest to both researchers and practitioners. Prior research has demonstrated that product price is one determinant; the same promotion is more effective on a low rather than a high price. We show when and why the opposite can occur.

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