THREE ESSAYS ON PRICE FRAMING AND PRICE PERCEPTION

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ABSTRACT

This dissertation focuses on contextual frames that influence how consumers perceive prices and how that in turn affects their product evaluations and consumption decisions. This research consists of three essays and attempts to further the understanding of contextual factors that affect how consumers perceive prices (essay 1) and how perceptions about prices influence product inferences (essay 2) and decision making (essay 3). While there is a substantial body of research on price framing and price perception, my research identifies and attempts to fill some important gaps in the existing research.

In my first essay, I introduce a new price framing effect – the *upper limit* framing effect. This essay shows that framing the upper limit of a price estimate as *less than* vs. *not more than* can result in systematic differences in perceptions regarding the underlying price. This research contributes to the existing price framing research, which primarily focuses on set prices, by investigating price estimates. It also makes important contributions to the temporal and monetary costs and semantic framing literatures and to the literature on negations.

In my second essay, I contribute to the existing perceived price-quality research that primarily concerns only the market prices. This essay shows that consumers over-apply the

perceived price-quality heuristic when setting product prices by themselves (self-decided prices). Specifically, this research shows that contextual factors that affect self-decided prices in turn influence product inferences, with the relationship between contextual frame and product inferences being mediated by self-decided prices.

In my third essay, I contribute to the existing price framing research by showing that in the context of multiple price presentation, the price presentation order (ascending vs. descending) affects the perceived importance of price in the decision making – an effect I term as the *price order* effect – an effect that is explained by prospect-theory driven loss aversion. Specifically, this research shows that descending (vs. ascending) price presentation order results in significantly lower perceived importance of price in the decision making process which in turn influences subsequent consumption decisions.

In addition to the individual contributions of each essay, this dissertation makes an overall contribution to the price framing and price perception research by identifying new price framing effects and by furthering the understanding of how consumers perceive prices and how perceptions about price influences consumer decision making.

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GENERAL AUDIENCE ABSTRACT

This dissertation shows how different contexts can influence consumers' perceptions about product prices. Utilizing a variety of everyday consumption products and scenarios, we show new and interesting ways in which seemingly unrelated contexts and frames can influence price perceptions. Specifically, we show that novel contexts and frames can affect (a) how consumers perceive price magnitude (essay 1), (b) how perceptions about prices influences product inferences (essay 2), and (c) how important a factor is price perceived to be in the decision making process (essay 3). Essay 1 shows that framing the upper limit of a cost estimate as ("*less than*" vs. "*not more than*") results in different perceptions about the underlying cost. Essay 2 shows that counter to intuitive expectations, consumers utilize prices that they themselves decide to pay for a product as being indicative of its quality. Essay 3 shows that ascending vs. descending price orders results in different consumption decisions due to differential perceived importance of price in the decision making. This dissertation also discusses the several important contributions made by this research.

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INTRODUCTION

Price is an important factor in consumer decision making. While the price of a product is only one out of the four elements in the marketing mix, how consumers perceive the prices they are presented with can influence decision making in a myriad of ways. Price perception can have an influence on inferences consumers make about products (Rao and Monroe 1988; Zeithaml 1988), on the motivation to process information about product and thus the decision making process (Aydinli, Bertini, and Lambrecht 2014), and ultimately, on the willingness to buy (Dodds, Monroe, and Grewal 1991). Thus, it is important to understand the factors that influence how consumers perceive prices. This research focuses on an important factor that influences price perception and the inferences consumers draw from perceived prices: contextual framing of prices.

The first essay of this dissertation presents a new framing effect: the *upper limit* framing effect. This research shows that framing the upper limit of a price estimate as "less than $X" vs. "not more than $X" results in differential perceptions of the size of the estimate and subsequent consumption decisions.

The second essay shows that the influence of market price perceptions on product-related inferences holds in the context of self-decided prices, too. Specifically, this research shows that counter to the normative expectations that inferences regarding products should influence how much consumers are willing to pay for a product, the reverse direction of the relationship is surprisingly robust. I demonstrate that contextual factors that affect changes in self-decided

prices in turn systematically affect the product-related inferences, with the influence of the contextual factor on product-related inferences being mediated by self-decided prices.

The third essay of this dissertation demonstrates that in the context of sequential multiple price presentation, descending (vs. ascending) price presentation order results in lower perceived importance of price – an effect I term as the *price order* effect. Specifically, based on the theory of loss aversion, this research shows that descending (vs. ascending) price presentation order results in significantly lower perceived importance of price in the decision making process, which in turn systematically influences downstream consumption choices.

In the next section, I provide a review of the existing research on the contexts and frames that influence price perceptions and the downstream influence of price perceptions on consumer inference making. Finally, I will describe how this dissertation contributes to the existing research.

Contexts and Frames affecting Price Perceptions

One of the major findings from the price perception literature pertains to the influence of the context in which prices are presented on how consumers perceive prices. The same product can be perceived as being more expensive when it is presented in a low (vs. high) price context (Adaval and Monroe 2002). Similarly, changing the end points of an evoked price range can affect how consumers perceive the presented prices (Janiszewski and Lichtenstein 1999). Further, the processing goal (discrimination vs. generalization) moderates the influence of variations in a set of presented prices on price perceptions (Cunha and Shulman 2011). When the processing goal is discrimination (generalization), price perceptions are influenced primarily by

contrast from price end points (assimilation towards mean price). For example, presented with three wine bottles at prices of $10, $15, and $20, under a discrimination (generalization) processing goal, increase in the end price of $20 (mean price of $15) would result in lower (higher) perceived price of the set of wine bottles due to tendency to contrast (assimilate) from the end price (mean price).

The presence of reference prices is another important contextual factor that affects how consumers perceive prices (Winer 1986; Lichtenstein and Bearden 1989; Urbany, Bearden, and Weilbaker 1988). The presence of reference prices results in more favorable evaluations of the advertised prices even when the reference prices were exaggerated (Urbany, Bearden, and Weilbaker 1988). In addition, semantic cues (involving same store price ("Was $X, Now $Y") vs. comparison price ("Seen elsewhere at $X, Now $Y") moderate the effect of credibility of reference prices on price perceptions (Lichtenstein and Bearden 1989; Lichtenstein et al. 1991), such that the credibility of a reference price only influenced price perception when the semantic cue used involve a comparison price.

Another contextual factor influencing price perception relates to the numbers used to represent the price (Schindler and Kirby 1997; Thomas and Morwitz 2005), specifically the *nine-ending* effect. Prices ending with the digit "9" are far more common than prices ending with "1" due to marketers' belief that consumers consider prices ending with the digit "9" to offer greater value than prices ending with the digit "1" (Schindler and Kirby 1997). Indeed, prices ending in "9" indeed are perceived to be smaller than very similar prices ending in "0" – however, this is only the case when the left digit of the price ending in "9" is smaller than the price ending in "0" (Thomas and Morwitz 2005).

Another important stream of research on price perceptions focuses on price discount framing. Discounts have been widely shown to reduce price perceptions (Biswas et al. 2013) and increase transaction value (Grewal, Monroe, and Krishnan 1988), with the effect depending on the discount size (Cai, Bagchi, and Gauri 2016). The discount framing literature shows that percentage-off vs. cents-off framing of price discount can result in systematically different price perceptions and higher subsequent purchase likelihood (Delvecchio, Krishnan, and Smith 2007; Heath, Chatterjee, and France 1995). Research on bundle price discounting suggests that the framing of the price discount can significantly influence the perceived bundle price (Janiszewski and Cunha, 2004; Khan and Dhar 2010). Similarly, price partitioning research also uncovers important antecedents of price perception. Partitioned or bundled prices are perceived as smaller than non-partitioned prices (Chakravarti et al. 2002; Hamilton and Srivastava 2008; Morwitz, Greenleaf, and Johnson 1998; Yadav and Monroe 1993). Finally, research has also studied the downstream consequences of price perception. Specifically, it has suggested that price perception can have two roles in the decision making process, a positive and a negative role (Lichtenstein, Ridgway, and Netemeyer 1993).

The positive role of price perception is related to the perceived price-quality schema, which is one of the most prominent decision making heuristics (Rao and Monroe 1988; Zeithaml, 1988). Indeed, the inverse price-demand relationship, wherein consumers draw quality inferences on the basis of the provided prices rather than making inferences about prices on the basis of the quality, which is driven primarily by perceived price-quality schema, is considered as one of the best substantiated findings in economics (Monroe 1973; Palda 1971). Under this role, higher the market/marketer-provided price, the more favorable the product related inference.

The negative role of price perception is related to perceived value, with higher prices associated with greater monetary sacrifice and hence lower perceived value (Grewal, Monroe, and Krishnan 1998), and lower influence consumers' willingness to buy (Dodds, Monroe, and Grewal 1991). More recently, a novel negative role of price perceptions is on consumers' motivation to process product information (Aydinli et al. 2015). The lower the perceived price, the lower consumers' involvement with the purchase is and thus the lower their likelihood to invest effort in the decision making process.

This dissertation contributes to the existing price framing and price perception research by identifying important contextual factors that influence how consumers perceive prices and how price perceptions affect their product evaluations and consumption decisions. Next, I explain the specific ways in which this dissertation contributes to the existing research.

The Present Research

This dissertation consists of three essays which attempt to address specific gaps in the existing price framing and price perception research.

The first essay of my dissertation studies how equivalent semantic framing (affirmation vs. equivalent negation) of the upper limit of cost estimates can result in differential perceptions of the underlying costs. Existing research studying the influence of price framing on price perceptions has primarily focused on set costs and has largely ignored framing of estimated costs. Further, research which has looked at cost estimate framing has focused on non-equivalent frames (Halberg and Teigen 2009; Hohle and Teigen 2017). Given, that (a) there can be several situations where consumers make consumption decisions on the basis on cost estimates instead

of set costs, and (b) marketers can interchangeably use equivalent frames when presenting cost estimates to consumers, it is important to understand how equivalent framing of cost estimates can influence perceptions of the underlying cost and thus downstream consumption decisions. Also, existing consumer research in general, and price framing research in specific, has not studied how an affirmation frame and its equivalent-negation frame can influence consumption choices differently. I address these research gaps by investigating how equivalent framing of the upper limit of a cost estimate as *less than* (affirmation frame) vs. *not more than* (equivalent-negation frame) can influence cost perceptions differently. Across a series of eleven studies, I propose and show that framing the upper limit of a temporal and monetary cost as "less than $X" vs. "not more than $X" can result in different perceptions about the underlying cost and systematically affect subsequent consumption choices – an effect I term as the *upper limit framing* effect. Thus, this research contributes to the price framing research by identifying a new framing effect. More importantly, this research contributes to the existing price framing and price perceptions research by studying how equivalent frames can influence perceptions of estimated costs. Further, this research contributes to the semantic framing research by studying how two equivalent semantic frames - an affirmation frame and its equivalent-negation frame - can influence price perceptions differently. In addition, the first essay of this dissertation contributes significantly to the negations-processing literature by identifying specific situations when negations can have greater meaning and be processed more easily than affirmations.

The second essay of this dissertation studies whether the perceived price-quality relationship would hold in situations where consumers are not provided a set price provided by the marketer, rather are expected to decide a price by themselves. The substantial body of research that has studied the robust relationship between perceived price and product

quality/utility has done so for market prices or marketer-provided prices – prices that are set by marketers in line with the market forces of price and demand (Monroe 1973). However, there can be a plethora of situations in which consumers themselves decide the price for a product, instead of being provided with a market price. Whether it be for auctions (Greenleaf 2004; Kamins, Dreze, and Folkes 2004), negotiations (Shurr and Ozanne, 1985; Srivastava, Chakravarti, and Rapoport 2000), or pay-what-you-want (PWYW) pricing situations (Chen, Koenigsberg, and Zhang 2017; Gneezy et al. 2012; Jung, Perfecto, and Nelson, 2016; Kim, Kaufman, and Stegemann 2014; Kim, Natter, and Spann 2009), several consumption situations require consumers to decide how they are willing to pay for a product/service and thus decide on the price by themselves. Extant research does not inform us whether the findings from the existing perceived price-quality schema research, which has been studied using marketer-provided prices, would hold for self-decided prices too. If anything, one should expect that the quality/utility that consumers assign to a product should influence the price that they decide to pay for the product – the self-decided price. However, counter to this normative expectation, I show across nine studies that, due to over-application of the price-quality heuristic, self-decided prices can affect product quality/utility expectations in the same way as marketer-provided prices. I also account for prominent alternative explanations provided by self-perception theory, cognitive dissonance theory, and selective accessibility theory. Further, one of the contexts studied in this essay is that regarding sequential presentation of possible prices in the ascending vs. descending price order. I show that descending (vs. ascending) price presentation order not only result in systematically higher willingness-to-pay but also in higher expectations about product utility and higher anticipated satisfaction. Thus, this essay potentially contributes to the

existing behavioral research on auctions by showing that consumers can systematically assign greater utility to a product that they purchase from a descending (vs. ascending) price auction.

The third essay of this dissertation studies how presentation order of multiple prices influences importance of price in decision making. Across a series of seven studies, I show that, based on the principle of loss aversion, descending (vs. ascending) price presentation order results in systematically higher perceived importance of product quality (vs. price) – an effect I term as the *price order* effect. This research contributes to price framing literature by showing that the price presentation order can influence consumer decision making. It identifies a contextual factor (ascending vs. descending price order) that affects perceived importance of price in the decision making process, and thus contributes to the existing price framing research which has primarily focused on the influence of contexts and frames on price perception but not on the importance of price in decision making. Also, it contributes to the existing research on loss aversion, by identifying an antecedent (ascending vs. descending price order) and consequence (perceived relative importance of quality-related attribute vs. price information) of loss aversion.

Essay 1 will be structured as follows: I will first provide an introduction of the research followed by a synopsis of the findings from the studies and the research contribution. Next, I will briefly discuss the existing consumer research on framing. Afterwards, I will discuss the research related to processing of negations vs. equivalent affirmations on the basis of which I will develop my hypotheses. I will then provide detailed descriptions of the eleven studies conducted. Finally, I will discuss the theoretical contributions made by this research along with it's practical implications. In short, I show that framing the upper limit of a cost estimate as *less than* vs. *not*

more than results in differential cost perceptions which in turn affects downstream consumption decisions.

Essay 2 will be structured as follows: I will first provide an introduction to the research followed by a summary of the findings and the research contribution. Next, I will discuss the existing research on (a) consumers' tendency to infer product value from their perceptions about marketer-provided prices, and (b) contextual influencers of willingness to pay, along with how such influencers affect self-decided prices in contexts such as auctions, negotiations, and pay-what-you-wish (PWYW) pricing scenarios. Afterwards, on the basis of the literature discussed, I will develop the hypothesis that consumers will systematically over-apply the perceived price-quality heuristic to the self-decided prices too. That is, the reverse/non-normative direction of the expected influence of product inferences on self-decided prices should be significant. Next, I will discuss two alternative mechanisms, rooted in self-perception, cognitive-dissonance, and selective accessibility theories, for the non-normative influence of self-decided prices on product inferences. I will then provide detailed descriptions of nine studies which show the underlying effect. Finally, I will discuss the theoretical contributions of this research along with its managerial implications. In short, this research shows that contextual factors that affect consumers' self-decided prices in turn influence their inferences about the product, with the relationship between the underlying context and product inference being mediated by self-decided prices.

Essay 3 will be structured as follows: I will first provide an introduction of the research followed by a summary of the findings and the theoretical contribution. I will then discuss the two relevant research streams: (a) ascending vs. descending price presentation order in the context of multiple price presentation, and (b) prospect theory based loss aversion. Then basis

this theoretical groundwork, I will introduce my hypotheses that presenting multiple prices in the descending (vs. ascending) price order will result in significantly lower perceived importance of price in decision making. I will then provide detailed descriptions of seven studies which provide evidence supporting the hypotheses. Finally, I will discuss the theoretical contributions made by this research along with its practical implications. In short, this research shows that presenting multiple prices in ascending vs. descending price order can systematically affect perceived importance of price as the decision making factor and that this influences downstream consumption choices.

In addition to the individual contributions made by each essay in this research to the contextual influencers of price perception research, it makes an overall contribution to the price framing and price perception research by identifying new framing effects and furthering the understanding of how consumers perceive prices and how perceptions about price influences consumer decision making.

ESSAY 1: "LESS THAN 20 MINUTES" VS. "NOT MORE THAN 20 MINUTES": FRAMING THE UPPER LIMIT OF A COST ESTIMATE USING A NEGATION VS. AN AFFIRMATION INFLUENCES CONSUMER PERCEPTIONS AND DECISIONS

1.1 ABSTRACT

This research presents an interesting new framing effect – that associated with the framing of cost estimates. Specifically, we hypothesize and provide evidence for the *upper-limit framing* effect: framing the upper limit of a cost estimate as "less than X" (vs. "not more than X") results in different expectations of the underlying costs. Across a series of eleven studies, we show that when estimates are small (large), *less than* (vs. *not more than*) framing results in contracted (expanded) cost perceptions due to increased (decreased) fluency in processing the provided estimate. Further, we also show that the upper limit framing effect systematically influences downstream consumption choices. Contributions emerge for the literatures on negation, framing, and consumer cost perception.

1.2 INTRODUCTION

Consumers often make consumption choices on the basis of estimates, rather than set temporal or monetary costs. Marketers interchangeably use "less than" vs. "not more than" frames to communicate the upper limit of cost estimates (appendix A). For example, a Geek Squad member may tell you that he will begin servicing your computer in either "less than 20 minutes," or "not more than 20 minutes." Similarly, a car mechanic can provide you with an estimated cost of repairs: "less than $250," or "not more than $250". Normatively, these two frames for the upper limit of a cost estimate are equivalent. Indeed, the results of a pre-test conducted with a sample of 60 MTurk panelists indicated that twice as many people consider the

frames to be very similar (67%) as compared to very different (33%). Thus, given that (a) consumers perceive these frames to be similar, and (b) marketers interchangeably use the frames to communicate upper limit estimates, one would expect that the two frames should not differ in terms of influencing consumers' cost perception and subsequent consumption decisions and behavior.

However, we show that these two equivalent frames (*less than* and *not more than*) actually result in divergent cost perceptions and subsequent consumption choices – what we term the *upper limit framing* effect. Specifically, we show that framing the upper limit of a cost estimate as "less than X" (vs. "not more than X") results in contracted (expanded) cost perceptions when estimates are small (large). Our hypotheses follow from negation theory, which suggests that negations are not processed as fluently as equivalent affirmations (Dale and Duran 2011; Khemlani, Orenes, and Johnson-Laird 2012; 2014; Nordemeyer and Frank 2014), causing individuals to minimize the effect of the negation (i.e., "not more than" is processed as "$_{\text{not}}$ more than"). We argue and show that this indeed is the case for negation frames involving small cost estimates, such that framing the upper limit as *less than* leads to contracted cost perceptions (vs. *not more than* framing). However, we argue and show that the reverse is true for large cost estimates: framing the estimate as *not more than* results in contracted cost perceptions (vs. *less than* framing) due to a match between the abstract nature of large costs (Sussman and Alter 2012; Wakslak, Trope, Liberman and Alony 2006) and the abstract nature of negations (Gilead, Liberman, and Maril 2012). That is, the presence of a large cost facilitates the abstract construal necessary to properly process the negation. This match allows for more fluent processing of the negation-based phrase. As such, we show that processing fluency mediates the interactive effect of estimate framing and estimate size on cost perception.

We test our hypotheses across a series of eleven studies. In studies 1a through 1d, we show that framing the upper limit of a cost as *less than* leads to contracted cost perceptions (vs. *not more than* framing) for small cost estimates. In studies 2a through 2c, we show that for estimates involving large costs, *not more than* (vs. *less than*) framing results in lower cost perceptions. In studies 3 and 4, we show that processing fluency drives the interactive effect of frame and estimate amount on cost perception. Study 3 shows, via reaction times, that *less than* framing is processed more fluently than *not more than* framing in the context of small cost estimates, but the reverse is true for large cost estimates. In study 4 we present further evidence for an interaction between upper limit frame and estimate amount in predicting processing fluency, which in turn is found to systematically influence perceived costs and consumption choices. Study 5 shows the process by which negations are easier to process for large cost estimates. Finally, 6 provides further process evidence by testing the effect in the context of benefit estimates.

This research makes a number of substantial theoretical contributions. First, we contribute to the negation literature. Prior research has shown that stand-alone negated statements are more difficult to process, and therefore possess weaker meaning than equivalent affirmations (e.g., someone deemed "innocent" can appear more free of guilt than someone deemed "not guilty" (Mayo, Schul, and Burnstein 2004; Wegner et al. 1981)), although under certain circumstances, negations and affirmations can be equally easy to process (Clark 1974; Johnson-Laird 1970). To our knowledge, we are the first to demonstrate circumstances in which a stand-alone negation is actually easier to process and has stronger meaning than an equivalent affirmation. (e.g., someone deemed "not guilty" can appear more free of guilt than someone deemed "innocent"). Second, we contribute to the nascent consumer literature on the influence of

negations on consumption decisions (Grant, Malaviya, and Sternthal 2004) by showing how negation (vs. equivalent affirmation) framing can influence consumption choices. Third, we contribute to the framing literature (Bagchi and Davis 2012; Levin and Gaeth 1988; Loewenstein and Prelec 1993; Monga and Bagchi 2012; Ulkumen, Thomas, and Morwitz 2008) by introducing a new framing effect--the *upper limit framing* effect. Finally, we contribute to the literature on temporal and monetary costs (Leclerc, Schmitt, and Dube 1995; Monga and Saini 2009; Munichor and LeBoeuf 2017; Okada and Hoch 2004; Saini and Monga 2008; Thomas and Morwitz 2005) by showing how *less than* versus *not more than* framings can influence cost perceptions.

Our research also presents substantial managerial implications. Given that marketers interchangeably use *less than* and *not more than* framing to express the upper limit of an estimate, we provide an important insight that the framing of the upper limit can influence perception of the underlying cost, and that the nature of the effect depends on the size of the estimate.

Next, we will present a brief overview of the framing literature, elucidate our theory on how *less than* versus *not more than* framing can influence cost perception and behavior, present the results of eleven studies, and discuss the implications of our research.

1.3 LOGICALLY EQUIVALENT FRAMING EFFECTS

There is an abundance of findings that suggest individuals process logically equivalent frames differently, leading to discrepancies in perception and behavior (Bagchi and Davis 2012; Levin and Gaeth 1988; Loewenstein and Prelec 1993; Monga and Bagchi 2012). For example,

Levin and Gaeth (1988) show that presenting a food item as "75% lean" results in more favorable evaluation of the item than presenting it as "25% fat". This is because the "25% fat" frame makes the harmful connotations of "fat" salient, which leads to more negative evaluations. Similarly, Bagchi and Davis (2012) show that item-price (vs. price-item) pricing results in more favorable package evaluation when the package size is large, because consumers anchor on the price of the package rather than the items that they are receiving. Additionally, framing an attribute using large numbers (e.g., kilojoules rather than kilocalories) makes the attribute more salient, which influences consumption choices (Pandelaere, Briers, and Lembregts 2011). Finally, multiple researchers (LeBoeuf 2006; Read et al. 2005) have demonstrated that individuals are more patient when wait time is framed in terms of dates (e.g., receive the reward on May 10) rather than extents (e.g., receive the reward in 30 days).

These framing effects are driven by differential processing of the presented frames. As such, two frames that are logically equivalent, but differ in terms of cognitive processing, should differentially influence perception and consumption. Next, we draw from negation theory in explaining why the logically equivalent frames *less than* and *not more than* should result in differential consumer perceptions and choices.

1.4 THE UPPER-LIMIT FRAMING EFFECT

As discussed earlier, one can communicate the upper limit of a cost estimate using *less than* (e.g., "less than $250) or *not more than* (e.g., "not more than $250"). Additionally, both regular consumers as well as marketers appear to find these frames interchangeable (see appendix A). Normatively, one would expect that framing the upper limit of a cost estimate in

terms of *less than* versus *not more than* should not influence perceptions about the underlying cost and subsequent consumption choices. However, the negation literature provides insight as to why these frames might differentially influence consumer cost perception and behavior.

Verbal inferences that involve negations require more effort and are less fluent to process than equivalent affirmations (Dale and Duran 2011; Khemlani, Orenes, and Johnson-Laird 2012; 2014; Nordemeyer and Frank 2014), although under certain circumstances they can be equally fluent to process (Clark 1974; Johnson-Laird 1970). For example, the statement "Alex is not silly" is less fluent to process than the complementary and equivalent statement "Alex is sincere". In turn, the less fluent processing associated with negations may interfere with how the negation is processed and/or remembered. For example, Just and Carpenter (1976) presented participants with directional probes and tracked eye movements. When participants were presented with a negated directional probe (e.g., "is not north"), their eyes still gravitated toward the negated direction (e.g., toward the top of the screen). Similarly, Hasson and Glucksberg (2006) presented participants with metaphors that were either affirmative or negated (e.g., This kindergarten is a/is no zoo) and found that in both cases, immediate reaction times were faster for affirmative-related words (e.g., noisy—consistent with the affirmative statement) than for negation-related words (e.g., calm—consistent with the negated statement), and that negation only took effect after a delay. This means that, at least temporarily, the opposite meaning of what was intended by the negated sentence was active in the participant's mind. Finally, Fiedler and colleagues (1996) asked participants to watch a short video and answer questions regarding items that were either present or not present in the video. While participants were able to correctly indicate that an item was not in the video (e.g., "there was no hat rack"), after a twenty-minute delay they were more likely to incorrectly indicate that the absent item indeed was in the video

(vs. items that they were not quizzed about earlier). To summarize, this line of research suggests that because negations are difficult to process, it may lead to greater accessibility of the affirmative content present in the negation.

In the context of cost estimates framed in terms of *less than* versus *not more than*, given the aforementioned research, it would appear that a straightforward hypothesis is in order: cost estimates framed as *not more than* should appear larger than those framed as *less than*, because consumers may not fully process the "not" in *not more than*. However, there are clues in the negation literature suggesting that in certain consumption settings, the opposite may emerge. More specifically, we are referring to the abstract nature of negations. Negations represent abstract thought in that they refer to the absence of a concept, which requires higher order meta-cognitive processing to distinguish "reality" from "non-reality" (Gilead, Liberman, and Maril 2012; Horn 2001). Indeed, it has been found that negated sentences are encoded more abstractly than non-negated sentences (Gilead et al. 2012). This is important, because research suggests that encountering a large cost will facilitate abstract thinking due to the general abstract nature of large numbers (Landy, Silbert and Goldin 2013; Texiera 2016) and the low probability of its occurrence (Sussman and Alter 2012; Wakslak, Trope, Liberman and Alony 2006). Consistent with prior research on monetary magnitude, we operationalize small costs as those in the tens or hundreds (e.g., $50 or $300) and large costs as those in the thousands (e.g., $2,000; Dreze and Nunes 2004; Malkoc and Zauberman 2006; Thaler 1981; Vohs, Meade, and Goode 2006). Indeed, the word thousand is derived from the Old Nordic word "thusund", which means "numberless", or so large that a number cannot describe it (Eco 2003; Piccinini et al. 2015). At a broad level, research on numerical cognition would suggest that large numbers stimulate an abstract mindset because large numbers cannot be processed in a concrete manner (e.g.,

counting, subitizing) like small numbers can be (Carey 2009; Landy et al. 2013; Leslie, Gelman and Gallistel 2008). More central to our research, large costs specifically should stimulate abstract thinking due to the rarity of their occurrence. Sussman and Alter (2012) posit that consumers perceive large expenditures as exceptional, or something that one would expect to occur with low probability on any given day. To underscore this point, in a pilot study, we asked 146 Mturk participants to indicate the probability on any given day (in percentages) that they would make a purchase worth less than $1,000 or more than $1,000 (between subjects). The results show that a cost of less than $1,000 is perceived to be significantly more likely (75.64%) than a cost of more than $1,000 (4.60%; $F(1, 144) = 436.10$, $p < .001$, $d = 3.48$). As such, when consumers face the proposition of a large cost, they are encountering a situation that occurs with low probability. In turn, when primed with low probability, individuals tend to construe situations in a more abstract manner (Wakslak et al. 2006). Hence, keeping all things constant, encountering a large cost should result in a more abstract mindset than would encountering a small cost.

Thus, it is possible that negations may actually be easier to process (vs. equivalent affirmations) if encountered in the context of large costs, as it has been shown that a match between an individual's mindset and the format in which information is provided can result in increased processing fluency (Labroo, Dhar, and Schwarz 2007; Lee and Aaker 2004). In turn, increased processing fluency should lead to contracted cost perception, which is consistent with prior research that suggests that increased fluency leads to more favorable evaluations (Labroo, Dhar, and Schwarz 2007; Reber, Winkielman, and Schwarz 1998) and higher truth ratings (Hansen, Dechene, and Wanke 2008; Lev-Ari and Keysar 2010). Thus, when paired with higher

costs, *not more than* $X should appear more favorable (i.e., less costly or aversive) and be more likely to "ring true" than *less than* $X.

To summarize, the aforementioned findings allow us to make predictions regarding how framing a cost estimate in terms of *less than* versus *not more than* will influence cost perceptions via processing fluency. In terms of processing fluency, when the cost involved is relatively small, we expect that the standard findings present in the negation literature will emerge. Consumers will have difficulty processing the negation present in the *not more than* frame, resulting in less fluency (vs. when processing the equivalent affirmative frame of *less than*). Because the default mindset is concrete (Malkoc et al. 2010, Monga and Bagchi 2012), and small costs do not facilitate abstract thought, negations are not fluently processed. However, because large costs elicit an abstract mindset due to their large numerical magnitude (Carey 2009; Landy et al. 2013; Leslie, Gelman and Gallistel 2008) as well as their low probability (Sussman and Alter 2012; Wakslak, et al. 2006), this should facilitate the processing of negations, which are abstract by nature (Gilead et al. 2012). This means that in the context of large costs, negations should be processed more fluently versus equivalent affirmations due to the match between the abstract nature of the negations and the abstract nature of the large costs.

In turn, processing fluency should influence cost perceptions, given that increased processing fluency leads to more favorable evaluations (Labroo, Dhar, and Schwarz 2007; Reber, Winkielman, and Schwarz 1998). In the context of costs, which are generally aversive, this may manifest in lower subjective perceptions of cost (e.g., "The cost doesn't seem so bad") or objective perceptions of cost (e.g., "It will probably only come out to $5"). Following the aforementioned logic regarding fluency, we predict for contexts involving small costs, framing the upper limit as *less than* leads to contracted cost perceptions (vs. *not more than* framing).

Individuals have difficulty processing the negation, essentially making the phrase "more than" salient (e.g., "not more than $250" is processed as "not more than $250"). However, for contexts involving large costs, the effect should reverse.

1.5 OVERVIEW OF STUDIES

Next, we present eleven studies that support these hypotheses. Studies 1a-1d demonstrate our predicted effects for small estimates, while studies 2a-2c do so for large estimates. In study 3, we provide process evidence via response times. In study 4, we demonstrate our effects while manipulating cost magnitude within a single consumption context, and provide evidence for our fluency-based process via mediation. In study 5, we provide further process evidence showing that abstract construal matching drives the effect in the case of large cost estimates. Finally, in study 6, we provide additional evidence for our fluency-based process by testing the upper limit framing effect in the context of benefit estimates.

1.6 STUDY 1A: SPENDING TIME TO COMPLETE A SURVEY (SMALL TEMPORAL COST ESTIMATE)

1.6.1 DESIGN AND PROCEDURE

This study utilized a between-subjects design, in which respondents were randomly assigned to either the *less than* or *not more than* upper limit framing condition. One hundred and twenty-two undergraduate students (M_{age} = 20.84 years; 68% female) took part in this study.

Participants were told that at the end of the scheduled lab session, they would have the opportunity to take part in a survey about the business school. Depending upon the experimental condition, the estimated time required to complete the business school survey was either presented as “less than 10 minutes” or “not more than 10 minutes”. Participants were then asked to choose whether they would like to take part in the additional survey. Finally, participants indicated when their next class was scheduled to begin and answered standard demographic questions.

1.6.2 RESULTS AND DISCUSSION

Twenty-eight respondents indicated that their next class started within fifteen minutes after the lab session was scheduled to end. Thus, these respondents were removed because they could not participate in the second survey and still make it to their next class on time. A bivariate chi-square analysis revealed that respondents in the *less than* upper limit framing condition (vs. those in the *not more than* condition) were more likely to take part in the extra survey (Percentage of respondents choosing to participate: *Less than* condition = 54.54%; *Not more than* condition = 36.0%, $\chi^2 = 3.26$, $p = .07$).

This study provides initial evidence that *less than* framing (vs. *not more than* framing) results in contracted cost perceptions when the underlying costs are small. Participants were more willing to give up their time in the *less than* condition, presumably because they perceived the temporal costs to be smaller. Next, we provide direct evidence that our frames influence cost perception.

1.7 STUDY 1B: RESTAURANT WAIT-TIME ESTIMATE (SMALL TEMPORAL COST ESTIMATE)

1.7.1 DESIGN AND PROCEDURE

This study utilized a between-subjects design, in which respondents were randomly assigned to either the *less than* or *not more than* condition. Two hundred and thirty-six undergraduate students (M_{age} = 20.75 years; 61% female) participated. Participants were asked to imagine: "You are going to eat out at a restaurant, and are speaking with the hostess. You ask her how long you will have to wait before you are seated." Next, in the *less than* (*not more than*) condition, participants were told that the hostess said, "Hold on. Let me check...It will be less than (no more than) 30 minutes. Your table will be ready in less than (no more than) 30 minutes." Next, participants indicated their perception of the wait time by answering two items: 1) "How long would you have to wait before your table is ready (1=short period of time, 7=long period of time)?", and 2) "How long does the wait feel to you? (1=like an instant, 7=like an eternity"; α = .76). Afterwards, participants indicated how likely they would be to wait for their table using two items: 1) "Will you wait for a table, or go to a different nearby restaurant (1=Wait for a table, 7=Go to a different restaurant (reverse coded)?", and 2) "How likely are you to wait at this restaurant rather than going to a different restaurant (1 = Very unlikely, 7 = Very likely; α = .92)?" Finally, participants answered standard demographic questions.

1.7.2 RESULTS AND DISCUSSION

An ANOVA analysis revealed that *less than* framing (vs. *not more than* framing) resulted in contracted wait-time perception ($M_{less\ than}$ = 4.60, *SD*=1.16; $M_{not\ more\ than}$ = 4.95, *SD* = 1.15; F (1, 234) = 5.44, p = .021, d = .30), and a greater likelihood of waiting at the restaurant ($M_{less\ than}$ = 5.09, *SD* =1.64; $M_{not\ more\ than}$ = 4.59, *SD* = 1.72; F(1, 234) = 5.24, p = .023, d = .29). Further, the effect of framing on likelihood to wait at the restaurant was mediated by wait time perception (10000 bootstrap 95% C.I. (-.5194, -.0465) (Hayes, 2013; Preacher and Hayes, 2004)).

This study shows that framing the upper limit of a relatively short wait-time estimate as *less than* (vs. *not more than*) results in contracted time perception, which leads to a higher likelihood to wait. In the next study, we again show the effect, while addressing a possible concern. More specifically, one might argue that the conditions are not entirely equivalent. For example, "less than 20 minutes" technically only includes 19 minutes and 59 seconds. We believe that this minute difference is not driving our effect, as participants are not likely thinking at this level of specificity. However, to rule out this alternative explanation, in the next study we compare *less than* 20 minutes to *not more than* 19 minutes. This is an extremely conservative test of our hypothesis given the "advantage" present in the *not more than* condition. Additionally, we test our effects using a real company: Best Buy Geek Squad.

1.8 STUDY 1C: BEST BUY GEEK SQUAD WAIT-TIME ESTIMATE (SMALL TEMPORAL COST ESTIMATE)

1.8.1 DESIGN AND PROCEDURE

This study utilized a between-subjects design, in which respondents were randomly assigned to either the *less than* or *not more than* condition. Two hundred and seven MTurk participants (M_{age} = 37.06 years; 46% female) participated. Participants were provided with the following scenario: “Lately, your laptop has not been functioning properly. There have been frequent unexplained shutdowns. Also, the laptop becomes unresponsive by itself. As such, you decide to take it in to be serviced. You take the laptop to "Geek Squad" at Best Buy for service. The customer service representative at Geek Squad says that they can inspect your laptop. But, she also says that because all technicians were busy, you would have to wait for some time before a technician can inspect your laptop. You ask how long you need to wait. She says: "Let me check my system...The system estimates that you will have to wait for less than 20 minutes (or no more than 19 minutes) before a technician can start inspecting your laptop".

Participants then indicated their perception of the wait time by answering the following two items: 1) “How long will you have to wait before a technician can start working on your laptop (1=For a short period of time, 7=For a long period of time)?”, and 2) How long does the wait feel to you (1=Like an instant, 7=Like an eternity; α = .87). Afterwards, participants indicated how likely they would be to wait for a technician at the repair store instead of going to a different repair store: “How likely are you to wait for a technician at this repair store rather than going to a different repair store (1=Very unlikely to wait for a technician at this repair store,

7=Very likely to wait for a technician at this repair store). Finally, participants answered standard demographic questions.

1.8.2 RESULTS AND DISCUSSION

ANOVA analysis revealed that *less than* framing (vs. *not more than* framing) resulted in contracted wait-time perception ($M_{less\ than}$ = 3.60, SD =1.26; $M_{not\ more\ than}$ = 4.04, SD = 1.44; F(1, 205) = 5.41, p = .02, d = .33) and a greater likelihood of waiting for a technician at the repair store ($M_{less\ than}$ = 5.96, SD =1.53; $M_{not\ more\ than}$ = 5.44, SD = 2.04; F(1, 205) = 4.28, p = .04, d = .29). Further, the effect of framing on the consumption decision regarding whether to order and wait for the technician was mediated by wait time perception (10000 bootstrap C.I. (-.6938, -.0712)).

This study shows the robustness of the *upper limit framing* effect by showing that the effect is significant even when the upper limit is higher in the *less than* (vs. *not more than*) condition. Thus, this shows that the effects are not driven by the potential non-equivalence of frames. In the next study, we examine whether our effects hold for small monetary cost estimates.

1.9 STUDY 1D: CAR REPAIR COST ESTIMATE (SMALL MONETARY COST ESTIMATE)

1.9.1 DESIGN AND PROCEDURE

This study utilized a between-subjects design, in which respondents were randomly assigned to either the *less than* or *not more than* condition. Two hundred and two MTurk panelists (M_{age} = 35.67; 51% female) participated. First participants read the following: "Imagine that your car needs some repairs - in the engine and the heating system. You visit the local mechanic. After the mechanic inspects the car, he says that he can provide you with an estimate of the cost of repairs before he starts working on the car. When you ask how much the repairs should cost, the mechanic says:". In the *less than* (*not more than*) condition, the mechanic said, "The repairs will cost less than (no more than) $475". Next, respondents indicated their perception of the cost using an average of two items: 1) "How much money would it cost to get the car repaired (1 = Small amount of money, 7 = Large amount of money)?" and 2) "How would you rate the cost of repairing the car (1 = Very low cost, 7 = Very high cost; α = .94)?" Next, participants indicated the likelihood of using the mechanic by answering the question, "How likely would you be to get the car repaired at this mechanic or go to a different mechanic (1 = Get the car repaired at this mechanic, 7 = Go to a different mechanic; reverse coded)?" Finally, participants indicated whether they own a car, and answered standard demographic questions.

1.9.2 RESULTS AND DISCUSSION

Controlling for car ownership, an ANOVA revealed that *less than* framing (vs. *not more than* framing) resulted in contracted cost perception ($M_{less\ than}$ = 4.88, SD = 1.45; $M_{not\ more\ than}$ = 5.29, SD = 1.26; $F(1, 199) = 4.11$, $p = .04$, $d = .3$), and a greater likelihood to get the car repaired by the mechanic ($M_{less\ than}$ = 4.44, SD = 1.85; $M_{not\ more\ than}$ = 3.96, SD = 1.82; $F(1, 199) = 3.75$, $p = .05$, $d = .26$). Further, the effect of upper limit framing on likelihood to get car repaired was mediated by perceived cost (10000 bootstrap 95% C.I.: -.2558, -.0146).

This study shows that the *upper limit framing* effect holds for monetary cost estimates. Next, in studies 2a, 2b, and 2c, we examine large cost estimates and demonstrate that our effects reverse.

1.10 STUDY 2A: HOUSE COST ESTIMATE (LARGE MONETARY COST ESTIMATE)

1.10.1 DESIGN AND PROCEDURE

This study utilized a between-subjects design, in which respondents were randomly assigned to either the *less than* or *not more than* condition. One hundred and seven undergraduate students (M_{age} = 20.69; 63% female) participated. Participants imagined that they were looking to buy a house. They had visited a real estate developer and were handed an information flyer with the house prices listed as either "All houses priced at less than $250,000" or "All houses priced at not more than $250,000." Next, respondents indicated their perception of the house cost using an average of two items: 1) "How much money do the available houses

cost (1 = Small amount of money, 7 = Large amount of money)?" and 2) "How likely would you be to get a low priced house (1 = Not at all likely, 7 = Very likely); reverse-coded; α = .69)?" Then, participants indicated how much experience they had with purchasing houses by answering the question, "How much experience do you have with buying houses (1 = No experience at all, 7 = A lot of experience)?" Finally, respondents answered standard demographic questions.

1.10.2 RESULTS AND DISCUSSION

Controlling for experience with buying houses, an ANOVA analysis revealed that *less than* (vs. *not more than*) framing resulted in higher perceived cost ($M_{less\ than}$ = 4.27, SD = 1.38; $M_{not\ more\ than}$ = 3.70, SD = 1.29; $F(1, 104) = 4.40$, p = .038, d = .43) This study shows that the results obtained in the previous studies reverses for large estimates, such that *not more than* (vs. *less than*) framing of a large estimated monetary cost results in lower perception of the actual cost. Next, we demonstrate that this effect holds in a different large-cost context while utilizing a different dependent variable.

1.11 STUDY 2B: PLUMBING REPAIR COST ESTIMATE (LARGE MONETARY COST ESTIMATE)

1.11.1 DESIGN AND PROCEDURE

This study utilized a between-subjects design, in which respondents were randomly assigned to either the *less than* or *not more than* condition. One hundred and thirty-three undergraduate students (M_{age} = 20.57; 68% female) participated. First, participants imagined that they needed to have plumbing work done at their home and had called for a plumber. The plumber, upon inspecting the repair, provided an estimate repair cost. In the *less than* (*not more than*) condition, the plumber said, "The repair cost will be less than $7,500" ("The repair cost will be not more than $7,500"). Respondents then responded to an open ended question, indicating how much they expected the cost of repairs to actually be. Finally, participants answered standard demographic questions.

1.11.2 RESULTS AND DISCUSSION

An ANOVA analysis revealed that *not more than* framing (vs. *less than* framing) resulted in contracted cost perception ($M_{less\ than}$ = $5,364.20, SD = $2,127.93; $M_{not\ more\ than}$ = $4,588.24, SD = $2,447.54; $F(1, 131) = 3.79$, $p = .054$, $d = .34$).

This study shows the robustness of the finding that the *upper limit framing* effect reverses for large estimates, such that *not more than* (vs. *less than*) framing of a large estimated monetary cost results in contracted perception of the actual cost. Next, we examine our effects in a context

involving a real cost the participants might incur, and implement a more consequential dependent variable.

1.12 STUDY 2C: STUDY ABROAD COST PERCEPTION (LARGE MONETARY COST ESTIMATE)

1.12.1 DESIGN AND PROCEDURE

This study utilized a between-subjects design, in which respondents were randomly assigned to either the *less than* or *not more than* condition. One hundred undergraduate students (M_{age} = 20.42 years; 64% female) participated in this study. The study was conducted in the atrium of the business school. Students were randomly recruited by the experimenter to take part in a survey about study abroad programs offered by the business school. Participants first read a short description about study abroad programs: "The College of Business offers a variety of study abroad programs that last approximately one semester. You can choose from a variety of options, such as spending time in Spain, Scotland, or Italy. These are just a few examples of all of the exciting places you can visit while studying abroad." Next, depending upon the experimental condition, participants read, "No matter which of these programs you choose, the program fee will be less than $12,000 (not more than $12,000)." Next, respondents indicated their perception of the program cost using an average of two items: 1) "How much money do the study abroad programs cost (1 = Small amount of money, 7 = Large amount of money)?" and 2) "How would you rate the cost of study abroad programs (1 = Very low cost, 7 = Very high cost; α = .85)?" Participants were then asked to provide an email address if they were interested in

receiving more information about study abroad programs offered by the business school (they could choose to leave this item blank). Finally, participants indicated if they had already studied abroad, and answered standard demographic questions.

1.12.2 RESULTS AND DISCUSSION

Controlling for whether participants had already studied abroad, an ANOVA analysis revealed that *less than* (vs. *not more than*) framing resulted in higher perceived program cost ($M_{less\ than}$ = 5.17, SD = 1.14; $M_{not\ more\ than}$ = 4.37, SD = .90; $F(1, 97) = 13.35$, $p < .001$, $d = .78$), and lower willingness to provide an email address to receive further information on the programs (*Less than* condition = 4.7%; *Not more than* condition = 22.8%, $\chi^2 = 6.34$, $p = .01$). Further, perceived program cost mediated the effect of condition (*less than* vs. *not more than*) on willingness to provide an email address to receive further information on the programs (10000 bootstrap sample 95% C.I. (.0084, .8115).

In this study, we utilize a large cost that participants might actually incur, and show that our effects emerge for a consequential dependent variable. Overall, across studies 1a-2c, we demonstrated our effects across a wide variety of consumption situations. Going forward, we shall provide process evidence. We posit that our effects emerge due to processing fluency. In the context of small costs, *less than* is easier to process than *not more than*. However, the reverse is true in the context of large costs. In the next study, we provide evidence for this hypothesis by asking participants to judge whether a cost is either *less than* or *not more than* $X. If our hypothesis is correct, when evaluating a small cost, response times should be faster for *less than* versus *not more than*. However, when evaluating a large cost, the reverse should emerge.

1.13 STUDY 3: RESPONSE TIMES

1.13.1 DESIGN AND PROCEDURE

This study utilized a 2 (upper limit frame: *less than* vs. *no more than*) x 2 (estimate amount: small vs. large) mixed factorial experimental design. The upper limit frame was a within-subjects factor while the estimate amount was a between-subjects factor. One hundred and sixteen undergraduate students (M_{age} = 20.73 years, 56.89% female) participated in this study, which was conducted using Direct RT software.

Respondents were presented with multiple screens, each of which presented an estimate (e.g., less than $100) and an amount (e.g., $95). Respondents were required to indicate, as quickly as possible, whether the estimate provided was correct given the amount mentioned. There were 30 screens in total: 10 each for *less than* and *no more than*, and 5 each for two filler screen types: *equal to* and *not less than*. The amounts ranged from $10 to $100 ($100,000 to $1,000,000) in the small (large) estimate amount condition. The order in which the screens were presented was randomized (see Appendix B for sample study screens and Appendix C for stimuli details). The dependent measure of this study was the participants' response time to the *less than* and *no more than* trials. At the end of the study, participants answered standard demographic questions.

1.13.2 RESULTS AND DISCUSSION

A 2 x 2 mixed factor ANOVA analysis, in which estimate amount (small vs. large) was a between-subjects factor and upper limit frame (*less than* vs. *no more than*) was a within-subjects factor, revealed a significant interaction between estimate amount and upper limit frame (F (1, 114) = 33.34, $p < .001$). For small estimate amounts, the *less than* (vs. *no more than)* upper limit frame resulted in a faster response time per trial ($M_{less\ than}$ = 1211.92 ms, SD = 79.46; $M_{no\ more\ than}$ = 1302.61 ms, SD = 87.37; F(1, 114) = 18.90, $p < .001$, d = 1.08). Conversely, for large estimate amounts, the *less than* (vs. *no more than)* upper limit frame resulted in a slower response time per trial ($M_{less\ than}$ = 1799.43 ms, SD = 153.08; $M_{no\ more\ than}$ = 1713.57 ms, SD = 110.01; F(1, 114) = 14.75, $p < .001$, d = .65).

Study 3 provides evidence for our proposed process. In the context of smaller costs, upper limit estimates are easier to process when the estimate is framed as *less than* versus *not more than*. However, the reverse emerges in the context of larger costs. In the next study, we manipulate the size of the cost as well as the framing method, and provide additional process evidence for our proposed fluency process via mediation.

1.14 STUDY 4: CAR REPAIR COST ESTIMATE (SMALL vs. LARGE MONETARY COSTS)

1.14.1 DESIGN AND PROCEDURE

This study utilized a 2 (upper limit frame: *less than* vs. *not more than*) x 2 (estimate amount: small vs. large) between-subjects experimental design. One hundred and seventy-one undergraduate students (M_{age} = 20.53 years, 56% female) participated. The scenario was identical to that utilized in study 1d, except for the costs involved. First, participants were randomly presented with one of the four repair cost estimates (less than $250, not more than $250, less than $2,500, and not more than $2,500). Next, participants indicated their perception of the cost by answering the question, "How likely is it that you are getting a good deal on the repair cost (1=Not at all likely, 7=Very likely)? (reverse-coded)," and likelihood to get the car repaired by answering the following questions: 1) "How likely would you be to get the car repaired at this mechanic? (1=Definitely not get it repaired at this mechanic, 7=Definitely get it repaired at this mechanic)" and 2) "How likely would you be to get the car repaired at this mechanic or go to a different mechanic? (1=Get the car repaired at this mechanic, 7=Go to a different mechanic; reverse-coded; α = .88)". Afterwards, we measured fluency in processing the estimate using two questions: 1) "How easy was it to think about the potential cost on the basis of the estimate that the mechanic provided? (1=Not easy at all, 7=Very easy)", and 2) "How effortless was it to think about the potential cost on the basis of the repair cost estimate that the mechanic provided? (1=Not effortless at all, 7=Very effortless; α = .83)". Finally, participants indicated if they owned a car, and answered standard demographic questions.

1.14.2 RESULTS AND DISCUSSION

Cost perception. Controlling for car ownership (in this and subsequent analyses), a 2 X 2 ANOVA revealed a significant interaction between upper limit frame and estimate amount in predicting perceived cost ($F(1, 166) = 11.67$, $p = .001$). For the small estimate amount, *less than* (vs. *not more than*) framing resulted in contracted cost perception ($M_{less\ than} = 2.62$, $SD = 1.1$; $M_{not\ more\ than} = 3.25$, $SD = 1.06$; $F(1, 166) = 6.74$, $p = .010$, $d = .58$). However, for the large estimate amount, the reverse emerged ($M_{less\ than} = 4.18$, $SD = 1.45$; $M_{not\ more\ than} = 3.47$, $SD = 1.41$; $F(1, 166) = 5.09$, $p = .025$, $d = .50$).

Likelihood of car repair. A 2 X 2 ANOVA revealed a significant interaction between upper limit frame and estimate amount in predicting likelihood to get the car repaired ($F(1, 166) = 14.47$, $p < .001$). For the small estimate amount, *less than* (vs. *not more than*) framing resulted in a greater likelihood to get the car repaired ($M_{less\ than} = 5.34$, $SD = 1.26$; $M_{not\ more\ than} = 4.33$, $SD = 1.5$; $F(1, 166) = 12.06$, $p = .001$, $d = .73$). However, for the large estimate amount, the reverse emerged ($M_{less\ than} = 3.16$, $SD = 1.30$; $M_{not\ more\ than} = 3.74$, $SD = 1.52$; $F(1, 166) = 3.78$, $p = .053$, $d = .41$).

Fluency. A 2 X 2 ANOVA revealed a significant interaction between upper limit frame and estimate amount in predicting fluency associated with processing the estimate ($F(1, 166) = 10.29$, $p = .002$). For the small estimate amount, *less than* (vs. *not more than*) was associated with higher fluency ($M_{less\ than} = 5.12$, $SD = 1.10$; $M_{not\ more\ than} = 4.53$, $SD = 1.48$; $F(1, 166) = 4.96$, $p = .027$, $d = .45$). However, the reverse was true for the large estimate amount ($M_{less\ than} = 4.29$, $SD = 1.38$; $M_{not\ more\ than} = 4.94$, $SD = 1.33$; $F(1, 166) = 5.41$, $p = .021$, $d = .48$).

Fluency mediation. Fluency significantly mediated the effect of upper limit framing on perceived cost for both small (10000 bootstrap 95% C.I. (-.1286, -.0004)) and large amounts (10000 bootstrap 95% C.I. (.0013, .1435)). In addition, the moderated mediation model (PROCESS model 7) was significant (Index of moderated mediation = .088, *SE* (boot) = .0587, 10000 bootstrap 95% C.I. (.0047, .2387)).

Cost perception mediation. Perceived cost significantly mediated the effect of upper limit framing on likelihood to get the car repaired for both small (10000 bootstrap 95% C.I. (-.3100, -.0200)) and large amounts (10000 bootstrap 95% C.I. (.036, .2683)). In addition, the moderated mediation model (PROCESS model 7) was significant (Index of moderated mediation = .271, *SE* (boot) = .104, 10000 bootstrap 95% C.I. (.1000, .5143)).

Study 4 demonstrates, using a single consumption context, that for small (large) cost estimates, *less than* (vs. *not more than*) framing results in contracted (expanded) cost perceptions, and that this effect is driven by processing fluency. In study 5, we provide evidence for the underlying reason for the reversal of standard negation effects (Dale and Duran 2011; Khemlani, Orenes, and Johnson-Laird 2012; 2014; Nordemeyer and Frank 2014) in the context of large cost estimates – the large cost facilitates the processing of the negation due to the abstract mindset elicited by large costs, resulting in increased fluency due to a match between the cost and the frame. In order to do this, we manipulate the decision time frame. Distant time frames have been associated with more abstract construal (Trope and Liberman 2003). Thus, if the reversal we see in the case of large cost estimates is due to a match between abstract nature of large costs and negation frames, then the effect should be attenuated when the time frame is the distant future. In the *less than* conditions, the time frame manipulation should have an effect on fluency because the abstract mindset elicited by the distant future frame matches the abstract

nature of the large cost, leading to fluency that would otherwise be missing. However, the time frame should have less of an effect in the *not more than* conditions, because the proposition is already fluently processed due to the match between the frame and cost.

1.15 STUDY 5: LAPTOP PURCHASE (LARGE MONETARY COST NOW vs. IN THE FUTURE)

1.15.1 DESIGN AND PROCEDURE

This study utilized a 2 (upper limit frame: *less than* vs. *not more than*) x 2 (decision time frame: now vs. future) between-subjects experimental design. Two hundred and fifty-five undergraduate students (M_{age} = 20.92 years, 55% female) participated. The study involved a laptop choice scenario involving a large cost estimate. First, participants were asked to imagine that they needed to buy a laptop for academic use either now or for the next year. They were then told that a laptop company offered a number of options all priced either *less than* $1,550 or *no more than* $1,550. Next, participants indicated their perception of the cost of the laptops by answering the following questions: 1) "How would you rate the estimated cost of laptops? (1=Very Small Cost, 7=Very Large Cost)," and 2) "What is the size of the estimated costs of laptops described above? (1=Very Small Cost, 7 = Very Large Cost; α = .87)", and likelihood to buy a laptop from this company by answering the following questions: 1) "How interested are you in buying a laptop described on the previous screen? (1=Not at all interested, 7=Very interested)" and 2) "How likely would you be to buy a laptop described on the previous screen? (1=Very Unlikely, 7=Very Likely; α = .93)". Afterwards, we measured fluency in processing the

cost estimate using two questions: 1) “How difficult was it to think about the laptop cost on the basis of the estimate provided? (1=Very Difficult, 7=Very Easy)”, and 2) “How effortful was it to think about the laptop cost on the basis of the estimate provided? (1=Very Effortful, 7=Very Effortless; $\alpha = .91$)”. Finally, participants indicated the cost of a laptop that they bought in the past, and answered standard demographic questions.

1.15.2 RESULTS AND DISCUSSION

Cost perception. Controlling for cost of laptop purchased in the past (in this and subsequent analyses), a 2 X 2 ANOVA revealed a significant interaction between upper limit frame and decision time frame in predicting perceived cost ($F(1, 250) = 7.99$, $p = .001$). When the decision time frame is the present, *not more than* (vs. *less than*) framing resulted in contracted cost perception ($M_{less\ than} = 5.16$, $SD = .95$; $M_{not\ more\ than} = 4.34$, $SD = 1.20$; $F(1, 250) = 16.47$, $p < .001$, $d = .76$). However, when the decision time frame is a year from now, the effect was attenuated ($M_{less\ than} = 4.44$, $SD = 1.06$; $M_{not\ more\ than} = 4.38$, $SD = 1.11$; $F(1, 250) = .004$, $p = .95$).

Within framing condition contrasts reveal that while there is no difference between the present and future conditions within the *not more than* conditions ($F(1, 250) = .123$, $p = .73$), the perceived cost in the future (vs. present) condition is significantly lower within the *less than* conditions ($M_{less\ than\_present} = 5.16$, $SD = .95$; $M_{less\ than\_future} = 4.44$, $SD = 1.06$; $F(1, 250) = 13.22$, $p < .001$).

Likelihood to buy laptop. A 2 X 2 ANOVA revealed a significant interaction between upper limit frame and decision time frame in predicting the likelihood to buy laptop ($F(1, 250) =$

6.87, $p = .009$). When the decision time frame is the present, *not more than* (vs. *less than*) framing resulted in higher likelihood to buy a laptop from the company ($M_{less\ than} = 3.03$, $SD = 1.45$; $M_{not\ more\ than} = 3.83$, $SD = 1.64$; $F(1, 250) = 9.07$, $p = .003$, $d = .52$). However, when the decision time frame is a year from now, the effect was attenuated ($M_{less\ than} = 3.60$, $SD = 1.22$; $M_{not\ more\ than} = 3.46$, $SD = 1.38$; $F(1, 250) = .47$, $p = .49$).

Within framing condition contrasts reveal that while there is no difference between the present and future conditions within the *not more than* conditions ($F(1, 250) = 2.43$, $p = .12$), the likelihood to buy the laptop is significantly higher in the future (vs. present) within the *less than* conditions ($M_{less\ than\_present} = 3.03$, $SD = 1.45$; $M_{less\ than\_future} = 3.60$, $SD = 1.22$; $F(1, 250) = 4.59$, $p = .033$).

Fluency. A 2 X 2 ANOVA revealed a significant interaction between upper limit frame and decision time frame in predicting processing fluency ($F(1, 250) = 5.28$, $p = .022$). When the decision time frame is the present, *not more than* (vs. *less than*) framing resulted in higher processing fluency ($M_{less\ than} = 3.94$, $SD = 1.53$; $M_{not\ more\ than} = 4.83$, $SD = 1.46$; $F(1, 250) = 14.77$, $p < .001$, $d = .60$). However, when the decision time frame is a year from now, the effect was attenuated ($M_{less\ than} = 4.63$, $SD = .98$; $M_{not\ more\ than} = 4.77$, $SD = 1.19$; $F(1, 250) = .36$, $p = .55$).

While there is no difference between the present and future conditions within the *not more than* conditions ($F(1, 250) = .08$, $p = .78$), the processing fluency in the future (vs. present) condition is significantly lower within the *less than* conditions ($M_{less\ than\_present} = 3.94$, $SD = 1.52$; $M_{less\ than\_future} = 4.77$, $SD = 1.19$; $F(1, 250) = 8.77$, $p = .003$).

Fluency mediation. Fluency significantly mediated the effect of upper limit framing on perceived cost when the decision time frame is now (10000 bootstrap 95% C.I. (.0308, .1743)) but not when the decision time frame is in the future (10000 bootstrap 95% C.I. (-.0219, .0569)).

In addition, the moderated mediation model (PROCESS model 7) was significant (Index of moderated mediation = .072, *SE* (boot) = .0389, 10000 bootstrap 95% C.I. (.0131, .1698)).

Cost perception mediation. Perceived cost significantly mediated the effect of upper limit framing on likelihood to buy laptop when the decision time frame is now (10000 bootstrap 95% C.I. (-.0216, -.0308)) but not when the decision time frame is in the future (10000 bootstrap 95% C.I. (-.0546, .0585)). In addition, the moderated mediation model (PROCESS model 7) was significant (Index of moderated mediation = -.0995, *SE* (boot) = .0550, 10000 bootstrap 95% C.I. (-.2441, -.0208)).

Study 5 demonstrates that construal level matching is driving the effects seen in the large cost conditions. While it could be argued that the reason for attenuation of the effect in the distant time frame condition is the fact that framing effects reduce under abstract construal (Malkoc and Zauberman 2006; Raue et al. 2015), extant research shows that this is not always the case. Specifically, research studying the interaction between message framing and construal level (Freling, Vincent, and Henard 2014; Kulkarni and Yuan 2015; Macdonnell and White 2015; White, Macdonnell, and Dahl 2011) shows that framing effects are not necessarily erased under conditions of abstract thinking– rather it depends on the match between message frame and construal level. The findings in this study are consistent with this body of research and show that the reversal of the upper limit framing effect is contingent on the interaction of the frame and construal level.

In study 6, we provide additional evidence for our proposed fluency mechanism by expanding our findings into the domain of benefits. Our logic pertaining to large costs should also apply to large benefits—the large numerical magnitude and the rarity with which individuals encounter large monetary benefits should result in more abstract processing (vs. small monetary

benefits). In turn, if fluency is driving our effects, we should see a reversed pattern if the lower limit of a benefit is considered. For smaller benefits, a *not less than* frame should result in contracted benefit perceptions (vs. a *more than* frame). However, for larger benefits, the reverse should emerge, as the larger benefit facilitates the processing of the negation, leading to increased fluency and expanded benefit perception.

1.16 STUDY 6: NEW JOB OFFER (SMALL vs. LARGE BENEFIT ESTIMATES)

1.16.1 DESIGN AND PROCEDURE

This study utilized a 2 (upper limit frame: *not less than* vs. *more than*) x 2 (estimate amount: small vs. large) between-subjects experimental design. Three hundred and thirteen MTurk panelists (M_{age} = 38.00 years, 53% female) participated. The scenario involved evaluating a job offer on the basis of the increase in salary. Participants were asked to imagine that they had received a job offer and that this new position would offer an estimated increase in salary. First, participants were randomly presented with one of the four estimated increase in salary (not less than $200, more than $200, not less than $2,000, and more than $2,000). Next, participants indicated their perception of the benefit (salary increase) by answering the following questions: 1) "Does the annual salary increase seem like a little money or a lot of money (1=A little money, 7=A lot of money)?", and 2) "How large does the annual salary increase seem? (1=Very small, 7 = Very large; α = .97), and likelihood to accept the job offer by answering the following questions: 1) "How interested are you in taking up this new offer? (1=Not at all interested, 7=Very interested)" and 2) "What would you be more likely to do – take up this new

job offer or stay with your current job? (1=Take up the new job offer, 7=Stay with your current job; reverse-coded; $\alpha = .88$)". Afterwards, we measured fluency in processing the estimated salary increase using two questions: 1) "How difficult was it to think about the annual salary increase on the basis of the provided estimate? (1=Very Difficult, 7=Very Easy)", and 2) "How effortful was it to think about the annual salary increase on the basis of the provided estimate? (1=Very Effortful, 7=Very Effortless; $\alpha = .94$)". Finally, participants indicated if their current salary, and answered standard demographic questions.

1.16.2 RESULTS AND DISCUSSION

Benefit perception. Controlling for current salary (in this and subsequent analyses), a 2 X 2 ANOVA revealed a significant interaction between upper limit frame and estimate amount in predicting perceived benefit ($F(1, 308) = 12.22$, $p = .001$). For the small estimate amount, *not less than* (vs. *more than*) framing resulted in contracted benefit perception ($M_{not\ less\ than} = 1.80$, $SD = 1.23$; $M_{more\ than} = 2.39$, $SD = 1.95$; $F(1, 308) = 6.96$, $p = .009$, $d = .36$). However, for the large estimate amount, the reverse emerged ($M_{not\ less\ than} = 4.50$, $SD = 1.49$; $M_{more\ than} = 3.81$, $SD = 1.67$; $F(1, 308) = 5.28$, $p = .022$, $d = .44$).

Likelihood of taking new job offer. A 2 X 2 ANOVA revealed a significant interaction between upper limit frame and estimate amount in predicting likelihood to take new job offer ($F(1, 308) = 9.40$, $p = .002$). For the small estimate amount, *not less than* (vs. *more than*) framing resulted in lower likelihood to accept new job offer ($M_{not\ less\ than} = 2.56$, $SD = 1.39$; $M_{more\ than} = 3.11$, $SD = 1.88$; $F(1, 308) = 4.83$, $p = .029$, $d = .33$). However, for the large estimate

amount, the reverse emerged ($M_{not\ less\ than}$ = 4.75, *SD* = 1.63; $M_{more\ than}$ = 4.14, *SD* =1.72; *F*(1, 308) = 4.55, *p* = .034, *d* = .36).

Fluency. A 2 X 2 ANOVA revealed a significant interaction between upper limit frame and estimate amount in predicting fluency associated with processing the estimate (*F*(1, 308) = 9.40, *p* = .002). For the small estimate amount, *not less than* (vs. *more than*) framing was associated with higher processing fluency ($M_{not\ less\ than}$ = 5.12, *SD* = 1.91; $M_{more\ than}$ = 5.73, *SD* =1.67; *F*(1, 308) = 5.71, *p* = .018, *d* = .34). However, for the large estimate amount, the reverse emerged ($M_{not\ less\ than}$ = 5.75, *SD* = 1.01; $M_{more\ than}$ = 5.19, *SD* =1.76; *F*(1, 308) = 4.24, *p* = .040, *d* = .39).

Fluency mediation. Fluency significantly mediated the effect of upper limit framing on perceived benefit for both small (10000 bootstrap 95% C.I. (-.1239, -0.0001)) and large amounts (10000 bootstrap 95% C.I. (.0002, .1036)). In addition, the moderated mediation model (PROCESS model 7) was significant (Index of moderated mediation = .0725, *SE* (boot) = .0493, 10000 bootstrap 95% C.I. (.0004, .1955)).

Benefit perception mediation. Perceived benefit significantly mediated the effect of upper limit framing on likelihood to accept the new job offer for both small (10000 bootstrap 95% C.I. (-.3673, -.0296)) and large amounts (10000 bootstrap 95% C.I. (.0579, .3988)). In addition, the moderated mediation model (PROCESS model 7) was significant (Index of moderated mediation = .4153, *SE* (boot) = .1246, 10000 bootstrap 95% C.I. (.1816, .6665)).

Study 6 demonstrates that for small (large) benefit estimates, *not less than* (vs. *more than*) framing results in contracted (expanded) cost benefit, and that this effect is driven by processing fluency.

1.17 GENERAL DISCUSSION

Consumers are often presented with estimates rather than exact amounts – whether it be for wait-times, durations of activities, or monetary costs. This research shows that the framing of the upper limit of an estimate can influence perceptions and consumption decisions, an effect we term the *upper limit framing* effect. Specifically, we show that when the estimate amount is small (large), *less than* (*not more than*) framing of the upper limit results in contracted perceptions of the underlying cost. Further, we show that these effects are driven by processing fluency such that negations are harder (easier) to process in the context of small (large) cost estimates.

We present evidence for our proposed effect across a series of eleven studies. Studies 1a-1d demonstrate that *less than* (vs. *not more than*) framing of the upper limit of a relatively small cost results in contracted cost perception. Studies 2a-2c reverse this effect in the context of relatively large costs. Finally, in studies 3 and 4, we provide process evidence for the underlying effect. In study 3, we show that cost estimates framed using *less than* are processed more fluently than those framed using *not more than* when the estimate is small, but the reverse emerges when the estimate is large. In study 4 we replicate the findings from the previous studies utilizing a single consumption context, showing an interaction between upper limit frame (*less than* vs. *not more than*) and estimate amount (small vs. large) in predicting cost perception and consumption choices, and show that processing fluency drives these effects. In study 5 we show that underlying reason for the reversal of results for large cost estimates is driven by abstract construal match between large cost estimates and the *not more than* frame. Finally, in study 6 we provide additional evidence for our fluency-based process in the context of benefits. Our effects

are robust, as they emerge in student and adult populations, for consequential and hypothetical choices, in the domains of money and time, across multiple types of consumption situations, and with downstream variables involving both choice and preference.

1.17.1 THEORETICAL AND PRACTICAL IMPLICATIONS

Our research makes a number of substantial theoretical contributions. First, we contribute to the negation literature (Dale and Duran 2011; Khemlani, Orenes, and Johnson-Laird 2012; 2014; Nordemeyer and Frank 2014) by being the first to demonstrate contexts in which stand-alone negations can be easier to process, and possess stronger meaning, than equivalent affirmations. While it has been shown that specific language surrounding a negation may make it easier to process (e.g., preceding the negation "John is not rich" with the premise "Either John is intelligent or he is rich," allows for relatively easy processing of the negation; Johnson-Laird and Tridgell (1972)), to our knowledge no research has demonstrated that negations can be made more fluent to process than equivalent affirmations by merely changing the information that is negated. The unique consumption context of cost estimates allows us to explore this interesting and important insight.

Second, we contribute to the relatively sparse consumer literature that studies the influence of negations on consumption decisions (Grant, Malaviya, and Sternthal 2004) by presenting evidence that negation (vs. equivalent affirmation) framing can influence consumption choices differently. The existing consumer research literature compares two non-equivalent negation frames (Grant et al. 2004: "not easy to use" vs. "not difficult to use") and

how they influence consumers' product evaluations. Thus, by comparing a negation frame with an equivalent affirmation frame, we contribute to the existing consumer research on negations.

Third, we contribute to the framing literature (Bagchi and Davis 2012; Levin and Gaeth 1988; Loewenstein and Prelec 1993; Monga and Bagchi 2012) by introducing a new framing effect, the *upper limit framing* effect. While prior literature on cost estimates has focused on lower versus upper bound estimates (i.e. more than $90 vs. less than $120; Halberg and Teigen 2009; Halberg, Teigen, and Fostervold 2009; Hohle and Teigen 2017; Lejarraga and Shelegia 2010; Teigen 2008; Teigen et al. 2007), we focus on equivalent frames of upper bound estimates and show that the language used to frame the upper limit of a cost estimate can influence perceptions of the cost as well as downstream consumption choices.

Finally, we contribute to the literature on temporal and monetary costs (Lee et al. 2015; Monga, May, and Bagchi 2017; Monga and Bagchi 2011; Okada and Hoch 2005; Zauberman and Lynch 2005) by showing how *less than* versus *not more than* framings can influence cost expectations. Given the recent interest in temporal and monetary cost framing (Bagchi and Davis 2012; Monga and Bagchi 2011; Munichor and LeBoeuf 2017), our research makes a timely contribution to this expanding body of research. Further, we also contribute to the existing research on fluency in the processing of costs (Thomas and Morwitz 2009). For example, Thomas and Morwitz (2009) examine the fluency associated with computing cost differences, while we examine the fluency associated with the language used to frame costs, adding to this stream of research.

This research provides important managerial insights. Marketers interchangeably use *less than* vs. *not more than* frames when providing consumers with estimates (appendix A). Thus, it can be assumed that marketers consider the two frames be alike in terms of how they influence

consumers' perception of the underlying cost. Our research provides managers with the important insight that the two frames can result in divergent perceptions of the actual cost, leading to a straightforward, yet powerful prescription; given the goal of minimizing cost perception, marketers can benefit from utilizing a *less than* (*not more than*) frame when communicating a small (large) cost estimate.

Our research also suggests implications for communicating public policy. For example, when communicating outcomes, public policy makers should take into account the magnitude of the outcome when determining how to frame the message. For example, if one wishes to communicate a low unemployment rate, it may be wise to use the frame, "The unemployment rate has been less than 6% over the last 5 years," versus "The unemployment rate has not exceeded 6% over the last 5 years." Conversely, the reverse might be true for claims involving larger numbers. For example, it might be more prudent to communicate an energy efficiency campaign in terms of "Improve the energy efficiency of your house for no more than $3,000," rather than, "Improve the energy efficiency of your house for less than $3,000."

1.17.2 LIMITATIONS AND FUTURE RESEARCH

While we make a number of important contributions with this research, it is not without limitations. First, there are a number of alternative explanations that while plausible, are not completely consistent with our results. For example, research on psychophysics and linguistic norms (Banks, Fuji, and Kayra-Stuart 1976; Dehaene 1989; Gentner and Bowdle, 2001; Whittlesea and Leboe, 2003) may suggest that the frame *less than* is better matched with smaller numbers because of the word "less", while the frame *not more than* is better matched with larger

numbers because of the word "more", which then may lead to greater fluency and more favorable evaluations. However, the results of study 6 suggest that this may not be happening in the contexts we examine; if these alternative processes were playing a role, the results of the study should be reversed. Another potential alternative explanation pertains to regulatory focus. Specifically, one may argue that *not more than* is a prevention-focused frame, which would match with individuals' motivation to prevent large costs, which can also be perceived as a large risk. This would result in greater fluency of processing large cost estimates framed as *not more than* (vs. *less than*) – thus accounting for the reversal of the upper limit framing effect for large cost estimates. While a plausible explanation, the pattern of results in study 5 suggest that it is not the underlying reason for our effect. Prior research shows that prevention (vs. promotion) focused frames are more appealing in the near (vs. distant) future (Theriault, Aaker, and Pennington 2007). Thus, if the effect were to be driven by a match between prevention-focused nature of *not more than* frame and greater consumer motivation to prevent large costs, this effect would be stronger when the decision time frame is the near (vs. distant) future. However, our results do not reveal this pattern. Although our studies do not support these alternative explanations, we do acknowledge that these processes may be playing a role, and that our studies do not definitively rule them out. This is especially true given that these alternative explanations, like the explanation we propose, also involve a fluency process based on congruency between the language used and the number involved. Nevertheless, we do believe that we have provided sufficient evidence to rule in our construal level fluency-based process.

From a theoretical standpoint, one might argue that the constructs of "small cost" and "large cost" might depend on the individual or situation. For instance, a $12,000 study abroad program fee might seem like a large cost to a regular student, but a small cost to a millionaire.

Similarly, the cost of $5,000 might seem large for a laptop, but small for a car. Perhaps future research can further examine our effects manipulating "small" versus "large" not by the magnitude of the cost, but by the type of individual or consumption context.

We argue that our effects hold for temporal and monetary costs, but given the many differences between the two (Leclerc, Schmitt, and Dube 1995; Lee et al. 2015; Monga and Saini 2009; Okada and Hoch 2004; Saini and Monga 2008), there may be an asymmetry in how the effects manifest depending on the resource involved. Because time is more malleable than money (Okada and Hoch 2004; Zauberman and Lynch 2005), consumers may mentally expand or shrink the temporal costs to fit the context. For example, given the context of "getting fit" and the time frames of thirty days versus one year, consumers may contract the one-year frame to make it seem like a shorter time period (i.e., wishful thinking). Conversely, they may mentally expand the thirty-day frame to feel like they are working very hard. Alternatively, consumers might alter the definition of "getting fit" across the two time frames. In the thirty-day time frame, "getting fit" might mean losing 3 pounds, while in the one-year frame it might mean running a marathon. Thus, there may be an asymmetry such that the size of the cost may have a weaker influence for time (vs. money) in predicting the effects of the frame used to communicate the cost.

A logical extension of this research would be to test the influence of lower limit frames on consumer perceptions and decisions. For example, a phone manufacturer might advertise battery life in terms of "more than X hours" versus "no less than X hours". It would be interesting to observe whether our predicted effects hold for lower limit frames. We begin to explore this context in study 6, but leave it open to future research to better flesh out the effects and processes in the domain of benefits, as it is outside the scope of the current research.

Another potentially fruitful avenue of research might involve examining whether other variables moderate the effects we show. For instance, different effects might emerge for analytic versus holistic thinkers (Choi, Koo, and Choi 2007). Because holistic thinkers tend to process in terms of the whole field rather than in terms of individual parts, holistic thinkers might automatically integrate the negation present in the *not more than* frame, leading to an attenuation of our effects. Similarly, because positive affect has been shown to facilitate the processing of negations (Matovic and Forgas 2018), inducing a positive mood might attenuate the effects we show. Another such moderating variable might be the perceived honesty of the estimate source. That is, it could be possible that estimates framed as *not more than*, commonly used in formal communications, are perceived as being more trustworthy by some consumers who have more exposure to such official communication. Thus, there could be an individual difference between consumers in terms of perceived trustworthiness of an estimate source when it uses *not more than* frame, and this could potentially moderate the overall effect.

Future research also can investigate how the use of negations influence perceptions of the individual or organization communicating the information. For example, marketing slogans that utilize negation-based arguments such as “no one can eat just one” (Frito Lay’s chips), “nobody doesn’t like SaraLee” (SaraLee), or “when ordinary soap just won’t do” (Dettol soap). It is possible that given the greater cognitive difficulty in processing negations as compared to affirmations, it is possible that consumers naturally associate negation-framed statements with greater intelligence. Consequently, negation-framed marketing claims may result in greater perceived brand intelligence.

ESSAY 2: NON-NORMATIVE INFLUENCE OF SELF-DECIDED PRICES ON PRODUCT INFERENCES

2.1 ABSTRACT

Across a variety of products and services, this research investigates whether self-decided prices (which the consumer selects to pay) influence product expectations, similarly to the way a marketer-provided price does. Normatively, product expectations should influence self-decided prices, such that more favorable product expectations seemingly should increase the consumer's willingness to pay. However, across of series of eight studies, the evidence instead indicates a different direction of influence, from self-decided prices to the favorability of product expectations. In a non-normative relation, higher self-decided prices lead to more favorable product expectations. This effect cannot be explained by self-perception theory, cognitive dissonance theory, or selective accessibility theory; rather, it reflects consumers' overreliance on the price–quality heuristic, resulting from their tendency to use marketer-provided prices as a proxy for product quality. These findings have notable theoretical contributions and managerial implications.

2.2 INTRODUCTION

Price is a key factor in consumer decision making (Adaval and Monroe 2002; De Langhe et al. 2014). From a purely economic perspective, consumers should be willing to buy a product if the value that they expect from the product is higher than the product price. This idea implies that consumers determine the expected value of a product independent of the price. However, ample research has shown that consumers use price as a cue for product value (Brucks, Zeithaml,

and Naylor 2000; Parasuraman, Zeithaml, and Berry 1988; Zeithaml 1988). For example, consumers' expectations about the quality of a wine increases with increasing price (Kardes et al. 2004; Plassmann et al. 2008), and the expected and actual efficacy of an energy bar decreases when it is sold at a discounted price (Shiv, Carmon, and Ariely 2005). Inferring expected value from price is rational to the extent that prices reflect the value a market assigns to a product.

In several situations, the price a consumer ends up paying for a product may not reflect market value though, particularly if consumers generate or select the product prices on their own, such as in name-your-own-price (NYOP) (Kim, Kaufman, and Stegemann 2014; Kim, Natter, and Spann 2009), pay-as-you-wish (PAUW) (Chen, Koenigsberg, and Zhang 2017), or pay-what-you-want (PWYW) (Barone et al. 2017; Gneezy et al. 2012; Jung, Perfecto, and Nelson, 2016) pricing schemes, auctions (Chakravarti et al. 2002; Cheema et al. 2005; Greenleaf 2004; Kamins, Dreze, and Folkes 2004), and negotiations (Shurr and Ozanne, 1985; Srivastava, Chakravarti, and Rapoport 2000). We use the term "self-decided prices" to refer to such situations, and these self-decided prices should reflect the value that consumers expect from the product.

Substantial research demonstrates that self-decided prices may depend on irrelevant contextual cues (Adaval and Wyer 2011; Jung, Perfecto, and Nelson 2016; Nunes and Boatwright 2004). Despite the resulting disconnect between the prices that consumers are willing to pay and the value they expect from a product, we propose that consumers are so prone to using the price–quality heuristic that they apply it even to infer how much value a product has for them when they have chosen the price. In other words, the expected value of a product should determine the self-decided price, but we predict the reverse effect too, such that consumers infer a product's value on the basis of the price that they happen to choose. The arbitrary nature of

these self-decided prices, which often reflect no actual market information, suggests that this practice lacks any logical basis. Yet across eight studies, we find that irrelevant contextual factors that determine the price consumers are willing to pay for a product also affect their perceptions of product value. This implies an over application of the price–quality heuristic, such that irrelevant contextual influences on self-decided prices affect perceived value more among consumers who tend to assume price and quality are connected, but they disappear when the arbitrary nature of the contextual influence is made salient.

This research thus contributes to several research streams. First, we advance existing research on price as a cue that informs product-related inferences (Cronley et al. 2005; Parasuraman et al. 1988; Zeithaml 1988) by showing that consumers draw product inferences not just from marketer-provided prices but also from self-decided prices. The use of this price–quality heuristic remains surprisingly ubiquitous, even when it clearly should not be used. Second, we contribute to research that investigates contextual factors involving prices (Grewal, Marmorstein, and Sharma 1996; Herr 1989; Huber, Holbrook, and Kahn 1986; Janiszewski and Lichtenstein 1999; Prelec, Wenerfelt, and Zettelmeyer 1997; Rajendran and Tellis 1994; Thomas and Morwitz 2005) and recent advances in price presentation order research (Cheema, Chakravarti, and Sinha 2012; DeMoranville, Klein, and Schoenbacher 2015; Suk, Lee, and Lichtenstein 2012) that highlights differences in the willingness to pay for prices presented in ascending versus descending orders. We add an important downstream consequence of price presentation order, namely, its influence on consumers' product-related inferences. Such price presentation order research is highly relevant to auctions and negotiations (Cheema et al. 2012), and the present research contributes to this related stream of literature. Third, we advance the growing body of research into PWYW pricing schemes (Chen et al. 2017; Gneezy et al. 2012;

Jung et al. 2016; Kim et al. 2009, 2014), which has primarily focused on factors that influence consumers' self-decided prices. By revealing how the self-decided price affects the inferences that consumers make about a product that they purchase, our study opens a new avenue for PWYW pricing literature.

We will next provide an overview of the existing research on (a) drawing value inferences from price, and (b) contextual influencers of willingness to pay. We would then develop our hypotheses based on these two bodies of research, and subsequently discuss the prominent alternative mechanisms.

2.3 INFERRING VALUE FROM PRICE

Consumers use the price information that marketers provide to infer product value or quality (Adaval and Monroe 2002; Kardes et al. 2004; Rao and Monroe 1989). Multiple studies of this price–quality heuristic reveal the important role of price in consumers' efforts to infer product value. Yet the actual correlation between price and quality is not very high and is driven partially by an incorrect understanding of heterogeneity in price–quality relations (De Langhe et al. 2014). Inferring value from price also appears to involve automatic processing (Shiv et al. 2005). Still, this heuristic may have some logical basis. All else being equal, in a competitive marketplace, a low quality option will not fetch the same price as a higher quality option. Thus, people expect that the prices that marketers assign to their products reflect the value those marketers would assign to them.

However, when consumers decide what price to pay for a product by themselves, they still might infer product value and quality, even though their self-decided prices do not reflect

market information. Such self-decided prices are common, as manifested in Pay-what-you-want (PWYW) (Kim et al. 2009, 2014) or Pay-as-you-wish (PAUW) (Chen et al. 2017) pricing schemes, auctions (Greenleaf 2004; Kamins et al. 2004), and price negotiations (Shurr and Ozanne 1985; Srivastava et al. 2000). For example, travel booking websites that offer a NYOP scheme allow consumers to choose the price they will pay for an airline ticket or hotel room, which the website accepts if that price meets minimum requirements. In both English and Dutch price auctions, consumers consider various prices for the same product and must decide which one is suitable for them. In a sense then, self-decided prices should reflect the value that consumers predict the offering will grant them, yet substantial research suggests that self-decided prices also depend on both relevant and irrelevant contextual factors.

2.4 CONTEXTUAL INFLUENCES ON WILLINGNESS TO PAY

Contextual factors significantly affect how consumers perceive presented prices and how much they are willing to pay for products (Adaval and Monroe 2002; Grewal et al.1996; Huber et al. 1986; Janiszewski and Lichtenstein 1999; Rajendran and Tellis 1994; Thomas and Morwitz 2005). For example, the presence of other prices, to which consumers can compare the price of a current offering, creates conditions in which a product may be judged as less expensive if it appears in a high versus low priced context, so that consumers become more willing to pay the price (Adaval and Monroe 2002). Price attractiveness also can be manipulated by changing the endpoints of an evoked price range (Janiszewski and Lichtenstein 1999).

Even anchoring on an irrelevant external price can substantially influence the price that consumers are willing to pay for a product (Adaval and Wyer 2011; Nunes and Boatwright

2004). For example, consumers are willing to pay more for a CD if an adjacent stall displays sweatshirts priced at $80 (vs. $10) (Nunes and Boatwright 2004). Similarly, anchoring on a higher price for clothing items results in greater willingness to pay for unrelated, subsequently presented target products (electronics; Adaval and Wyer 2011). Subliminal anchoring on irrelevant high prices affects consumers' willingness to pay for products that are not related to the price anchors (Adaval and Wyer 2011; Mussweiler and Englich 2005). Thus, consumers might remain unaware of contextual price anchors and fail to adjust their willingness to pay accurately.

Anchoring applies not only when consumers see irrelevant prices but also when they confront a series of relevant prices. In auctions, the multiple prices might appear in ascending or descending order, and consumers generally are willing to accept higher prices in the latter situation (Cheema et al. 2012). They are also more likely to select a higher priced option in a set when the brands appear in ascending rather than descending price order (Suk et al. 2012). In salesperson–customer interactions, a descending (vs. ascending) price order results in a greater likelihood that consumers choose the higher priced options (DeMoranville et al. 2015). In PWYW pricing schemes, the default, suggested, and maximum prices all exert influences on the self-decided price that consumers are willing to pay (Jung et al. 2016), similar to the way that the average price paid by other customers (Gneezy et al. 2012) and the regular retail price (Kim et al. 2014) can exert effects.

In summary, consumers' willingness to pay depends on contextual factors, and we predict that these factors affect self-decided prices in general. In that case, consumers' self-decided prices may not reflect their expected value very well. However, we argue that consumers often fail to recognize how contextual elements guide their decision making. In addition, they may not

realize the difference between marketer-provided prices and self-decided prices, in terms of the market information they contain. As a result, consumers may treat their self-decided prices as valid market prices and infer value and quality from them.

2.5 INFERRING VALUE AND QUALITY FROM SELF-DECIDED PRICES: ALTERNATIVE MECHANISMS

We propose that consumers' tendency to use marketer-provided prices to infer product value (Plassmann et al. 2007, 2008; Rao and Monroe 1989; Scitovszky 1944) carries over to the domain of self-decided prices, such that consumers apply the price–quality heuristic to their own chosen prices. However, we also consider the potential effects of three alternative mechanisms, from social psychology literature.

First, the impact of self-decided prices on inferred value and quality could stem from cognitive dissonance (Elliot and Devine 1994; Festinger 1962). Cognitive dissonance theory proposes that people find it psychologically disconcerting to hold opposite thoughts about the same object and thus seek to eliminate one of those thoughts, to reestablish a balance. If consumers have decided on a high price (perhaps due to the influence of an irrelevant contextual factor), they cannot also harbor expectations of poor product value, because such low expectations would be antithetical to the high self-decided price and cause cognitive dissonance. Thus, in conditions in which irrelevant contextual factors elicit a higher self-decided price from consumers, consumers may adjust their expected product value to minimize their cognitive dissonance.

Second, self-perception theory (Bem 1967, 1972; Calder and Staw 1975), which is a rival theory to cognitive dissonance, suggests that people look to their own behavior to make inferences about themselves and rationalize their choices. If contextual factors influence consumers' self-decided price beyond their active awareness (Adaval and Monroe 2002; Adaval and Wyer 2011; Mussweiler and Englich 2005), it is possible that a higher price, which is merely an artifact of an irrelevant contextual factor, causes consumers to make an inaccurate attribution, assuming that the price means they value the product highly.

Third, selective accessibility theory (Strack and Mussweiler 1997) would predict that relevant anchors that influence self-decided prices can also selectively increase accessibility of anchor-consistent product attributes, and thus, product quality inferences. This selective accessibility process can operate before consumers decide the product price. That is, anchor consistent thoughts about product attributes enter the process by which consumers decide the self-decided price which in turn influence the quality inferences. Importantly, the existing research on selective accessibility theory shows that it is applicable when the anchor is relevant and it shares a clear and obvious relationship with the product. However, this might not be the case in several consumption domains involving self-decided prices wherein the connection between the anchor and focal product is subtle or perhaps even non-existing (Adaval and Wyer 2011; Mussweiler and Englich 2005; Nunes and Boatwright 2004). For example, in several of the domains studied by the existing PWYW research, the provided anchor is irrelevant to the focal product (for e.g. CDs and sweatshirts as studied by Nunes and Boatwright 2004). Such lack of obvious correspondence between the anchor and the focal product is not accommodated by the existing selective accessibility research and thus this theory does not appear entirely applicable

to this present research which studies the influence of both relevant and irrelevant anchors on self-decided prices (and quality inferences).

However, a more liberal definition of the selective accessibility theory would be that even irrelevant anchors can evoke general expectations of product attributes which in turn can influence general quality inferences. Based on this definition, selective accessibility theory would predict that a general quality inference is evoked as soon as a price is considered, regardless of whether the price is actually plausible and applicable to the product. In contrast, the price quality schema would predict that quality inferences are made only after the self-decided price is applied to the product – requiring the price to be plausible and applicable to the product. This implies that according to the price quality schema, but not selective accessibility explanation, (a) the underlying price-quality relationship should be relevant, and (b) at the very least, the product should at least be known before a quality inference can be drawn.

Based on assertion (a), the selective accessibility theory would predict that arbitrary and irrelevant anchors that influence self-decided prices would also influence product inferences regardless of the normative price range of the product. For example, a selective accessibility account (but not one based on a price quality schema) would predict that consumers infer similar product quality if they were to decide to pay $100 either for a product whose normative price ranges from $20 to $100 or for a product whose normative price ranges from $100 to $400. Next, based on assertion (b), a selective accessibility account (but not price quality one) would predict that when considering a high (vs. low) price, consumers would infer a general high (vs. low) quality even when the product is not known to them. We test both of these assertions in our studies (assertion (a) in study 8 and assertion (b) in study 9).

To rule out these alternative explanations, we use a paradigm in some of our studies to ensure the self-decided prices are entirely determined by the situation, such that the participants do not experience any tension and cannot attribute their behavior (i.e., self-decided prices) to their attitudes toward the product. In one study, we also ask participants to observe someone else's self-decided prices. These do not originate with the self, so self-perception and cognitive dissonance theories do not apply; vicarious cognitive dissonance is unlikely. We also test whether a liberally defined selective accessibility theory can explain the effect by studying the influence of irrelevant anchors on self-decided prices (and product quality). We test whether self-decided prices evoke general inferences of quality that are independent of specific details about the products such as its normative price range or knowledge about the product. Finally, in line with our proposed explanation involving an overreliance on the price–quality heuristic, we test whether the underlying effect is stronger among consumers with stronger, versus weaker, price–quality schema.

2.6 OVERVIEW OF STUDIES

We conducted nine experiments to test our prediction that self-decided prices affect product-related inferences in the same way as marketer-provided prices do, due to consumers' tendency to rely too much on the price–quality heuristic. In studies 1, 2, and 3, we adopt a dichotomous choice, contingent valuation experimental procedure, as is commonly used to elicit people's willingness to pay (Cameron and James 1987; Wertenbroch and Skiera 2002). Within this experimental procedure, we present respondents with a variety of prices in either ascending

or descending price order. The participants' self-decided prices are higher in response to the descending price order, and these higher prices also lead to more favorable product inferences.

Then we apply a different experimental procedure in the remaining studies to confirm the underlying effect. Specifically, in a fictitious game show, participants could bid on products. We focused on the last round, in which participants simply had to bid their remaining budget (which was non-fungible), and we manipulated whether they had much or a little left. We find that the bid amount, even though completely unrelated to the inherent product value, affects their product quality expectations. The arbitrary nature of these bids renders cognitive dissonance and self-perception implausible. Study 5 specifically rules out alternative explanations provided by self-perception theory and cognitive dissonance theory by showing that participants make similar product inferences when they decide on the bid amount versus when someone else does. Study 6 shows that the arbitrary bids affect product inferences more for consumers who routinely believe that price signals quality. Study 7 confirms that making the arbitrary nature of the bids salient eliminates these effects. Finally, studies 8 and 9 shows that the effect cannot be explained by the selective accessibility model.

2.7 STUDY 1

With study 1 we test the idea that an undue influence on self-decided prices affects subsequent judgments of product usefulness. To influence self-decided prices, we asked participants to indicate, for a range of prices, if they would consider buying a product at that price. The prices appeared from low to high (ascending price order) or from high to low (descending price order). In line with anchoring processes (Ariely and Simonson 2003; Kamins

et al. 2004), we expect a higher willingness to pay in the latter condition, which in turn should prompt higher judgments of product usefulness.

2.7.1 DESIGN AND PROCEDURE

This study features a single factor (price order: ascending vs. descending) experimental design. One hundred eleven undergraduate students (67% female, M_{age} = 20.74) took part in this study in exchange of course credit. Respondents in both experimental conditions first read descriptions of a Bluetooth speaker, then considered a series of prices (ranging from $10 to $100, in equally spaced intervals of $10). They had to indicate whether they would be willing to buy the speaker at each of the presented prices. After indicating their willingness to buy at each of the presented prices (which we used to compute their self-decided price), respondents also noted how useful they regarded the Bluetooth speaker (1 = "Not at all useful" to 7 = "Very useful").

2.7.2 RESULTS

After excluding 10 participants who exhibited response reversals or inconsistency (i.e., willingness to buy the product at a higher price but not at a lower price), we applied a one-way analysis of variance, which shows that self-decided prices are lower in response to the ascending (vs. descending) price presentation order ($M_{ascending}$ = $19.26, SD = 14.39; $M_{descending}$ = $35, SD = 25.85; $F(1, 99) = 14.86$; $p < .001$; $d = .75$). In addition, the ascending price presentation results in lower perceived product usefulness ($M_{ascending}$ = 3.54, SD = 1.65; $M_{descending}$ = 4.18, SD = 1.65; $F(1, 99) = 4.24$; $p = .042$; $d = .38$), in line with our predictions. A bootstrap mediation test shows

that the indirect effect of price presentation order on product-related inferences, through self-decided prices, is significant (indirect effect estimate = -.16, *SE* = .50; 10,000 samples, 95% confidence interval [CI] = [-.27, -.07]). We also test a reverse mediation model, in which the price presentation order affects perceived usefulness and then willingness to pay, but it does not yield a significant indirect effect (95% CI = [-1.86, .43]).

2.7.3 DISCUSSION

This study confirms that self-decided prices can influence product inferences. Specifically, price presentation order influences self-decided prices, which in turn affect perceived product usefulness. This study provides evidence for our argument that due to sheer habituation with using marketer-provided prices to make product inferences, consumers rely on self-decided prices to make product inferences too. This process is opposite normative expectations of the direction of the relationship between product valuations and self-decided prices, which predicts that product expectations influence self-decided prices, not the other way around.

2.8 STUDY 2

The previous study suggests that consumers infer product value from their self-decided prices, but the procedure we used to manipulate the prices also manipulates the starting prices; the initial price is lower in the ascending price order than in the descending one. Perhaps then the starting prices affect product inferences, which would imply a different explanation. If

consumers regard the starting prices as marketer-provided prices, their observed application of a price–quality heuristic would merely replicate prior research. To rule out this alternative interpretation, we continue using the ascending versus descending price presentation order, but we also manipulate the step sizes. Self-decided prices may differ more between the two price presentation order conditions if the differences between their consecutive price levels is small ($10) rather than large ($20). If participants infer product value from the initial price, this price step size should not moderate the effect of the price presentation order on product inferences. If instead they infer product value from the self-decided price, it should.

This study also tests another alternate explanation for the effect observed in the previous study. It could be possible that respondents merely answer to a certain number of presented prices, irrespective of the price presentation order. That is, respondents mindlessly respond to a specific number of screens without attending to the prices being presented and that the difference between the starting prices translates into the difference in self-decided prices and thus perceived quality. If this is indeed the case, then:

(a) number of yes responses in the ascending price order should be equal to the number of no responses – both when the price step size is $10 and $20, and

(b) number of yes (no) responses in ascending (descending) price order should be the same whether the price step size is $10 or $20.

However, any systematic influence of price order and step size on the number of responses would indicate that the respondents do not mindlessly respond to a certain number of screens but rather engage in active decision making at each level of presented price.

2.8.1 DESIGN AND PROCEDURE

We adopt a 2 (price presentation order: ascending vs. descending) × 2 (price step size: \$10 vs. \$20) between-subject factorial design. One hundred and ninety-eight undergraduate students (57% female; M_{age} = 20.76) took part in this study in exchange of course credit. The price presentation order was manipulated as in study 1, but we used different price levels, such that the prices varied from \$10 to \$110 rather than from \$10 to \$100. Then we manipulated the price step size by varying the prices in the self-decided price elicitation procedure, using either steps of \$10 or \$20.

Also, unlike previous study where the respondents had to answer to all price levels in the experimental paradigm, this study was programmed to not show the price levels beyond the respondents' maximum willingness to pay. That is, in the ascending (descending) price condition, the final price shown to respondents was the price at which they said no (yes) to the product. This was done to avoid the preference reversals that were observed in the previous two studies.

We also made two other changes, relative to study 1. First, to increase generalizability, we changed the product (room heater plus cooler). Second, we measured perceived product quality. That is, after responding to the self-decided price elicitation procedure, respondents completed four Likert scale items (α = .92) to gauge their expected product quality ("What is the most likely durability of this heater/cooler?" (scale from 1 = "Very Poor Durability" to 7 = "Very Good Durability"), "What is the most likely quality of the heating function of this heater/cooler?", "What is the most likely quality of the cooling function of this heater/cooler?",

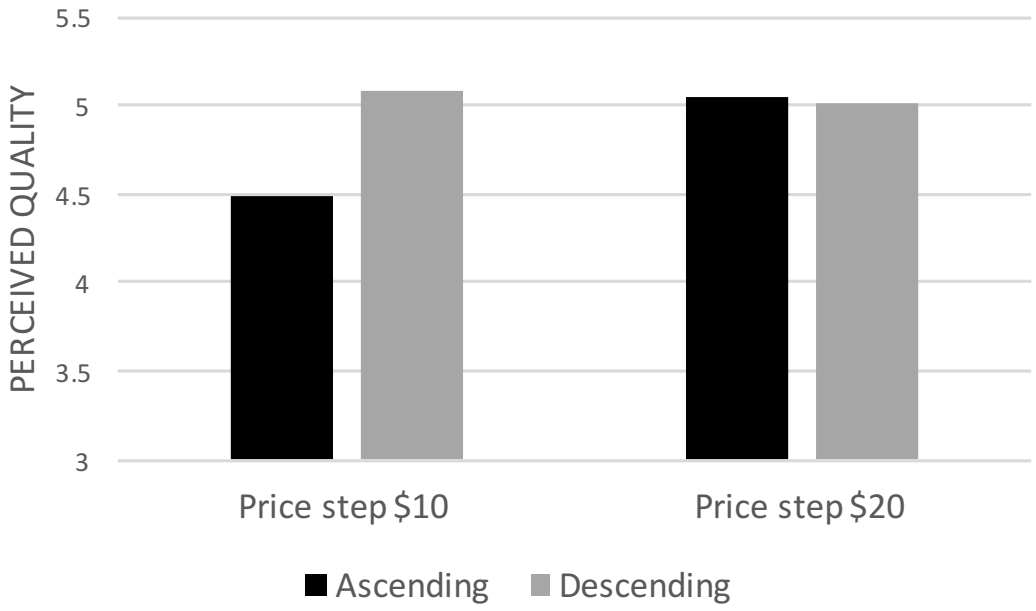
"What is the most likely overall quality of this heater/cooler?" (scales from 1 = "Very Poor Quality" to 7 = "Very Good Quality")).

2.8.2 RESULTS

A general linear model procedure tests the main effects of price presentation order, price steps, and their interaction on self-decided prices. The main effect of the price presentation order on self-decided prices again is significant ($M_{ascending}$ = \$42.50, SD = 23.24; $M_{descending}$ = \$92.65, SD = 27.68; $F(1, 194) = 191.88$; $p < .001$; $d = 1.96$), but the main effect of the price steps (\$10 vs. \$20) is not ($M_{pricestep\_\$10}$ = \$67.62, SD = 36.77; $M_{pricestep\_\$20}$ = \$67.01, SD = 34.92; $F(1, 194) = .035$; $p = .85$). We find a significant interaction between price presentation order and price steps ($F(1, 194) = 4.18$, $p = .042$). As expected, planned contrasts revealed that the influence of price presentation order on the self-decided prices is stronger when price step size is \$10 ($M_{ascending}$ = \$39.22, SD = 22.17; $M_{descending}$ = \$96.60, SD = 23.70; $F(1, 194) = 128.96$; $p < .001$) than when the price step size is \$20 ($M_{ascending}$ = \$45.92, SD = 24.06; $M_{descending}$ = \$88.54, SD = 31.01; $F(1, 194) = 68.33$; $p < .001$). If self-decided prices inform product inferences (rather than the initial prices consumers encounter), we should observe similar interactions for expected product quality, and the results confirm this prediction. We find a significant interaction between price presentation order and price step sizes for expected product quality ($F(1, 194) = 3.94$, $p = .049$). Planned contrasts revealed that ascending price presentation order results in lower perceived product quality when the price step size is \$10 ($M_{ascending}$ = 4.49, SD = 1.11; $M_{descending}$ = 5.08, SD = .98; $F(1, 194) = 7.16$; $p = .008$) but not when it is \$20 ($M_{ascending}$ = 5.05, SD = 1.30; $M_{descending}$ = 5.01, SD = 1.05; $F(1, 194) = .02$; $p = .88$) (see figure 1).

FIGURE 1

STUDY 2: INFLUENCE OF INTERACTION BETWEEN PRICE ORDER AND PRICE STEP ON PERCEIVED QUALITY



We also ran a moderated mediation model (PROCESS model 7; 10,000 bootstrap samples; Preacher and Hayes 2008) to test whether the price step size moderates the indirect effect of price presentation order on expected product quality through self-decided prices. The index of moderated mediation (.19, SE = .10; 95% CI = [.01, .41]) is significant, indicating that the conditional indirect effect through self-decided prices is significantly stronger when price step size is $10 (indirect effect estimate = .75; *SE* = .12; 95% CI = [.54, .99]), as compared to when price step size is $20 (indirect effect estimate = .56; *SE* = .10; 95% CI = [.39, .79]).

2.8.3 DISCUSSION

This study shows that higher self-decided prices, not higher starting prices, represent the underlying reason for more favorable product inferences in the case of descending (vs. ascending) price order. We also use a different product, which increases the generalizability of the results.

2.9 STUDY 3

This study shows that the effect of self-decided prices on product inferences cannot be attributed to prior product expectations. Specifically, we manipulate the prior quality expectations of products and show that the influence of self-decided prices on perceived quality is over and above the effect of prior product quality expectations.

2.9.1 DESIGN AND PROCEDURE

We adopt a 2 (price presentation order: ascending vs. descending) × 2 (quality cue: present vs. absent) between-subject factorial design. Two hundred and forty MTurk panelists (55% female; M_{age} = 37.13) took part in this study in exchange for token compensation. The price presentation order was manipulated as in the previous two studies. The prices varied from \$15 to \$60, in steps of \$5. The product used for this study was a bottle of wine (see details in appendix A). We provided detailed description of the wine bottle, including wine variety and

price range. In the quality cue present condition, respondents were shown that the bottle of wine had won two awards. This award information was absent in the quality cue absent condition. A pre-test indicated that the presence of the award information results in significantly higher perceived quality ($M_{award\_present}$ = 4.81, SD = 1.07; M_{award_absent} = 4.11, SD = 1.13; $F(1, 84) = 8.78$; $p = .004$; $d = .64$).

We also made two other changes, relative to the previous studies. First, to increase generalizability, we changed the product (wine). Second, we also provided a price range for the product ($15 to $60) in the product description itself to rule out the possibility that the effect obtained in the previous studies is due to the fact respondents did not have any price information other than their self-decided price. That is, it is possible that in the absence of prior price expectations about the presented product and any relevant external price cues, self-decided prices emerge as the salient price cue. However, when consumers have prior price expectations about the product or when they are provided with an external price cue, they would no longer utilize their self-decided price to make quality inferences. In order to test this, we provide a price range for the focal product along with other relevant details about the product. Also, the provided price range information is the same as the range of prices on which the respondents are subsequently asked to indicate their willingness-to-buy. This is helpful in two ways. First, it would encourage consumers to consider each of the presented prices (including the smallest and the largest prices) as plausible prices. Second, given that the price range information is the same across the ascending and descending price order conditions, any systematic differences between the conditions in terms of expected quality would then be solely due to the difference in self-decided prices.

After responding to the self-decided price elicitation procedure, respondents completed five Likert scale items ($\alpha = .95$) to gauge their perceptions regarding product quality. These items were: 1) "How good would this wine taste? (scale from 1= "Very Bad" to 7 = "Very Good"); 2) "What is the most likely quality of the grape variety that has been used in this wine?", 3) "What is the most likely quality of this brand of wine?", 4) "What is the most likely overall quality of this bottle of wine?" (scales from 1 = "Very Poor Quality" to 7 = "Very Good Quality"); and 5) "How prestigious do you think are the awards that have been given to this wine?" (Quality cue present condition), or "Imagine that this bottle of wine has been given some awards. How prestigious do you think are the awards that have been given to this wine?" (Quality cue absent condition) (scales from 1 = "Not Prestigious at All" to 7 = "Very Prestigious").

2.9.2 RESULTS

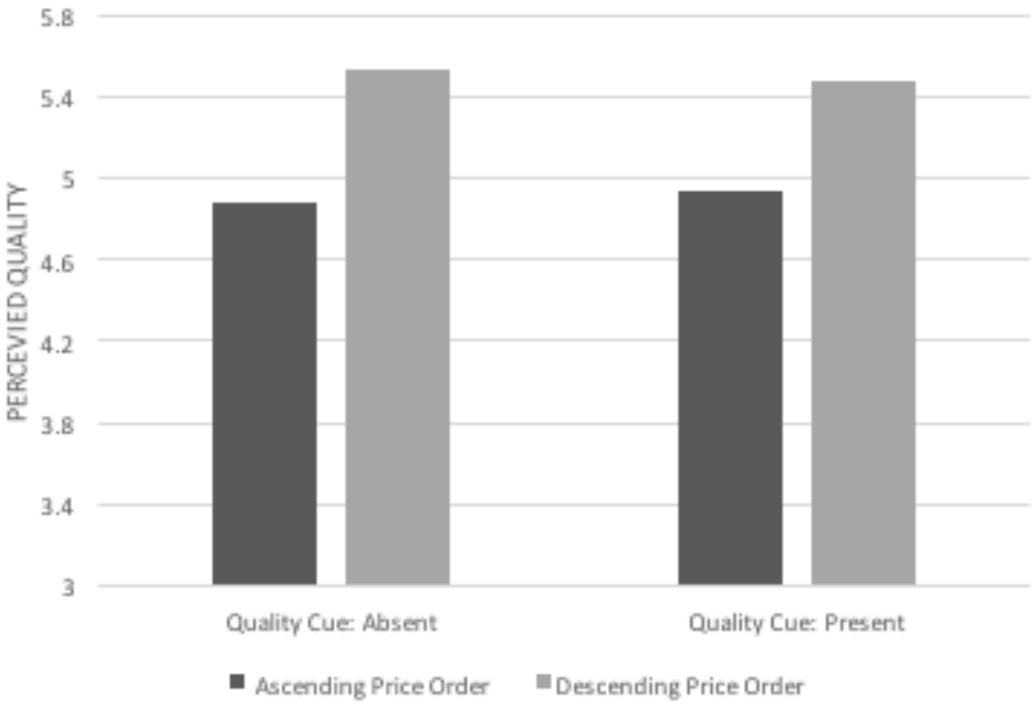
A general linear model procedure tests the main effects of price presentation order, prior quality expectations, and their interaction on self-decided prices. The main effect of the price presentation order on self-decided prices again is significant ($M_{ascending}$ = \$22.10, SD = 13.85; $M_{descending}$ = \$36.94, SD = 20.26; $F(1, 236) = 44.00$; $p < .001$; $d = .86$), but the main effect of the prior quality expectations (quality cue: present vs. absent) is not ($M_{quality\ cue:\ present}$ = \$28.88, SD = 19.34; $M_{quality\ cue:\ absent}$ = \$30.29, SD = 18.44; $F(1, 236) = .74$; $p = .39$). There was no interaction between price presentation order and prior quality expectation ($F(1, 236) = 1.61$, $p = .21$).

If self-decided prices inform product inferences over and above the effect of the prior quality expectations that consumers have, we should observe (a) a significant main effect of

price order on perceived quality, and (b) no interaction between price order and prior quality expectation on perceived quality. The results confirm this prediction. We find that the while the main effect of price presentation order on perceived quality is significant ($M_{ascending}$ = 4.90, *SD* = 1.39; $M_{descending}$ = 5.50, *SD* = 1.09; $F(1, 236) = 13.63$; $p < .001$; $d = .48$), the main effect of prior quality expectations ($M_{quality\ cue:\ present}$ = 5.21, *SD* = 1.26; $M_{quality\ cue:\ absent}$ = 5.20, *SD* = 1.30; $F(1, 236) = .002$; $p = .96$), and the interaction between price presentation order and prior quality expectations ($F(1, 236) = .123$, $p = .73$) are not significant. (see figure 2).

FIGURE 2

STUDY 3: INFLUENCE OF INTERACTION PRICE ORDER AND QUALITY CUE ON PERCEIVED QUALITY



We also ran a moderated mediation model (PROCESS model 7; 10,000 bootstrap samples; Preacher and Hayes 2008) to test whether the prior quality expectation moderates the indirect effect of price presentation order on perceived quality through self-decided prices. The index of moderated mediation (.17, SE = .14; 95% CI = [-.08, 46]) is not significant. Conditional indirect tests indicate that self-decided prices mediates the effect of price presentation order on perceived quality both when the quality cue is present (indirect effect estimate = .52; *SE* = .12; 95% CI = [.32, .79]), and when the quality cue is absent (indirect effect estimate = .36; *SE* = .11; 95% CI = [.17, .59]).

2.9.3 DISCUSSION

This study shows that the influence of self-decided prices on perceived quality cannot be attributed to prior expectations of quality. By systematically manipulating prior expected quality, we show that self-decided prices influence perceived quality over and above the effect of prior expected quality.

In our next five studies, we adopt a different experimental procedure to test the non-normative influence of self-decided prices on product-related inferences, for two main reasons. First, with a different experimental procedure, we can confirm the robustness of the proposed effect. Second, whereas studies 1 and 2 subtly manipulate participants' self-decided prices, in the remaining studies we turn to a paradigm in which they are virtually constrained by the situation, which renders cognitive dissonance and self-perception explanations less plausible.

2.10 STUDY 4

The study design involved a fictitious game show. Participants had to imagine being contestants in a game show with multiple rounds, each of which entailed a two-step procedure. They first had to bid for the opportunity to spin a wheel, marked by various products. If their bid exceeded a randomly determined amount, they proceeded to the second step, in which they got to spin the product wheel and received whatever product the wheel signaled. If their bid fell short, they proceeded to the next round. Irrespective of whether they won or lost the bid, the bid amount was subtracted from their allotted budget. The experimental procedure focused on the last round. Participants read that they had either a lot or a little money left and that they could not keep any of the money after the last round. Logically then, they should bid all of their budget.

With this paradigm, we elicit an arbitrary, self-decided price that is totally dictated by the situation. Participants thus should not consider their bidding behavior diagnostic of their intrinsic product valuation (self-perception theory), nor should they feel dissonance if they ascribe low value to the product when the amount bid is high (cognitive dissonance theory). Any systematic differences across experimental conditions (low vs. high bid amounts), in terms of product inferences, thus imply a mindless overreliance on the price–quality heuristic.

2.10.1 DESIGN AND PROCEDURE

One hundred thirty undergraduate students (68% female; M_{age} = 20.56) took part in this study in exchange for course credit. In the two-step, interactive, online game simulation, respondents read that they were taking part in a game called “Wheel of Fortune.” In the first step,

they had a certain amount of game money to use and were required to bid a certain amount to play. Then in the second step, they saw the virtual wheel (appendix B), which contained a list of products, and had to spin that wheel.

Thus in the first step, respondents blindly bid an amount that they wished to play in that round, even without seeing the wheel of products, let alone knowing which product they could win. To manipulate the amount bid, we asked respondents to imagine that they were in the last stage of the game and were left with either $20 (low remaining budget condition) or $100 (high remaining budget condition) in game money, which was non-transferrable to cash or credit, so any amount not bid would be useless. After respondents spun the wheel, they learned that they had won a pair of sunglasses, and they indicated their expectations of product quality on two seven-point Likert-scale items ($\alpha = .92$) ("What do you think would be the quality of the pair of sunglasses?" and "What is the most likely quality of the pair of sunglasses?").

2.10.2 RESULTS

As expected, the bid amounts are significantly higher when the remaining budget is large (M_{large_budget} = \$89.85, SD = 23.22) rather than small (M_{small_budget} = \$18.69, SD = 4.05; $F(1, 128) = 592.45$, $p < .001$, $d = 4.27$). The expected product quality of the sunglasses also is higher when the remaining budget is large ($M_{large\_budget} = 4.60$, $SD = 1.55$) rather than small ($M_{small\_budget} = 3.86$, $SD = 1.49$; $F(1, 128) = 7.68$, $p = .006$, $d = .49$).

2.10.3 DISCUSSION

Self-decided prices (operationalized as a bid amount) influence consumers' product-related inferences. We find that the expected quality of a pair of sunglasses increases when the amount bid is higher. Yet the respondents bid this amount blindly, and the self-decided prices were entirely constrained by the situation. Thus, participants should not have anticipated that their self-decided prices provided any information about the product. They also should not sense any cognitive tension when indicating product value or think that prices reflect their attitudes. Therefore, the potential alternative mechanisms, derived from self-perception and cognitive dissonance theories, appear very implausible.

2.11 STUDY 5

To rule out these self-perception and cognitive dissonance theory–based accounts even more definitively, in study 4 we ask participants to imagine either being a game show contestant (actor perspective) or watching another game show contestant (observer perspective). In the latter condition, participants do not take participate in the game but rather observe a distinct other participate in the game. From an observer perspective, self-perception and cognitive dissonance are irrelevant, but the suggested bid amount might continue to affect product inferences if consumers mindlessly apply the price–quality heuristic.

2.11.1 DESIGN AND PROCEDURE

One hundred and eighty-five undergraduate students (64% female; M_{age} = 20.83) took part in this study in exchange for course credit. It features the Wheel of Fortune game from study 4, with some key differences. First, study 5 uses a 2 (remaining budget: small vs. large) × 2 (perspective: actor vs. observer) between-subject factorial design. Similar to study 4, we manipulated the remaining budget by telling respondents that they were participating in the last stage of the game and were left with either $20 (small remaining budget condition) or $100 (large remaining budget condition). However, we also manipulated the perspective (actor vs. observer) that respondents took while participating in the game, by telling them that they were participating in the game themselves (actor perspective condition) or were watching someone else play the game on television (observer perspective condition). Second, study 5 includes another design element (bid amount–based qualification) to account for the potential alternate mechanisms of cognitive dissonance and self-perception. Before respondents bid an amount, they read that they would be eligible to play only if their bid was larger than a randomly generated number between 0 and 200. Thus, respondents had a motivation to bid the largest amount possible. By providing an explicit reason to maximize their bid amounts, we ensure that respondents do not anchor on the bid amount as an indicator of intrinsic product valuation (self-perception mechanism) or adjust their product inferences to reduce dissonance (cognitive dissonance mechanism). Third, in the actor perspective condition, the bid amount was elicited in the same manner as in study 4, but the observer perspective condition involved a small difference. These respondents were told that they were only watching the game and that the

player had decided to bid $20 ($100) in the small (large) remaining budget condition. The dependent measures are identical to those from study 4.

2.11.2 RESULTS

As expected, in the actor perspective, the bid amount in the small budget condition (M_{small_budget} = \$17.91, SD = 4.70) is lower than that in the large budget condition (M_{large_budget} = \$89.04, SD = 25.27; $F(1, 89) = 344.90$, $p < .001$, $d = 3.91$). A general linear model, with the remaining budget (small vs. large), perspective (actor vs. observer), and their interaction, reveals that the main effect of bid amount on expected product quality is significant (M_{small_budget} = 3.87, SD = 1.19; M_{large_budget} = 4.56, SD = 1.53; $F(1, 182) = 11.9$, $p = .001$, $d = .50$), whereas the main effect of perspective ($F(1, 182) = .02$, $p = .90$) and the interaction between remaining budget and perspective ($F(1, 182) = .59$, $p = .44$) are not significant.

2.11.3 DISCUSSION

This study conclusively rules out self-perception and cognitive dissonance as underlying reasons to explain why self-decided prices affect product-related inferences. It does not confirm our proposed mechanism though. This confirmation is the aim of the next two studies.

2.12 STUDY 6

To test if the influence of self-decided prices on product-related inferences is due to an overreliance on the price–quality heuristic, we examine if individual differences in price–quality schema moderate the effect. We predict that self-decided prices lead to stronger product inferences among people who more strongly believe that price and quality are related.

2.12.1 DESIGN AND PROCEDURE

One hundred nineteen undergraduate students (53% female; M_{age} = 20.87) took part in this study in exchange for course credit. They were randomly assigned to one of two conditions (remaining budget: \$20 vs. \$100; all with the actor perspective). After completing questions regarding their bid amount and expected product quality, participants filled out a four-item scale to measure their price–quality schema (α = .89; Lichtenstein and Burton, 1989). These scale items are in appendix C.

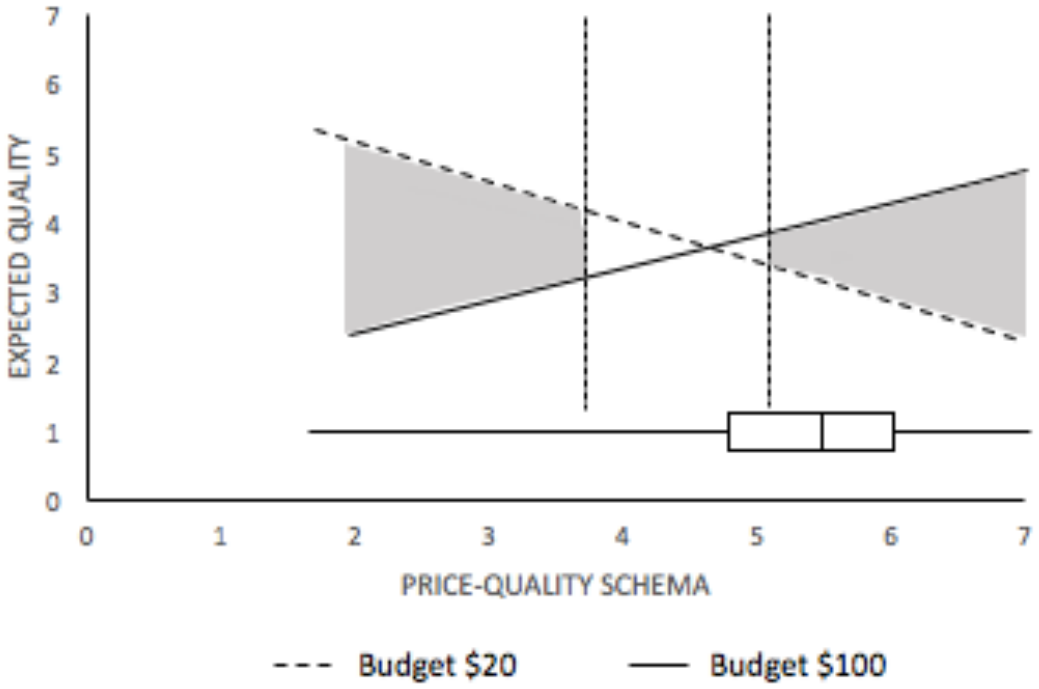
2.12.2 RESULTS

The bid amount in the small budget condition (M_{small_budget} = \$17.55, SD = 5.16) again is lower than that in the large budget condition (M_{large_budget} = \$89.05, SD = 21.62; F(1, 117) = 620.51, p < .001, d = 4.55). As predicted, the expected product quality is higher in the large budget condition (M_{large_budget} = 4.06, SD = 1.55) compared with the small budget condition (M_{small_budget} = 3.41, SD = 1.61; F(1, 117) = 5.06, p = .03, d = .41). To test for moderation by the

price–quality schema, we estimated a general linear model that contained the remaining budget (as a dummy), price–quality schema, and their interaction. We find a significant interaction ($F(1, 115) = 17.32$, $p < .001$). When we estimate Johnson-Neyman regions of significance, somewhat surprisingly, we identify two regions (see figure 3).

FIGURE 3

STUDY 6: JOHNSON-NEYMAN REGIONS



The first region (3.74 or lower) indicates that participants who do not equate price and quality in general expect higher quality when the self-decided price is lower; we have no good explanation for this surprising outcome, though we note that it pertains to a small portion of the sample (8.4%). The second region (5.15 or higher) involves a much higher portion of the overall

sample (63.05%), and it suggests that people are more likely to expect higher quality when their self-decided price is higher, even if the latter is entirely contextually determined.

2.12.3 DISCUSSION

This study provides evidence that the non-normative influence of self-decided prices on product inferences is due to consumers' tendency to use a price–quality heuristic, which they even apply to their own self-decided prices.

2.13 STUDY 7

If consumers rely too much on the price–quality heuristic when considering self-decided prices, they presumably do so rather mindlessly. In that case, making consumers mindful of the arbitrary nature of their self-decided prices should reduce their tendency to draw on those prices to infer value. With study 7, we test this prediction and also seek to replicate the moderation by price–quality schema that we found in study 6.

2.13.1 DESIGN AND PROCEDURE

Two hundred thirty-nine participants (64% female; M_{age} = 38.13) from online consumer panel (Amazon MTurk) took part in this study in exchange for token compensation. They played the Wheel of Fortune game, with a 2 (remaining budget: small vs. large) × 2 (reminder intervention: absent vs. present) between-subjects design. For the experimental conditions with a

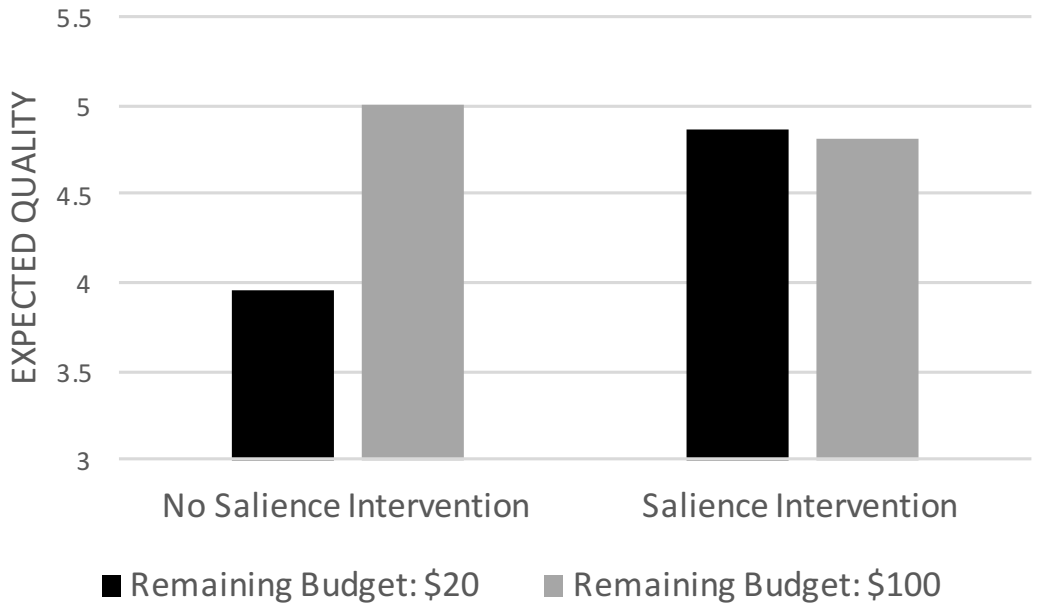
reminder intervention, we asked respondents to acknowledge that the bid amount was random in nature and not connected in any way to the asking price of the product, before they responded to the expected product quality measures. For the experimental conditions without a reminder intervention, respondents only completed the expected quality items. All respondents then filled out the price–quality schema scale from study 6.

2.13.2 RESULTS

Again, the overall bid amount is significantly higher in the large budget condition (M_{large_budget} = \$82.68, SD = 27.48) than in the small budget condition (M_{small_budget} = \$17.98, SD = 4.03; $F(1, 237) = 640.58$, $p < .001$, $d = 3.29$). The general linear model with remaining budget and reminder intervention as fixed factors and expected quality as the dependent variable indicates significant main effects of remaining budget (M_{large_budget} = 4.90, SD = 1.32; M_{small_budget} = 4.38, SD = 1.49; $F(1, 235) = 7.94$, $p = .005$, $d = .37$) and reminder intervention ($M_{intervention\_present}$ = 4.44, SD = 1.44; $M_{intervention\_absent}$ = 4.84, SD = 1.39; $F(1, 235) = 4.20$, $p = .04$, $d = .28$). In addition, we find a significant interaction between remaining budget and reminder intervention ($F(1, 235) = 9.44$, $p = .002$) (figure 4). Expected product quality is significantly higher in the large budget condition (M_{large_budget} = 5.00, SD = 1.21) compared with the small budget condition (M_{small_budget} = 3.95, SD = 1.46; $F(1, 235) = 17.16$, $p < .001$, $d = .78$) if the reminder intervention is absent, but it is not when the reminder intervention appears (M_{large_budget} = 4.82, SD = 1.41; M_{small_budget} = 4.86, SD = 1.38; $F(1, 235) = .03$, $p = .86$).

FIGURE 4

STUDY 7: EXPECTED QUALITYAS A FUNCTION OF THE SALIENCE OF THE ARBITRARY NATURE OF SELF-DEFINED PRICES

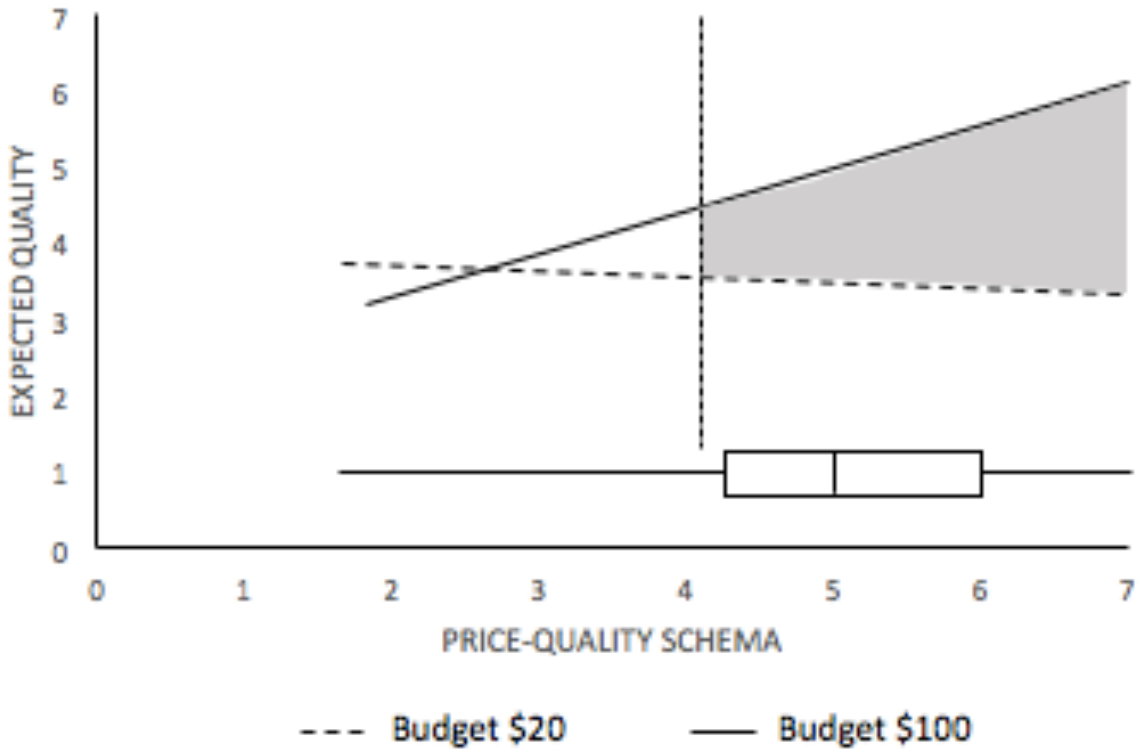


In a general linear model with two fixed factors (remaining budget and reminder intervention) and a continuous factor (price-quality schema), we identify a significant three-way interaction *(*$F(1, 231) = 4.14$, $p = .04$). In support of the robustness of the study 6 findings, we find a significant interaction ($F(1, 114) = 7.63$, $p = .007$) between price–quality schema and remaining budget when the reminder intervention is absent, but the interaction is not significant ($F(1, 117) = .001$, $p = .97$) when the reminder intervention is present. A Johnson-Neyman significance analysis helps unpack the significant interaction between the price–quality schema and remaining budget without a reminder intervention. One region, associated with price–quality schema values of 4.16 or higher, accounts for 77% of the participants. The effect of the remaining budget on expected quality is significant only among people whose price–quality

schema values fall in this region (see figure 5). That is, the remaining budget affected expectations of quality among 77% of the participants. We do not replicate the significant but unexpected reverse effect at the low end of the scale that we found in study 6.

FIGURE 5

STUDY 7: JOHNSON-NEYMAN REGION



2.13.3 DISCUSSION

This study provides further evidence that a mindless over application of the price–quality heuristic is the underlying reason that bid amounts influence expected quality. We show not only that the effect of bid amounts on expected quality is moderated by price–quality schema but also

that the effect disappears when participants are reminded of the arbitrary nature of their bid amounts.

2.14 STUDY 8

Previous studies show the robustness of the influence of self-decided prices on product inferences and that this is due to over-application of price-quality schema. Further, we also show that self-perception theory or cognitive dissonance theory cannot be used to explain the effect. In this study we show that selective accessibility theory too is not the underlying process for the effect. Selective accessibility theory predicts that priming consumers with large (vs. small) amount of money would systematically result in higher perceived quality regardless of the normative price range for the product. However, price-quality schema would predict that the self-decided prices alone would interact with the normative price range for a product in influencing the perceived quality. That is, paying an amount which is at the high (vs. low) end of the price range of a product that is normatively cheap (vs. expensive) should result in higher perceived quality even though it is a smaller amount of money. In other words, a consumer would have a higher perceptions of product quality when paying an amount (say, $X) that is at the high end of the price range of a product that is normatively cheap than when paying an amount ($Y) that is the low end of the price range of a product that is normatively expensive. Price-quality schema would predict that this would occur even if the amount $X is less than the amount $Y. However, the selective accessibility model, which completely ignores the normative price range of the product, would not predict this result especially when the amount $X is less than the amount $Y.

2.14.1 DESIGN AND PROCEDURE

One hundred and ninety-four undergraduate students (66% female; M_{age} = 21.80) took part in this study in exchange for course credit. They played the Wheel of Fortune game, with a 2 (remaining budget: small vs. large) × 2 (wine case size: 5 bottles vs. 20 bottles) between-subjects design. The product used in this study was a case of wine. For the experimental conditions in which the normative price range was $20 to $100, we told respondents that they had won a case of wine containing 5 bottles. For the experimental conditions in which the normative price range was $80 to $400, we told respondents that they had won a case of wine containing 20 bottles. Now, a typical bottle of wine ranges from $4-$5 at the low end to $20 at the high end. Indeed a pre-test testing the perceived availability, quality, and expensiveness of wine bottles priced at $1, $4, $5, and $20 (within-subjects) indicates that:

(a) while there is no difference in the perceived availability of wine bottles priced $4 (% considering available: 89.42%), $5 (% considering available: 92.94%), and $20 (% considering available: 91.76%) ($F(2, 83) = .64$, $p = .53$), wine bottle priced at $1 (% considering available: 9.41%) is considered to be significantly less available than each of these prices: $1 vs. $4 ($F(1, 84) = 336.00$, $p < .001$), $1 vs. $5 ($F(1, 84) = 426.00$, $p < .001$), and $20 ($F(1, 84) = 392.00$, $p < .001$),

(b) on a scale from 1 (low quality) to 7 (high quality), wine bottles priced at $4 ($M_{quality_\$4} = 2.76$) and $5 ($M_{quality_\$5} = 2.82$) are expected to be significantly lower in quality as compared to a wine bottle priced at $20 ($M_{quality_\$20} = 5.35$) (vs. $4 ($F(1, 84) = 298.78$, $p < .001$), and vs. $5 ($F(1, 84) = 294.382$, $p < .001$), and

(c) on a scale of 1(low price) to 7 (high price) with midpoint of 4 labeled as average price, while prices of \$1 ($M_{perceivedprice\_\$1}$ = 1.11, $t(84)$ = -47.92, $p < .001$), \$4 ($M_{perceivedprice\_\$4}$ = 2.01, $t(84)$ = -15.15, $p < .001$), and \$5 ($M_{perceivedprice\_\$5}$ = 2.26, $t(84)$ = -13.64, $p < .001$) are perceived to be significantly lower than the average price for a wine bottle, price of \$20 ($M_{perceivedprice\_\$20}$ = 5.47, $t(84)$ = 11.02, $p < .001$) is perceived to be significantly higher than the average price for a wine bottle.

A second pre-test indicated that the average price of a bottle of wine purchased by college students ranges from \$10 to \$15. Taken together, the results of the pre-tests can help us conclude that (a) a price of \$1 per bottle is implausible as very few respondents actually consider such a wine bottle to be available in the market, and (b) a price of \$4-\$5 (\$20) would be considered to be at the low (high) end of the normative price range for a bottle of wine. Thus, the normative price range of a case of wine containing 5 bottles (20 bottles) should range from \$20 to \$100 (\$80 to \$400). Selective accessibility theory would predict that the perceived quality of wine would be higher for respondents in the high (vs. low) remaining budget condition regardless of whether they had won a case of wine with 5 bottles or 20 bottles. However, price-quality schema would predict that there would be an interaction between remaining budget and wine case size.

For the case of wine with 5 bottles, \$100 (vs. \$20) remaining budget condition would systematically result in higher expected quality of wine because the former implies a self-decided price of \$20 per bottle and the latter \$4 per bottle. In both situations, the price is plausible and participants would likely apply a price-quality schema to them. The results for a case of wine with 20 bottles would be very different. If participants decide on \$100 for the case, this implies \$4 per bottle, which signals low quality. However, if participants decide on \$20 for

the case, this implies $1 per bottle. Because this price is very unlikely, participants may be unlikely to apply any price-quality schema to it. In this situation, they may simply anticipate the wine to be fairly average and thus higher than when they receive only 5 bottles.

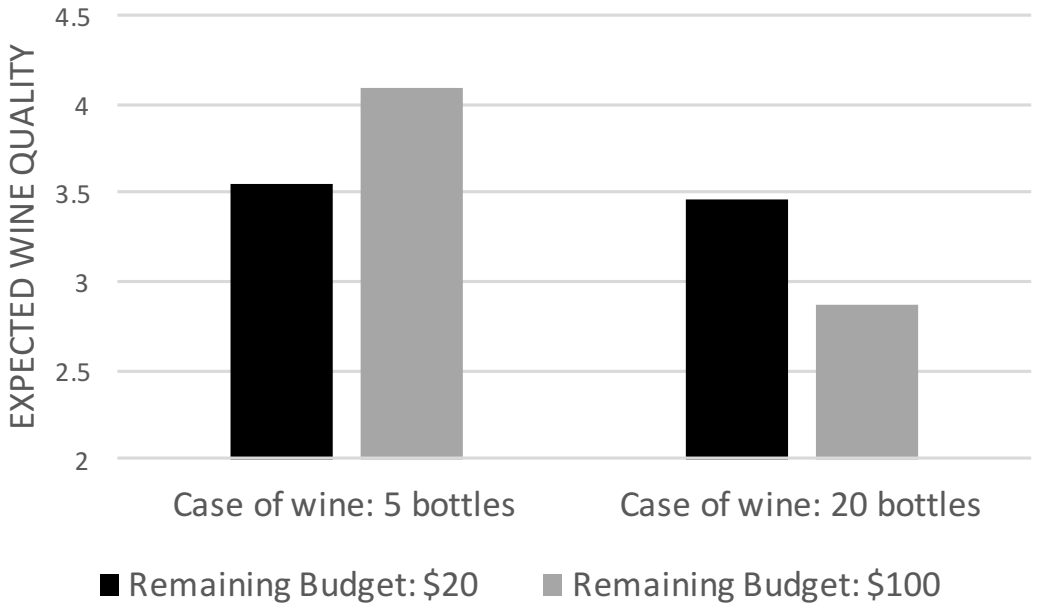
2.14.2 RESULTS

Again, the overall bid amount is significantly higher in the large budget condition (M_{large_budget} = \$88.79, SD = 20.24) than in the small budget condition (M_{small_budget} = \$18.12, SD = 3.55; $F(1, 190) = 1086.73$, $p < .001$, $d = 4.86$). The general linear model with remaining budget and normative price range as fixed factors and expected quality as the dependent variable indicates a significant main effect of normative price range ($M_{\#bottles\_5}$ = 3.88, SD = 1.20; $M_{\#bottles\_20}$ = 3.24, SD = 1.42; $F(1, 190) = 12.00$, $p = .001$, $d = .49$) but no main effect of remaining budget (M_{large_budget} = 3.63, SD = 1.30; M_{small_budget} = 3.50, SD = 1.39; $F(1, 190) = .029$, $p = .87$). More importantly, we find a significant interaction between remaining budget and the number of bottles in the case ($F(1, 190) = 9.10$, $p = .003$) (figure 6). As observed in the previous studies, when the number of bottles in the case was 5, the expected product quality is significantly higher in the large budget condition (M_{large_budget} = 4.09, SD = 1.15) compared with the small budget condition (M_{small_budget} = 3.55, SD = 1.20; $F(1, 190) = 4.17$, $p = .043$, $d = .46$). However, when the number of bottles in the case was 20, the expected quality is significantly lower in the large budget condition (M_{large_budget} = 2.86, SD = 1.19) compared with the small budget condition (M_{small_budget} = 3.47, SD = 1.51; $F(1, 190) = 4.94$, $p = .027$, $d = .45$). Selective accessibility theory can explain the pattern of results obtained for the 5 bottle case conditions but not for the 20 bottle case conditions.

Further, planned contrasts reveal that, contrary to the predictions of the selective accessibility theory, the expected product quality in the large remaining budget is higher when the wine case has 5 bottles ($M_{\#bottles\_5}$ = 4.09, SD = 1.15) than when the wine case has 20 bottles ($M_{\#bottles\_20}$ = 2.86, SD = 1.19; $F(1, 190) = 25.11$, $p < .001$, $d = 1.05$).

FIGURE 6

STUDY 8: EXPECTED QUALITYAS A FUNCTION OF THE INTERACTION BETWEEN SELF-DECIDED PRICES AND CASE SIZE



2.14.3 DISCUSSION

This study provides further evidence that over application of the price–quality heuristic is the underlying reason that self-decided prices influence expected quality. We also show that the effect cannot be attributed to selective accessibility theory which would have predicted that the

perceived quality would have been higher for remaining budget high (vs. low) conditions regardless of the normative price range. This is because the selective accessibility model (but not price quality schema) would predict that the self-decided price does not need to be applied to the product in order to diagnose its quality. Thus, while this theory would expect any self-decided price to be considered as being diagnostic of product quality, price quality schema would predict that only those self-decided prices which can actually be applied to the product be considered as diagnostic of product quality. Indeed, our results provide evidence for this by showing that the effect obtained when the normative price range is $20 to $100 reverses when the price range is $80 to $400 – results which are consistent with price-quality schema but not selective accessibility theory.

2.15 STUDY 9

This study provides further evidence for the involvement of the price-quality schema in the underlying process. Further, it also shows that the underlying effect cannot be attributed to the selective accessibility model. In order to test the selective accessibility model based process account, we elicit expected product quality both before and after the product is revealed in the wheel of fortune game scenario. Selective accessibility model would predict that the expected product quality would be higher in the high (vs. low) bid amount condition both when the expected product quality is measured before and after the product is revealed. This is because the selective accessibility model would predict that a self-decided price can be considered diagnostic of general quality without having to be applied to the specific product. However, our proposed process involving price-quality schema would predict that the expected product quality would be

higher in the high (vs. low) bid amount condition only when the expected product quality is measured after the product is revealed and not when the expected product quality is measured before the product is revealed. This is because knowledge of the product is necessary for the self-decided price to be applied to the product and the price-quality schema to operate.

2.15.1 DESIGN AND PROCEDURE

One hundred and seventy-three undergraduate students (51% female; M_{age} = 21.33) took part in this study in exchange for course credit. They played the Wheel of Fortune game, with a 2 (remaining budget: small vs. large) × 2 (expected quality measure: pre and post product reveal vs. post product reveal only) between-subjects design. The product utilized in this study was a pair of sunglasses. All respondents filled out the expected product quality items from study 4 after the product is revealed in the gameplay. However, in the conditions in which expected quality measure is administered both pre and post product reveal, respondents also answered the following two seven-point Likert-scale items before being showed the product that they won (α = .91) ("What do you think would be the quality of the product you would win?" and "What is the most likely quality of the product you would win?").

2.15.2 RESULTS

Again, the overall bid amount is significantly higher in the large budget condition (M_{large_budget} = \$89.02, SD = 20.98) than in the small budget condition (M_{small_budget} = \$18.47, SD = 3.72; $F(1, 171) = 943.19$, $p < .001$, $d = 4.68$). Further, collapsing across pre & post vs. post

only conditions, the main effect of remaining budget on expected product quality measured post product reveal is significant (M_{small_budget} = 3.21, SD = 1.34; M_{large_budget} = 4.76, SD = 1.48; F(1, 171) = 51.96, p < .001, d = 1.10). Further, the interaction between remaining budget and pre & post vs. post only conditions is not significant (F(1, 171) = .36, p = .55), such that the expected quality measured post product reveal is higher in the large (vs. small) remaining budget condition for both the pre & post condition (M_{small_budget} = 3.20, SD = 1.34; M_{large_budget} = 4.62, SD = 1.61; F(1, 171) = 21.51, p < .001) and for the post condition only (M_{small_budget} = 3.22, SD = 1.36; M_{large_budget} = 4.90, SD = 1.35; F(1, 171) = 30.40, p < .001). However, within the pre & post condition, the main effect of remaining budget on expected product quality measured before product reveal is not significant (M_{small_budget} = 3.94, SD = 1.31; M_{large_budget} = 4.20, SD = 1.39; F(1, 84) = .77, p = .38).

2.15.3 DISCUSSION

This study provides further evidence that a mindless over application of the price–quality heuristic, and not selective accessibility model, is the underlying reason that bid amounts influence expected quality. We show that bid amount influences expected product quality only when the expected product quality is measured post product reveal and not before product reveal.

2.16 GENERAL DISCUSSION

Consumers tend to infer product quality and value from prices. Although the actual price–quality relation often is weak, there is at least some logical basis for this inference; in

competitive marketplaces, higher quality should fetch higher prices. The question that we address in this article is whether consumers still apply this price–quality heuristic to infer quality when they determine the prices themselves. This rather mindless application of the heuristic lacks any logical basis. If anything, consumers should decide the price on the basis of the value they assign to a product.

In nine studies, we find evidence that consumers continue to infer value and quality from self-decided prices, even when they clearly should not. Studies 1, 2, and 3 show that consumers infer higher value for a product when its possible prices appear in descending rather than ascending order. This is due to the fact that people decide on a higher price in the former situation, as long as the difference between adjacent prices is not too high (study 2), and this effect holds regardless of prior expectations of product value (study 3). Our mediation models indicate that self-decided prices are not derived from anticipated value; rather, the link goes the other way. Studies 4–9 rule out alternative explanations derived from cognitive dissonance theory, self-perception theory, and selective accessibility theory and bolster the idea that a mindless application of a price–quality heuristic produces the observed effect. Only people who typically associate price and quality show the effect, but they no longer do so when the arbitrary nature of a self-decided price is made salient.

We thus make several contributions to pricing research. We advance existing theory about how price functions as a proxy for quality, by showing that consumers use not just marketer-provided price information to draw product inferences, but also self-decided prices. In addition, we confirm that they do so through a mindless application of a price–quality heuristic. By demonstrating that price presentation order affects perceived product value, we add to research that identifies its influence on willingness to pay (DeMoranville et al. 2015; Suk et al.

2012) and bid amounts in auctions (Cheema et al. 2012). This important finding is relevant for different situations in which price presentation orders tend to vary, such as auctions, negotiations, and salesperson–customer interactions. In a somewhat more tangential way, our research contributes to price presentation order research, in that it reveals that price step sizes can significantly influence auction outcomes. We manipulated this factor in only one study though, so further research should continue to explore this effect. Finally, we contribute to growing literature on PWYW pricing (Barone et al. 2017; Chen et al. 2017; Gneezy et al. 2012; Jung et al. 2016; Kim et al. 2009, 2014), which thus far has focused primarily on how price anchoring and contextual factors influence consumers' self-decided prices. As our contribution, we note that self-decided prices in a PWYW pricing context can influence the inferences that consumers make about products. In this regard, it is interesting to note that travel websites such as Priceline.com and Hotwire.com offer a blind bidding-based pricing scheme, not unlike the experimental game in our studies 4–9.

Further research could attempt to integrate our findings with research on the winner's curse (Bajari and Hortacsu 2003; Thaler 1988), which suggests that people who win an auction end up overpaying for the product, at least from an economic perspective. Yet the net psychological outcome of bidding high amounts may be positive; according to our findings, bidding large amounts may cause the bidders to increase their valuation of the product, which may increase the satisfaction they derive from obtaining the product. Similarly, buying a product by paying the first (and highest) price a salesperson quotes might bestow the psychological benefit of enhanced subsequent valuation of the product and thus higher satisfaction from its use. Conversely, buying a product after much haggling with a salesperson and managing to obtain it at a rock-bottom price potentially could have negative consequences on subsequent product

valuation and derived satisfaction from use. Still, even if a high price increases anticipated satisfaction, it is unclear how it affects actual satisfaction. On the one hand, a placebo effect could push actual experiences to align with expectations (Gilbert and Wilson 2000; Kahneman and Snell 1992; Wilson et al. 2000). On the other hand, satisfaction research suggests that increased expectations are harder to meet, so they may lead to lower post-consumption satisfaction (Mandel and Nowlis 2008). In a related stream, researchers could explore how deciding on a price affects satisfaction. If the price presentation order affects satisfaction, it conceivably could affect associated outcomes too, like loyalty (Olsen 2002) or word of mouth.

Finally, the sequential multiple price presentation in studies 1 and 2 involved different price levels for the same product. In other situations, consumers may encounter a variety of options that vary in price, such as a suite of hotel options on a webpage. It would be interesting to test whether consumers' self-decided prices are higher when the list of choices is sorted in descending (vs. ascending) order, as well as whether their anticipation is more favorable.

ESSAY 3: THE *PRICE ORDER* EFFECT: THE IMPACT OF PRICE PRESENTATION ORDER ON THE RELATIVE IMPORTANCE OF QUALITY VS. PRICE

3.1 ABSTRACT

In several situations, sellers face the choice between presenting multiple prices to consumers in either ascending or descending order. However, extant research on multiple price presentation does not provide much insight into how the price presentation order can influence the consumer decision making. This research fills this important gap by showing an important way in which price presentation order can influence how consumers make decisions. We show across a series of seven studies that descending (vs. ascending) price presentation order results in significantly greater perceived relative importance of the quality (vs. price) information – an effect we term as the *Price Order* effect. This research makes significant a contribution to the multiple price presentation literature. The managerial implications of this research and the potential avenues for future research are discussed.

3.2 INTRODUCTION

Consumers often confront multiple prices during the same marketplace interaction. In the case of auctions/negotiations (Chakravarti et al. 2002; Cheema, Chakravarti, and Sinha, 2012), consumers encounter multiple prices for the same marketing offering. In the case of a salesperson introducing a suite of products/services (DeMoranville, Klein, and Schoenbachler, 2015), consumers come across multiple prices for a suite of marketing offerings. In both of these cases, the subsequent prices that consumers receive are either strictly increasing or strictly decreasing. While prior research has shown that price presentation order can affect willingness to

pay (DeMoranville et al. 2015; Suk, Lee, and Lichtenstein, 2012), no research has examined if it also affects consumers' decision-making process. In the present paper, we examine this. Across seven studies, we show that the price presentation order influences decision-making process in a fundamentally important way: Confronted with a descending (vs. ascending) price order, consumer tend to consider quality as more important than price – an effect we term as the *price order* effect. This effect can be explained by consumers' higher sensitivity to losses than to gains. In the descending price order condition, the first option people encounter has the highest price but also the highest quality. Each subsequently presented option involves a monetary gain (i.e. lower price) but also a quality loss. This makes consumers more sensitive to the quality than to the price and renders consumers less likely to deviate far from the first offer they consider.

We make important contributions to the existing literature in several important ways. First, we contribute to research on sequential information presentation in general (Biswas, Zhao, and Lehmann 2010; Mogilner, Shiv, and Iyengar 2012), and on sequential price presentation in specific (Chakravarti et al. 2002; Cheema et al. 2012; DeMoranville et al. 2015; Suk et al. 2012), by showing that the price presentation order affects the relative the importance of quality vs. price. Second, we contribute to the existing research on loss aversion by identifying a novel implication of it on consumption decision making – relative weighting of decision attributes. Finally, we offer new insights on the impact of regulatory focus and sense of power on consumer decision making.

3.3 ASCENDING VS. DESCENDING PRICE ORDER

Most of the existing research on price presentation order either focuses on English price auctions (Ariely and Simonson, 2003; Greenleaf, 2004; Kamins, Dreze, and Folkes, 2004), or on Dutch price auctions or price negotiations (Chakravarti et al. 2002; Cheema et al. 2005) and negotiations (Galinsky, Leonardelli, Okhuysen, & Mussweiler, 2005; Galinsky and Mussweiler, 2001; Kray, Thompson, and Galinsky, 2001; Northcraft and Neale, 1987; Whyte and Sebenius, 1997). Most of this research finds that, due to anchoring, the starting price influences the outcome of an auction or a negotiation. In addition, when consumers confront multiple prices, either sequentially (DeMoranville et al. 2015) or simultaneously (Suk et al. 2012), they are more likely to prefer the higher priced alternatives when the options are presented in a descending (vs. ascending) order. While price presentation order may affect willingness to pay (DeMoranville et al. 2015; Suk et al. 2012), it is unclear how this affects consumer decision-making more generally. In order to understand how multiple price presentation order can influence consumer decision making, let us first consider contexts with different price presentation orders.

There are two situations involving multiple price presentation. First, the multiple prices are being presented for the same option – a situation similar to that in a price auction or negotiation. Extant research suggests that in this case the initial anchor price significantly influences the willingness to pay. That is, a lower starting price anchor in the case of ascending (vs. descending) price presentation order results in a significantly lower willingness to pay. Given that the quality of the choice option remains constant, the only difference between the

ascending and descending price orders is that prices are becoming successively less (vs. more) affordable and thus consumers are losing (vs. gaining) on price in the ascending (vs descending) price presentation order. This successive loss (vs. gain) on price should be the only factor, other than the initial price anchor, that influences decision making differently for ascending (vs. descending) price presentation orders.

A second situation involves the presentation of a suite of consumption choice options, in which each choice option differs from the other in terms of quality. For example, a mobile or internet services company can offer multiple plans, each offering different amount of data and accordingly priced differently. A sales representative for this company would typically introduce the options to a consumer by presenting the various price levels (and the associated amounts of mobile data) in the ascending or descending order of prices. Similarly, a camera company can offer multiple camera options, with the options differing in terms of the camera resolution and price. A product catalog designed by this camera company would present the available options either in the ascending or descending order of price (and camera resolution). In such situations, each presented price level corresponds to a distinct quality level. In contrast to the first situation involving multiple price presentations for a single option, there are two differences between the ascending and descending price orders – (a) consumers are successively losing (vs. gaining) on price, and (b) consumers are successively gaining (vs. losing) on quality in the ascending (vs descending) price presentation order. There is scant research on the effect of this relative gain (vs. loss) in quality (vs. price) in the descending (vs. ascending) price presentation orders on consumer decision making.

We argue that prospect theory (Kahneman and Tversky 1979) can help us understand how this interaction between ascending vs. descending price presentation order and gain vs. loss

on price vs. quality influences decision making. Prospect theory suggests that instead of focusing on the absolute utility of a choice option, people are more likely to focus on the relative gain or loss that option presents as compared to alternative options. When adapted to consumption contexts, prospect theory helps explain why consumers are more likely to evaluate the available choice options by comparing across options as compared to evaluate each option individually (Markman and Loewenstein 2010; Nam, Wang, and Lee 2012; Van Horen and Pieters 2012). Prominent examples of this are the attraction (Huber, Payne, and Puto 1982), tradeoff contrasts (Tversky and Simonson 1993), and compromise/extremeness aversion (Neumann, Böckenholt, and Sinha 2016; Simonson and Tversky 1992) effects which show that the likelihood to choose an item from a set of presented choice options changes when the choice set changes. Further, prospect theory research shows that people are more sensitive to losses (vs. gains). That is, keeping all other factors constant consumers are more sensitive to a loss of $100 as compared to a gain of $100. Consequently, it appears that the value function is concave (convex) for gains (losses) (Kahneman and Tversky 1979).

Another interesting finding of the prospect theory research is the status quo bias (Samuelson and Zeckhauser 1988; Chernev 2004). The status-quo bias shows people are unlikely to move from the status quo option that they are endowed with because the potential loss (vs. gain) incurred as a consequence of leaving it loom larger. Consumer research has found this applicable in a variety of interesting contexts, including how merely touching a product results in higher feelings of perceived ownership (Peck and Shu 2009). In the multiple price presentation context, the first presented option may possibly be considered the status quo option, and consumers may be reluctant to move from this option. Thus, when the prices are presented in ascending (descending) order, consumers should be more likely to choose the lowest (highest)

priced option. However, the status quo effect alone cannot provide a complete understanding of the consumer decision making process for multiple price presentation contexts. This is because the status quo effect does not take into account two important factors relevant to the multiple price presentation context: (a) consumers would react to an entire sequence of presented options (and not just the first option presented), and (b) consumers will compare between the presented options using the price vs. quality tradeoff instead of evaluating each option in isolation.

In sum, prospect theory would predict the following:

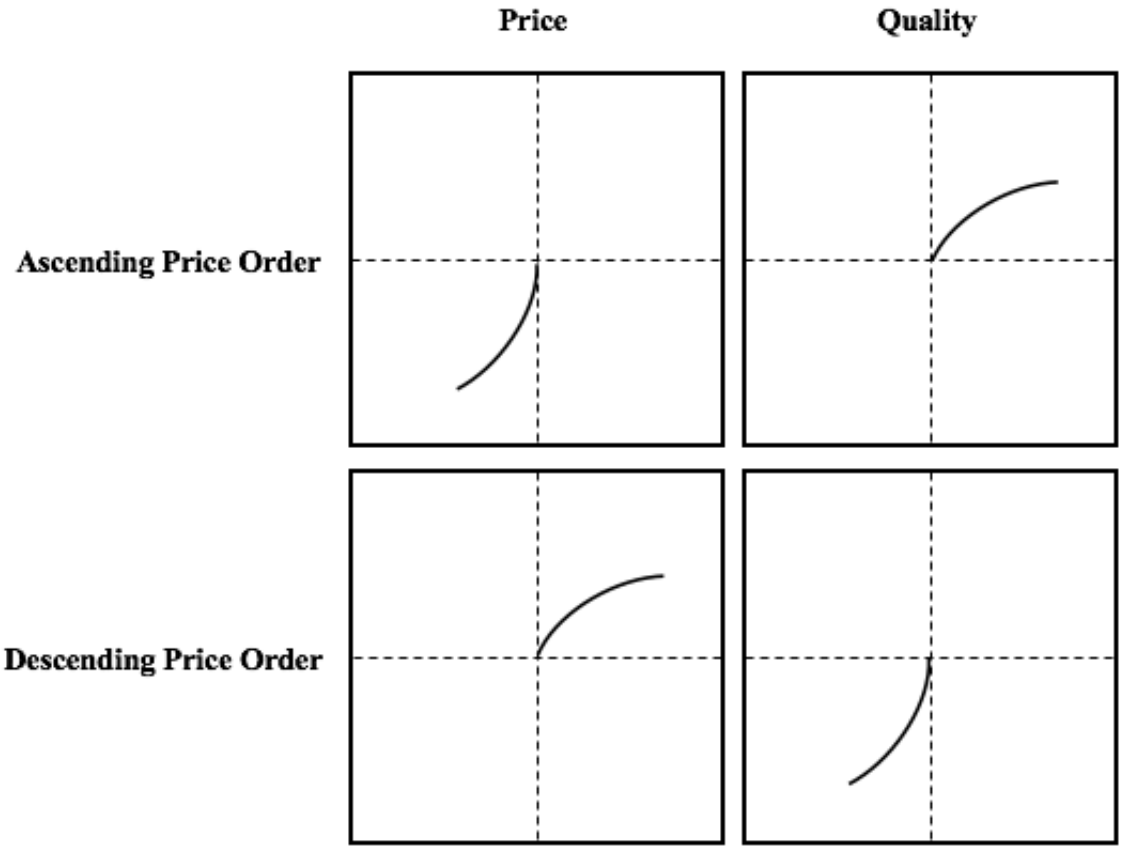
(a) when consumers successively lose on price in the ascending price presentation order, they should be more sensitive to their loss on price than their gain in quality. That is, when prices are ascending, consumers should be more likely to prefer a cheaper, lower-quality option,

(b) when consumers successively lose in quality in the descending price presentation order, they should be more sensitive to their loss on quality than their gain in price. That is, when price is ascending, consumers should be more likely to prefer a higher-quality, pricier option.

The above arguments are summarized in figure 1.

FIGURE 1

PROSPECT THEORY CURVES FOR PRICE AND QUALITY IN ASCENDING AND DESCENDING PRICE PRESENTATION ORDERS



Thus, we hypothesize that:

H1: Ascending (vs. descending) price presentation of multiple choice options results in systematically greater perceived importance of price (vs. quality), which in turn systematically influences consumption choices.

H2: Prospect-theory based loss aversion mediates the influence of ascending (vs. descending) price presentation on greater perceived importance of price (vs. quality).

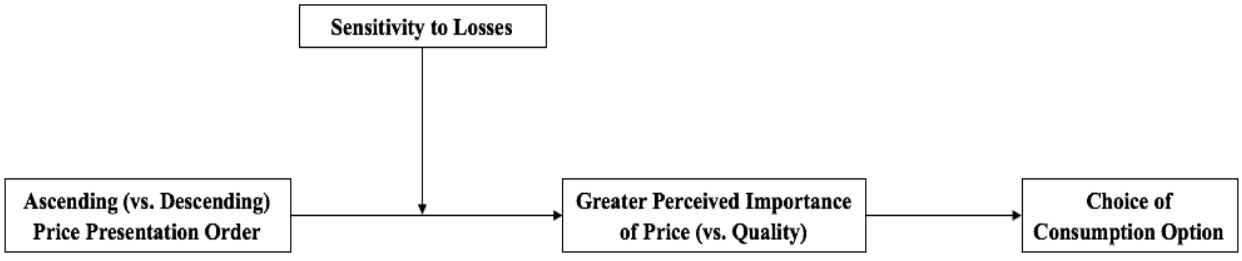
Further, extant research has found a variety of individual difference variables such as regulatory focus (Florack and Hartmann 2007; Liberman et al. 1999; Molden and Hui 2011; Polman 2012), sense of power (Inesi 2010; Polman 2012), thinking styles (McElroy and Seta 2003), and emotional-regulation ability (Sokol-Hessner et al. 2009) to influence loss aversion. For example, regulatory focus research has shown that prevention-focused individuals are more sensitive to losses and thus display greater loss aversion. Given that our proposed process involves loss aversion, we expect that such process-linked individual difference variables would moderate the price order effect and thus provide evidence for the process. Thus, we also hypothesize that:

H3: Individual difference variables such as trait regulatory focus will moderate the influence of ascending (vs. descending) on greater sensitivity to subsequent losses on price (vs. quality).

Our theoretical model is presented in figure 2.

FIGURE 2

THEORETICAL MODEL



3.4 OVERVIEW OF STUDIES

We conducted seven studies to test our hypotheses. Studies 1A, 1B, and 2 showed that our hypothesis regarding the price order effect holds: that ascending (vs. descending) price presentation order results in significantly greater perceived importance of quality-related attributes (vs. price) information and thus downstream consumption choices. Finally, studies 3, 4, 5, and 6 show the underlying process for the effect.

3.5 STUDY 1A

This study presents a first test of the hypothesis that a descending (vs. ascending) price order results in systematically greater relative weight placed on quality (vs. price).

3.5.1 DESIGN AND PROCEDURE

This study utilized a single factor (price presentation order: ascending vs. descending) between-subjects experimental design. One hundred and five university students took part in this study in exchange for course credit (M_{age} = 20.81, 55% female). Participants were required to take part in a simulated interaction with a salesperson offering a suite of internet plans which varied on two parameters: internet speed (quality-related attribute) and price. The salesperson

presented in total ten internet service plans in a sequential order, with the internet speeds ranging from 10 MB per second to 100 MB per second, and prices ranging from $10 to $100 per month. The prices varied in steps of $10 and the internet speeds in steps of 10 MB. This study manipulated the order in which the internet plans were presented to the respondents such that the first plan presented in the ascending (descending) condition was priced at $10 ($100) with the prices of plans presented next successively increasing (decreasing).

After viewing with the internet plans in either ascending or descending price order, respondents were asked to choose one internet plans and to indicate whether they considered price or internet speed as more important for their choice ("Out of price and internet speed, what was more important to you while making the choice of internet service plan?" Price (1) and Internet Speed (7)). Finally, standard demographics related questions (age and gender) were included.

3.5.2 RESULTS AND DISCUSSION

A one-way ANOVA revealed that respondents in the descending price order condition ($M_{descending}$ = 4.33, SD = 1.57) were significantly more likely than those in the ascending price order condition ($M_{ascending}$ = 3.72, SD = 1.60) to consider internet speed as being more important than price while making the choice of internet service plan ($F(1, 103) = 3.90$, $p = .051$, $d = .38$). Thus, this supports our focal hypothesis regarding the price order effect - that descending (vs. ascending) price presentation results in significantly greater emphasis on the quality-related attribute (vs. price). Further, respondents in the descending price order condition ($M_{descending}$ = 5.94, SD = 2.45) were significantly more likely to choose the higher speed-higher priced plans as

compared to those in the ascending price condition ($M_{ascending}$ = 4.89, SD = 1.80; F(1, 104) = 6.33, p = .013, d = .49). Using Preacher and Hayes (2004) bootstrapping method, we found that greater perceived relative importance of internet speed vs. price mediated the influence of price presentation order on final choice (Indirect effect estimate = -.23, SE = .13; 10,000 samples, 95% C.I. = [-.50, -.02]).

3.6 STUDY 1B

The aim of Study 1B is to provide evidence for the robustness of the results obtained in the previous study – that descending (vs. ascending) price order results in significantly greater weight placed on the quality (vs. price).

3.6.1 DESIGN AND PROCEDURE

Similar to study 1A, this study utilized a single factor (price presentation order: ascending vs. descending) experimental design. One hundred and thirty-three respondents from an online consumer panel (Amazon MTurk) took part in this study in exchange for token compensation (M_{age} = 36.62, 68% female). The experimental procedure utilized in this study was identical to that used in study 1A, with a few notable changes. First, instead of internet service plans, the focal product used in this study was a suite of mobile service plans. Second, instead of internet speed, the quality-related attribute used in this study was number of gigabytes (GBs) of high-speed data. Third, the dependent measure for the relative weighting of quality-related attribute vs. price was expanded to a three item scale (α = 0.90) with each item responded to on seven-

point Likert scale items with end points of the scale being "definitely price (1)" and "definitely high-speed data (7)": (a) "Out of price and high-speed data, what was more important to you while making the choice of mobile plan?", (b) "Out of price and high-speed data, what influenced your choice of mobile plan more?", and (c) "Out of price and high-speed data, what did you think about more while choosing the mobile plan?". Fourth, in this study, the items regarding the perceived importance of quality vs. price were presented before option choice.

Finally, this study also measured the respondents' construal level (using two item scale ($\alpha = 0.98$) outlined in Aggarwal and Zhao (2015)). It could be argued that price primarily being a feasibility-focused attribute, ascending (vs. descending) price presentation order primes feasibility focus to a greater extent and that this in turn systematically influences downstream consumption decisions. Thus, the construal level measure was included to test this potential alternative explanation for the price order effect. Finally, respondents were asked standard demographics questions.

3.6.2 RESULTS AND DISCUSSION

One-way ANOVA revealed that respondents in the descending (vs. ascending) price order condition were significantly more likely to consider the number of GBs of high speed data as being more important than price ($M_{descending} = 3.41$, $SD = 1.63$; $M_{ascending} = 2.78$, $SD = 1.65$; $F(1, 131) = 4.97$, $p = .03$, $d = .38$). Further, there was no difference between ascending and descending price orders in terms of priming of abstract vs. concrete construal ($F(1, 131) = .83$, $p = .37$), thus showing that the price order effect cannot be attributed to construal level priming. Also, respondents in the descending (vs. ascending) price order condition were significantly

more likely to choose the mobile service plan offering higher number of GBs of high-speed data ($M_{descending}$ = 5.3, SD = 2.31; $M_{ascending}$ = 3.39, SD = 1.62; $F(1, 131) = 30.74$, $p < .001$, $d = .96$). Finally, relative perceived importance of quality vs. price mediated the influence of price presentation order on final choice (Indirect effect estimate = -.16, SE = .08; 10,000 samples, 95% C.I. = [-0.35, -0.02]). Thus, this shows that differential relative weighting of quality-related attribute vs. price information (partly) explains the effect of price presentation order on choice. This study provides support for the price order effect by using a different quality-related attribute in a slightly different marketing context. This study also shows that differential weighting of quality-related vs. price attribute is implicated in the process by which ascending vs. descending price order influences final choices. Further, this study rules out an explanation related to construal priming.

Finally, in this study, we presented the perceived attribute importance items were presented before the measure related to the consumption choice. Given that we replicate the effect obtained in the previous study, the effect we obtain is unlikely to be an artifact of respondents' tendency to first randomly choose a consumption option and then adjust their expressed attribute importance to fit their randomly chosen option.

3.7 STUDY 2

This study aims to provide further evidence for the price order effect by using a different class of product (digital cameras), along with a different price range. Further, it includes two new items to test the price order effect and rules out the possibility of the results obtained regarding

the price order effect being an outcome of a confounding artifact of the experimental design utilized in studies 1A and 1B.

3.7.1 DESIGN AND PROCEDURE

Similar to studies 1A and 1B, this study utilized a single factor (price order: ascending vs. descending) experimental design. One hundred and fifty-five respondents from an online consumer panel (Amazon MTurk) took part in this study in exchange for token compensation (M_{age} = 36.85, 72% female). While this study utilized an experimental procedure similar to that in study 1B, it incorporated some important changes. First, this study utilized a different class of product: digital cameras. Second, this study involved a different quality-related attribute: lens resolution of the digital camera, ranging from 6 MP to 24 MP. Third, the prices presented ranged from $50 to $140, instead of $10 to $100, as in the case of studies 1A and 1B. Finally, this study, in addition to the three items measuring relative importance of quality-related attribute vs. price, it also included two additional Likert-scale items which separately measured the importance of the quality-related attribute (lens resolution: "How important a role did lens resolution play in your choice of digital camera?") and price ("How important a role did price play in your choice of digital camera?") with the end points of the scale being "not at all important" (1) to "very important" (7) for both items. These two items were included in order to rule out the possibility that the greater tendency for the respondents in the descending (vs. ascending) price order condition to choose the quality-related attribute as being more important than price was an artifact of the congruence between the scale end points for the items related to the two focal DVs: (a) choice of product, and (b) relative weighting of quality-related attribute and price. It is

possible that due to anchoring on the initial price, respondents in the ascending (descending) price condition are more likely to choose the lower priced plan (presented on the left (right) portion of the scale item related to the DV). This propensity to click on the left (right) scale points for the item related to choice of plan in the case of ascending (descending) price order condition could have resulted in a systematic bias towards clicking on the left (right) portion of the scale for the item corresponding to relative weighting of quality-related attribute and price.

Thus, the results obtained regarding the price order effect in studies 1A and 1B might be due to a confounding artifact. By measuring the importance of the quality-related attribute and price on separate items, this artifact-based account for the price order effect can be tested. If descending (vs. ascending) price order indeed results in greater perceived importance of quality-related attribute (vs. price), then a mixed-ANOVA model should yield a significant interaction between price order and perceived importance, such that for the item measuring perceived importance of lens resolution (price), descending (ascending) price order should be significantly greater than ascending (descending) price order.

This study also included two construal level priming measure items along with standard demographic questions.

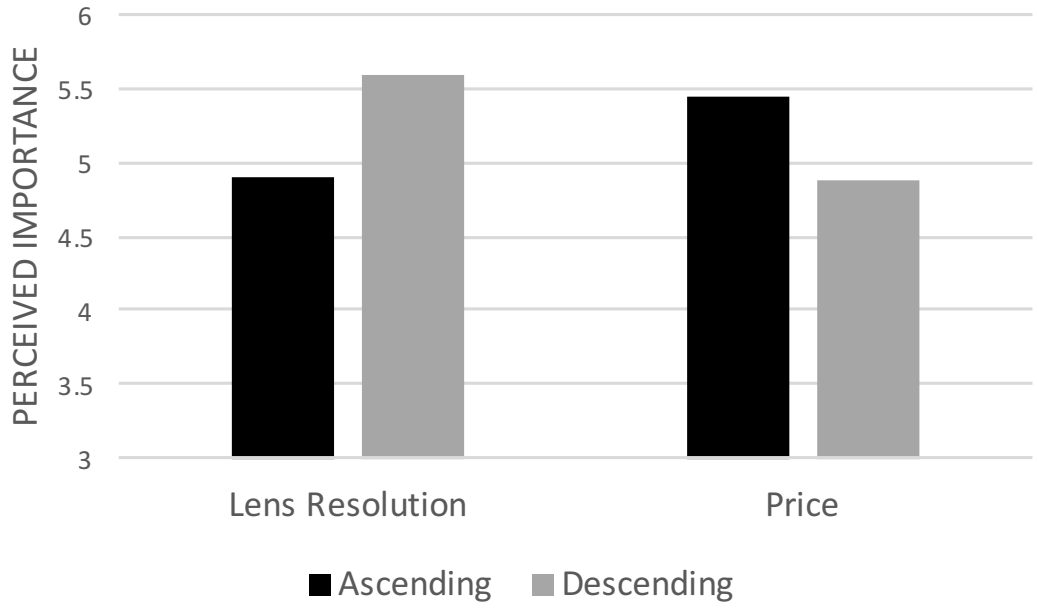
3.7.3 RESULTS AND DISCUSSION

A one-way ANOVA revealed that respondents in the descending (vs. ascending) price order condition were significantly more likely to consider lens resolution as being more important than price while choosing a digital camera from the list of presented options ($M_{descending}$ = 4.82, SD = 1.88; $M_{ascending}$ = 4.05, SD = 1.88; $F(1, 153) = 6.52$, $p = .01$, $d = .41$). Further,

providing evidence that the price order effect was not an artifact of congruence between scale end points for the DVs related to (a) choice of camera, and (b) relative weighting of quality-related product attribute and price, another one-way ANOVA revealed that while price was considered as more important by respondents in the ascending price order condition ($M_{ascending}$ = 5.45, SD = 1.41; $M_{descending}$ = 4.87, SD = 1.68; $F(1, 153) = 5.29$, p =.022, d = .37), lens resolution was considered as more important by respondents in the descending price order condition ($M_{descending}$ = 5.6, SD = 1.41; $M_{ascending}$ = 4.91, SD = 1.59; $F(1, 153) = 8.13$, p = .005, d = .46). Using a within-subjects general linear model, with perceived importance as a within-subject variable (with price and lens resolution as the within-subject conditions), and price order as the between-subject variable, a significant interaction between perceived importance of price and lens resolution emerged ($F(1, 153) = 9.40$, p = .003; see figure 3).

FIGURE 3

STUDY 2: INFLUENCE OF ASCENDING VS. DESCENDING PRICE ORDERS ON PERCEIVED IMPORTANCE OF QUALITY VS. PRICE



Further, a one-way ANOVA revealed that respondents in the descending (vs. ascending) price order condition were significantly more likely to choose the digital cameras with higher lens resolution ($M_{descending}$ = 8.17, SD = 2.21; $M_{ascending}$ = 5.94, SD = 2.57; $F(1, 153) = 32.65$, $p < .001$, $d = .93$). The indirect effect of price presentation order on the likelihood to choose the higher lens resolution-but higher priced choices through perceived relative importance of attribute vs. price was significant (Indirect effect estimate = -.35, SE = .14; 10,000 samples, 95% C.I. = [-0.63, -0.09]).

Finally, there was no difference between ascending and descending price order conditions in terms of construal level priming ($F(1, 153) = .005$, $p = .94$); this again makes construal level priming an unlikely candidate process.

This study provides support for the price order effect by testing the effect in a different marketing context involving a different product and a different quality-related attribute, as compared to those in studies 1A and 1B. Further, this study shows the robustness of the underlying effect by utilizing a different measure, which rules out an artifact-based explanation for the effect. Finally, this study shows again that the alternative process involving construal level priming is not the underlying reason for the price order effect. Next, we provide initial evidence for our proposed process.

3.8 STUDY 3

Our proposed process for the price order effect is that consumer do not want to deviate too much from an initial option because they are more sensitive to the losses subsequent options entail than to the gains they entail. If this is indeed the process, then the effect should hold regardless of the attributes involved in the tradeoff – price vs. quality or quality vs. quality. This study involves relative weighting of two quality attributes in addition to relative weighting of price vs. quality attribute.

3.8.1 DESIGN AND PROCEDURE

Two hundred and twelve respondents from an online consumer panel (Amazon MTurk) took part in this study in exchange for token compensation (M_{age} = 35.86, 46% female). While this study utilized an experimental procedure similar to that in the previous studies, it incorporated some important changes. First, this study utilized a different choice context:

residential apartment. Second, this study involved a 2 (choice order: ascending vs. descending) X 2 (attribute tradeoff: price-quality vs. quality-quality) experimental design. Price was operationalized as the monthly rent for the presented apartment options. In the price-quality attribute tradeoff conditions, the quality attribute was apartment size in square feet. The rents (square footage (sq. ft.)) of the presented options ranged from $800 to $2000 (800 sq. ft. to 2000 sq. ft.). There were thirteen options presented in total with the rents (sq. ft.) differing by $100 (100 sq. ft.) in each consecutive step. In the quality-quality attribute tradeoff conditions, while one quality attribute was apartment size in square feet, the other quality attribute was distance from one's workplace in the city center (in miles). While progressing through the ascending (descending) distance from city center condition, the square footage of the apartment increased (decreased). The distance from city center (square footage) of the presented options ranged from 1 to 13 miles (800 sq. ft. to 2000 sq. ft.). There were thirteen options presented in total with the distance from city center (sq. ft.) differing by 1 mile (100 sq. ft.) in each consecutive step.

Finally, this study, in addition to measuring the preferred apartment option, also included two items ($\alpha = 0.92$) measuring relative importance of rent vs. square footage (distance from city center vs. square footage): (a) "Out of monthly rent and total area in sq. ft., what influenced your decision more regarding each of the presented apartment options?", (b) "Out of monthly rent and total area in sq. ft., what did you think about more while evaluating each of the presented options?" on 7-point likert-scale from Definitely Monthly Rent (1) to Definitely Total Area in sq. ft. (7) ((a) "Out of distance from the workplace in city center and total area in sq. ft., what influenced your decision more regarding each of the presented apartment options?", (b) "Out of distance from the workplace in city center and total area in sq. ft., what did you think about more while evaluating each of the presented options?" on 7-point likert-scale from Definitely Distance

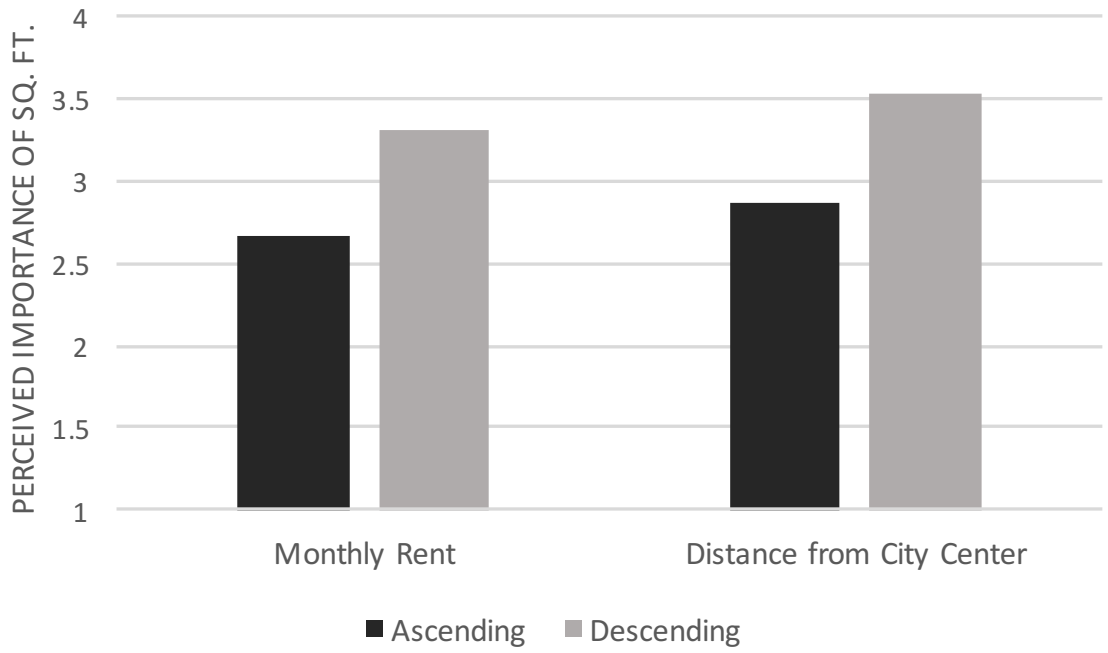
(1) to Definitely Total Area in sq. ft. (7)). Respondents were then asked standard demographics related questions.

3.8.2 RESULTS AND DISCUSSION

A general linear model with presentation order and attribute tradeoff as between-subject factors and relative perceived importance of attributes as the dependent variable revealed that while the main effect of presentation order was significant ($M_{Ascending\_Sq.Ft.}$ = 2.77, SD = 1.76; $M_{Descending\_Sq.Ft.}$ = 3.41, SD = 2.10; F(1, 208) = 5.85, p = .016, d = .33), the main effect of attribute tradeoff ($M_{Rentvs.Sq.Ft.}$ = 2.98, SD = 1.90; $M_{Distancevs.Sq.Ft.}$ = 3.19, SD = 2.01; F(1, 208) = .64, p = .42), and their interaction (F (1, 208) = .00, p = .99) were not. Planned contrasts revealed that descending square footage presentation orders resulted in systematically greater perceived importance of square footage both: (a) when the square footage was traded off with monthly rent ($M_{AscendingSq.Ft.\_AscendingRent}$ = 2.66, SD = 1.63; $M_{DescendingSq.Ft.\_DescendingRent}$ = 3.3, SD = 2.11; F(1, 208) = 2.89, p = .09), and (b) when the square footage was traded off with distance from city center ($M_{AscendingSq.Ft.\_AscendingDistance}$ = 2.87, SD = 1.89; $M_{DescendingSq.Ft.\_DescendingDistance}$ = 3.52, SD = 2.10; F(1, 208) = 2.96, p = .087). The results are summarized in figure 4.

FIGURE 4

STUDY 3: PERCEIVED IMPORTANCE OF SQ. FT.



Similarly, a general linear model with presentation order and attribute tradeoff as between-subject factors and propensity to choose the apartment with larger square footage as the dependent variable revealed that the main effect of presentation order was significant ($M_{Ascending\_Sq.Ft.}$ = 3.6, SD = 2.88; $M_{Descending\_Sq.Ft.}$ = 5.33, SD = 3.75; F(1, 208) = 14.48, p <.001, d = .52) but the main effect of attribute tradeoff ($M_{Rentvs.Sq.Ft.}$ = 4.12, SD = 3.31; $M_{Distancevs.Sq.Ft.}$ = 4.79, SD = 3.56; F(1, 208) = 2.27, p = .13), and the interaction (F(1, 208) = .63, p = .43) were not. Planned contrasts revealed that descending square footage presentation orders resulted in systematically greater likelihood to choose the apartment with larger square footage both: (a) when the square footage was traded off with monthly rent ($M_{AscendingSq.Ft.\_AscendingRent}$ = 3.43, SD = 2.66; $M_{DescendingSq.Ft.\_DescendingRent}$ = 4.81, SD = 3.75; F(1, 208) = 4.53, p = .035), and (b) when the

square footage was traded off with distance from city center ($M_{AscendingSq.Ft._AscendingDistance}$ = 3.76, SD = 3.10; $M_{DescendingSq.Ft._DescendingDistance}$ = 5.87, SD = 3.71; $F(1, 208) = 10.59$, p =.001).

Further, the indirect effect of presentation order on likelihood to choose the larger square footage apartment options through the perceived relative importance of square footage vs. rent was significant (Indirect effect estimate = .37, SE = .16; 10,000 samples, 95% C.I. = [.09, .74]).

Given that this study shows that the price order effect replicates in contexts involving tradeoff between two quality-related attributes, it can be concluded that the underlying process for the effect is not greater priming of concrete/feasibility mindset in the ascending (vs. descending) price condition, but rather the underlying cause for the effect is greater sensitivity to the loss attribute. We provide a more direct process evidence in the next study.

3.9 STUDY 4

This study provides direct evidence for our proposed involving loss aversion. We manipulate gain vs. loss focused processing mindset and show that the effect is attenuated under gain focus.

3.9.1 DESIGN AND PROCEDURE

Two hundred and twenty-six respondents from an online consumer panel (Amazon MTurk) took part in this study in exchange for token compensation (M_{age} = 36.04, 45% female). While this study utilized an experimental procedure similar to that in the previous study, it incorporated some important changes. First, this study involved a 2 (choice order: ascending vs.

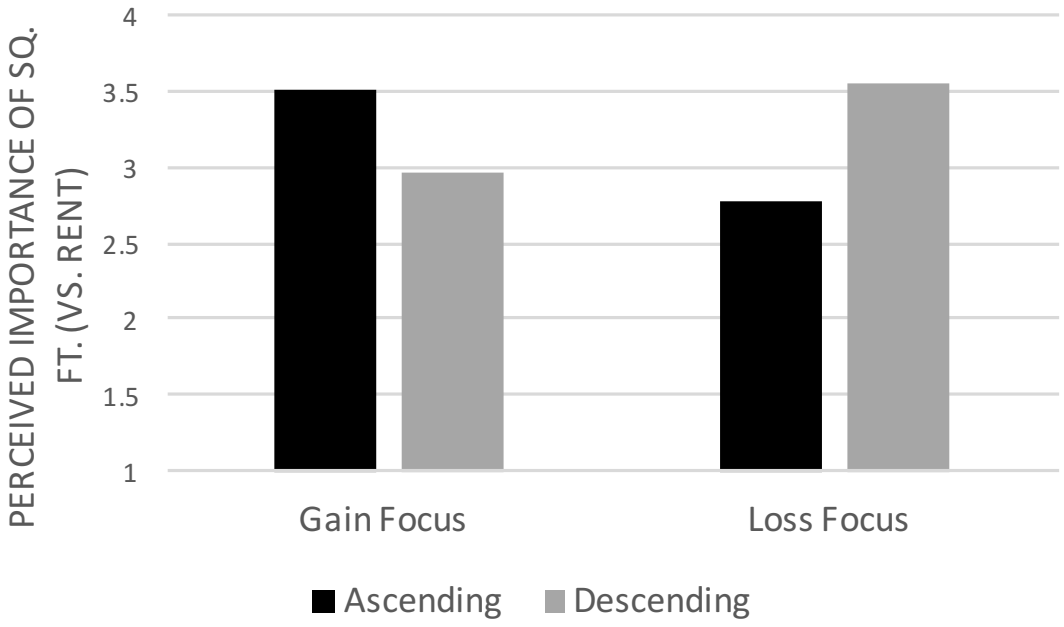
descending) X 2 (focus: gain vs. loss) experimental design. In the gain (loss) focus conditions, before being presented with the options, respondents were provided with the following instruction: "*As each of the options is presented, focus on what you are gaining (losing) while progressing through the sequence of options.*" Second, while the consumption context remained the same (housing rentals), this study only incorporated the price-quality tradeoff (monthly rent vs. square footage) operationalized in the previous study. The dependent measures regarding apartment option chosen and relative importance of rent vs. sq.ft. were also identical to that in the previous study. Respondents were also asked standard demographics related questions.

3.9.2 RESULTS AND DISCUSSION

A general linear model with presentation order and processing focus as between-subject factors and relative perceived importance of attributes as the dependent variable revealed that while neither the main effect of presentation order ($M_{Ascending\_Rent.}$ = 3.11, SD = 1.91; $M_{Descending\_Rent}$ = 3.24, SD = 1.81; $F(1, 222) = .07$, $p = .80$) or processing focus ($M_{Gainfocus}$ = 3.22, SD = 1.94; $M_{Lossfocus}$ = 3.13, SD = 1.78; $F(1, 222) = .21$, $p = .65$), the interaction between price order and processing focus was significant ($F(1, 222) = 7.13$, $p = .008$). Planned contrasts revealed that ascending rent presentation order resulted in systematically greater perceived importance of rent only under loss focus ($M_{AscendingRent\_Lossfocus}$ = 2.78, SD = 1.83; $M_{DescendingRent\_Lossfocus}$ = 3.55, SD = 1.64; $F(1, 222) = 4.92$, $p = .028$; reverse coded), and not under gain focus ($M_{AscendingRent\_Gainfocus}$ = 3.50, SD = 1.94; $M_{DescendingRent\_Gainfocus}$ = 2.96, SD = 1.92; $F(1, 222) = 2.44$, $p = .12$; reverse coded). The results are summarized in figure 5.

FIGURE 5

STUDY 4: INTERACTION BETWEEN ASCENDING VS. DESCENDING PRICE ORDERS AND GAIN VS. LOSS FOCUS ON PERCEIVED IMPORTANCE OF SQ.FT. VS. RENT



Similarly, general linear model with presentation order and processing focus as between-subject factors and propensity to choose the higher rent options as the dependent variable revealed that while the main effect of presentation order was significant ($M_{Ascending\_Rent.}$ = 4.10, SD = 3.26; $M_{Descending\_Rent}$ = 5.04, SD = 3.48; $F(1, 222) = 3.97$, $p = .047$, $d = .28$), the main effect of processing focus was not ($M_{Gainfocus}$ = 4.88, SD = 3.61; $M_{Lossfocus}$ = 4.25, SD = 3.14; $F(1, 222) = 1.58$, $p = .21$). More importantly, the interaction between price order and processing focus was significant ($F(1, 222) = 6.20$, $p = .014$). Planned contrasts revealed that ascending rent presentation order resulted in systematically greater higher propensity to choose the higher rent options only under loss focus ($M_{AscendingRent\_Lossfocus}$ = 3.34, SD = 2.47; $M_{DescendingRent\_Lossfocus}$ =

5.33, *SD* = 3.52; $F(1, 222) = 10.12$, $p = .002$; reverse coded), and not under gain focus ($M_{AscendingRent\_Gainfocus} = 5.00$, *SD* = 3.82; $M_{DescendingRent\_Gainfocus} = 4.78$, *SD* = 3.44; $F(1, 222) = .12$, $p = .73$).

Further, we used process model 7 (Preacher and Hayes 2004) analysis to the test the moderated mediation model involving moderation of the indirect effect through perceived importance of sq. ft. vs. rent by gain vs. loss focus. This analysis revealed that while the indirect effect of presentation order on propensity to choose the higher rent apartment options through the perceived relative importance of rent was significant under loss focus (Indirect effect estimate = .41, *SE* = .19; 10,000 samples, 95% C.I. = [.07, .80]), this was not the case under gain focus (Indirect effect estimate = -.29, *SE* = .20; 10,000 samples, 95% C.I. = [-.71, .08]). The index of moderated mediation was significant (Index: -.70, *SE* = .29; 10,000 samples, 95% C.I. = [-1.32, -.19]).

By directly manipulating loss vs. gain focus in order to attenuate the effect under gain focus, this study shows that loss aversion is the underlying process for the price order effect. It is interesting to note that while the effect reverses under gain focus, this is not statistically significant. Perhaps this is due to the fact that gain focus does not entirely eliminate the natural loss focus of people and may thus only cancel it out.

The next study provides further evidence for this by showing that the effect is moderated by trait regulatory focus and sense of power – both of which have been shown by extant research to moderate loss aversion.

3.10 STUDY 5

This study tests H3 – that individual level variables that moderate loss aversion also moderate the price order effect. In doing so, we provide direct evidence for our proposed involving loss aversion. Specifically, we show the individual difference variables of regulatory focus and sense of power both moderate the price order effect.

3.10.1 DESIGN AND PROCEDURE

One hundred and seventy-eight respondents from an online consumer panel (Amazon MTurk) took part in this study in exchange for token compensation (M_{age} = 36.01, 44% female). This study utilized a between-subjects (choice order: ascending vs. descending) experimental design. The scenario and the dependent measures were adapted from the previous study. In addition, respondents were required to answer (a) ten item Regulatory Focus Questionnaire (RFQ: Higgins et al. 2001 – a validated scale for measuring regulatory focus) (Appendix A), and (b) eight item sense of power scale (Anderson and Galinsky 2006 – a validated scale for measuring power) (Appendix B). Respondents also answered standard demographic questions.

3.10.2 RESULTS AND DISCUSSION

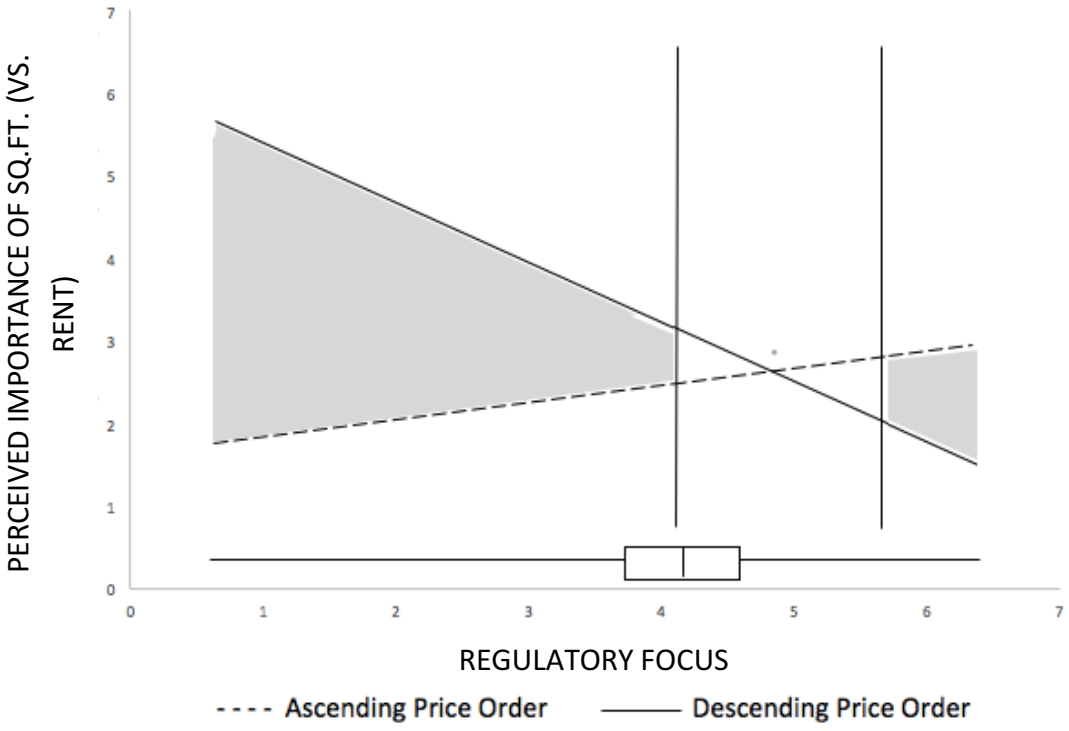
A one-way ANOVA revealed that rent was perceived to be significantly more important under ascending (vs. descending) order of rent presentation ($M_{Ascending\_Rent.}$ = 2.69, SD = 1.59; $M_{Ascending\_Rent.}$ = 3.22, SD = 1.81; $F(1, 176) = 4.33$, $p = .04$, $d = .31$; reverse coded). Also, a one-

way ANOVA revealed that there was a significantly higher propensity to choose the higher rent option under descending (vs. ascending) order of rent presentation ($M_{Ascending\_Rent.}$ = 3.76, SD = 2.95; $M_{Ascending\_Rent.}$ = 5.22, SD = 3.45; $F(1, 176) = 9.21$, $p = .003$, $d = .45$). Further, the indirect effect of presentation order on propensity to choose the higher square footage (and, rent) apartment options through the perceived relative importance of square footage vs. rent was significant (Indirect effect estimate = .36, SE = .17; 10,000 samples, 95% C.I. = [.04, .71]).

To test for moderation by the regulatory focus, we estimated a general linear model that contained the presentation order (as a dummy), regulatory focus, and their interaction. We find a significant interaction ($F(1, 174) = 9.89$, $p = .002$). When we estimate Johnson-Neyman regions of significance, we identify two regions (see figure 6).

FIGURE 6

STUDY 5: JOHNSON-NEYMAN REGIONS (REGULATORY FOCUS)

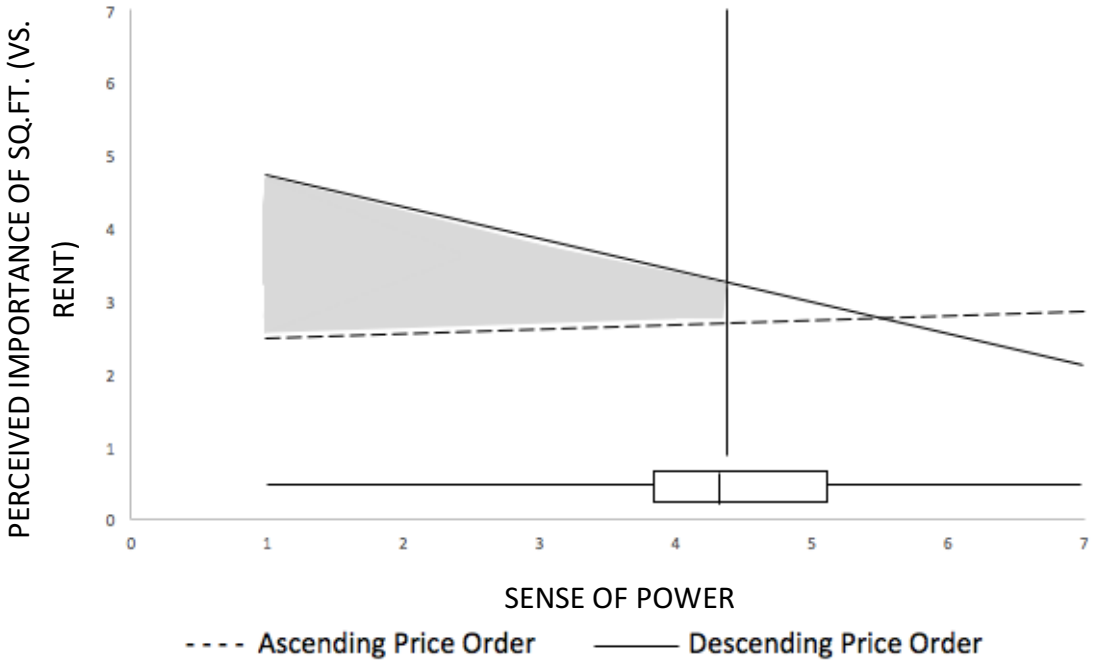


The first region (4.05 or lower), involving 48.32% of the sample indicates that as prevention focus increases, perceived importance of the loss attribute (rent (square footage) in ascending (descending)) increases. The second region (5.75 or higher) involves a smaller portion of the overall sample (1.69%), and it suggests that as promotion focus increases, perceived importance of the gain attribute (rent (square footage) in descending (ascending)) increases. Further, process model 7 (Preacher and Hayes 2004) analysis revealed that while the indirect effect of presentation order on propensity to choose the higher rent apartment options through the perceived relative importance of rent was significant for prevention focus respondents (Indirect effect estimate = .86, *SE* = .26; 10,000 samples, 95% C.I. = [.35, 1.37]), this was not the case for promotion focus respondents (Indirect effect estimate = -.19, *SE* = .21; 10,000 samples, 95% C.I. = [-.64, .19]). The index of moderated mediation was significant (Index: -.64, *SE* = .21; 10,000 samples, 95% C.I. = [-1.04, -.24]).

To test for moderation by sense of power, we estimated a general linear model that contained the presentation order (as a dummy), sense of power, and their interaction. We find a significant interaction ($F(1, 174) = 5.26$, $p = .023$). When we estimate Johnson-Neyman regions of significance, we identify one region (see figure 7).

FIGURE 7

STUDY 5: JOHNSON-NEYMAN REGIONS (SENSE OF POWER)



The Johnson-Neyman region (4.43 or lower), involving 52.25% of the sample indicates that as sense of power decreases, perceived importance of the loss attribute (rent (square footage) in ascending (descending)) increases.

Further, process model 7 (Preacher and Hayes 2004) analysis revealed that while the indirect effect of presentation order on propensity to choose the higher rent apartment options through the perceived relative importance of rent was significant for respondents with low sense of power (Indirect effect estimate = .72, *SE* = .28; 10,000 samples, 95% C.I. = [.18, 1.27]), this was not the case for respondents with high sense of power (Indirect effect estimate = -.06, *SE* = .22; 10,000 samples, 95% C.I. = [-.52, .34]). The index of moderated mediation was significant (Index: -.33, *SE* = .16; 10,000 samples, 95% C.I. = [-.65, -.02]).

This study provides further support for our proposed process of loss aversion by showing that the price order effect is moderated by regulatory focus and sense of power – both of which have been shown to moderate loss aversion. That is, extant research show that (a) as prevention focus increases, and (b) as sense of power decreases, loss aversion increases. Thus, the findings of this study that the price order effect strengthens with (a) increase in prevention focus, and (b) decrease in sense of power, show that loss aversion is involved in the underlying process for the effect.

3.11 STUDY 6

This study provides further evidence for our proposed process of loss aversion. Existing research which shows that choosing for others (vs. choosing for self) reduces loss aversion (Andersson et al. 2014; Chakravarthy et al. 2011; Polman 2012; Sokol-Hessner et al. 2009; Sutter 2009). Thus, we manipulate choosing for self vs. other in the choice scenario and show that the price order effect is attenuated when the choice is made for someone else.

3.11.1 DESIGN AND PROCEDURE

One hundred and fifty-one undergraduate students took part in this study in exchange for token compensation (M_{age} = 22.14, 52% female). While this study utilized an experimental procedure similar to that in the previous study, it incorporated an important change. This study involved a 2 (choice order: ascending vs. descending) X 2 (choice task: choosing for self vs. choosing for other) experimental design. In the choosing for self (other) choice task conditions,

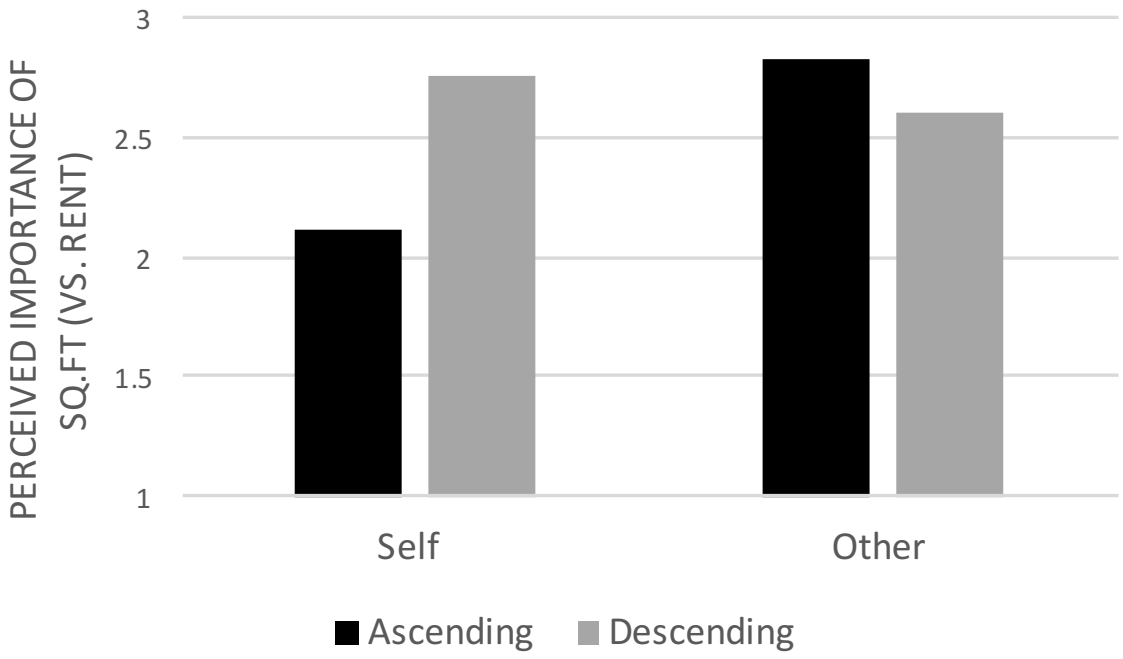
respondents were told that they had to choose an apartment option for themselves (for a friend). Other than this, the remained of the study was identical to the previous, including the scenario, the dependent measures, the scales for regulatory focus and sense of power, and standard demographics related questions.

3.11.2 RESULTS AND DISCUSSION

General linear model with presentation order and choice task as between-subject factors and relative perceived importance of attributes as the dependent variable revealed that while neither the main effect of presentation order ($M_{Ascending\_Rent.}$ = 2.55, SD = 1.36; $M_{Descending\_Rent}$ = 2.70, SD = 1.26; $F(1, 147) = .86$, $p = .36$) or choice task ($M_{ChoosingforSelf}$ = 2.49, SD = 1.22; $M_{ChoosingforOther}$ = 2.74, SD = 1.39; $F(1, 147) = 1.68$, $p = .20$), the interaction between price order and choice task was significant ($F(1, 147) = 3.99$, $p = .047$). Planned contrasts revealed that ascending rent presentation order resulted in systematically greater perceived importance of rent only when choosing for self ($M_{AscendingRent\_ChoosingforSelf}$ = 2.12, SD = .94; $M_{DescendingRent\_ChoosingforSelf}$ = 2.75, SD = 1.34; $F(1, 147) = 4.31$, $p = .040$; reverse coded), and not when choosing for other ($M_{AscendingRent\_ChoosingforOther}$ = 2.83, SD = 1.53; $M_{DescendingRent\_ChoosingforOther}$ = 2.60, SD = 1.16; $F(1, 147) = .57$, $p = .45$; reverse coded). The results are summarized in figure 8.

FIGURE 8

STUDY 6: INTERACTION BETWEEN ASCENDING VS. DESCENDING PRICE ORDERS AND CHOOSING FOR SELF VS. OTHER ON PERCEIVED IMPORTANCE OF SQ.FT. VS. RENT



Similarly, general linear model with presentation order and choice task as between-subject factors and propensity to choose the higher rent options as the dependent variable revealed that while the main effect of choice task was not significant ($M_{ChoosingforSelf}$ = 5.43, SD = 2.91; $M_{ChoosingforOther}$ = 4.45, SD = 2.58; F(1, 147) = 2.51, p = .12), the main effect of presentation order ($M_{Ascending\_Rent}$ = 4.01, SD = 2.47; $M_{Descending\_Rent}$ = 5.92, SD = 2.78; F(1, 147) = 17.84, p <.001) and the interaction between price order and choice task were significant (F(1, 147) = 12.63, p = .001). Planned contrasts revealed that ascending rent presentation order resulted in systematically propensity to choose the higher rent options when choosing for self ($M_{AscendingRent\_ChoosingforSelf}$ = 3.52, SD = 2.11; $M_{DescendingRent\_ChoosingforSelf}$ = 6.77, SD = 2.64; F(1,

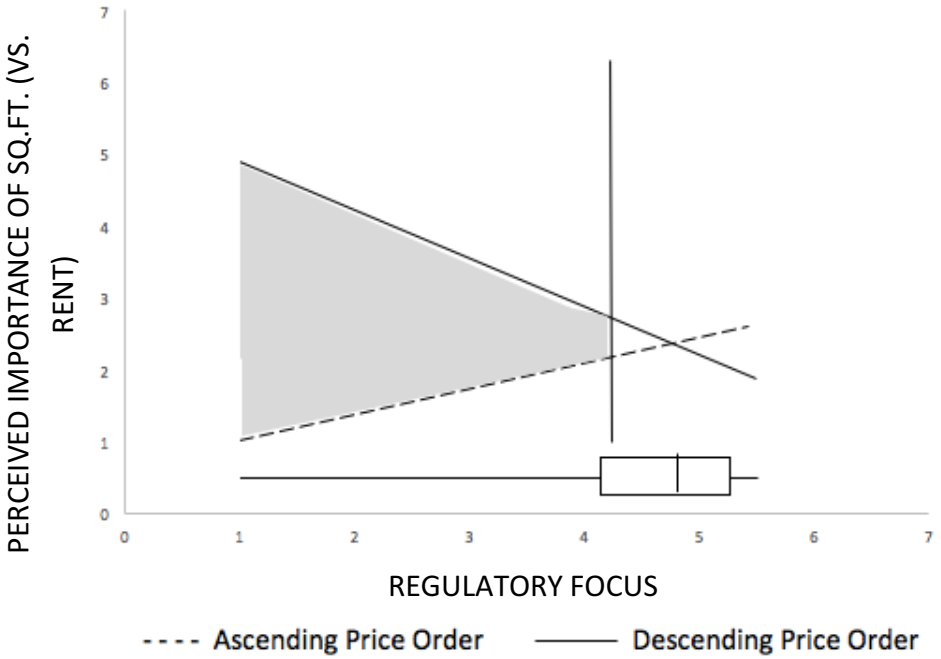
147) = 30.46, $p < .001$), and not when choosing for other ($M_{AscendingRent\_ChoosingforOther}$ = 4.34, SD = 2.65; $M_{DescendingRent\_ChoosingforOther}$ = 4.62, SD = 2.50; $F(1, 147) = .22$, $p = .64$).

Further, process model 7 (Preacher and Hayes 2004) analysis revealed that while the indirect effect of presentation order on propensity to choose the higher rent apartment options through the perceived relative importance of rent was significant when choosing for self (Indirect effect estimate = .37, SE = .18; 10,000 samples, 95% C.I. = [.08, .78]), this was not the case when choosing for other (Indirect effect estimate = -.14, SE = .19; 10,000 samples, 95% C.I. = [-.56, .18]). The index of moderated mediation was significant (Index: -.50, SE = .28; 10,000 samples, 95% C.I. = [-1.13, -.05]).

In a general linear model with two fixed factors (price order and choice task) and a continuous factor (regulatory focus), we identify a significant three-way interaction ($F(1, 143) = 7.46$, $p = .007$). In support of the robustness of the study 5 findings, we find a significant interaction between price order and regulatory focus when the choice task involves choosing for self ($F(1, 71) = 9.46$, $p = .003$), but the interaction is not significant when choosing for other ($F(1, 72) = 2.04$, $p = .16$). A Johnson-Neyman significance analysis helps unpack the significant interaction between the price order and regulatory focus in the choosing for self condition. One region, associated with regulatory focus values of 4.23 or lower, accounts for 57.33% of the participants. The effect of the price order on relative importance of square footage vs. price is significant only among prevention focus participants (figure 9).

FIGURE 9

STUDY 6, SELF CONDITION: JOHNSON-NEYMAN REGIONS (REGULATORY FOCUS)

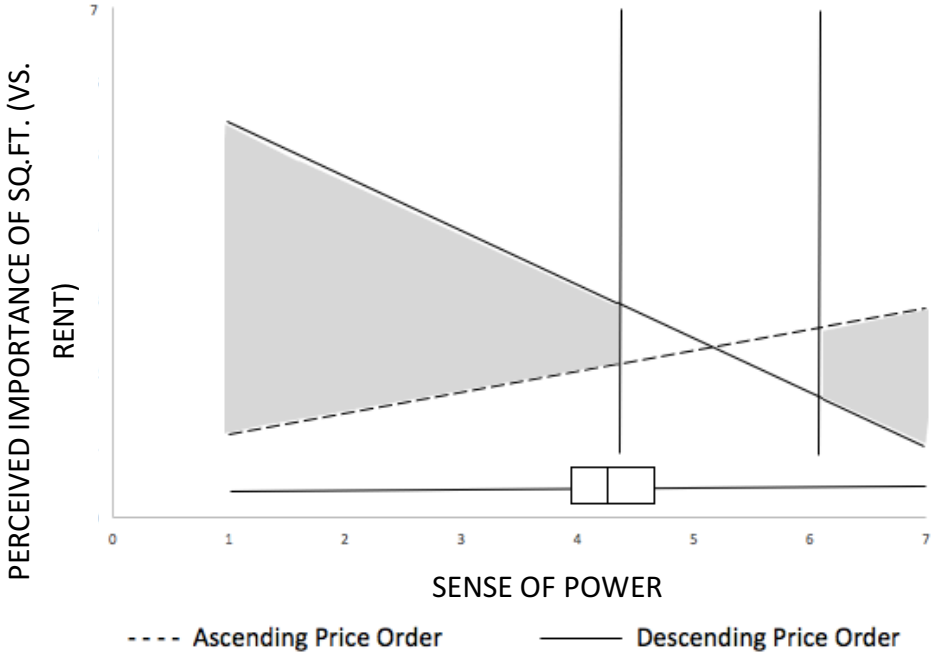


STUDY 6, OTHER CONDITION: INTERACTION NOT SIGNIFICANT

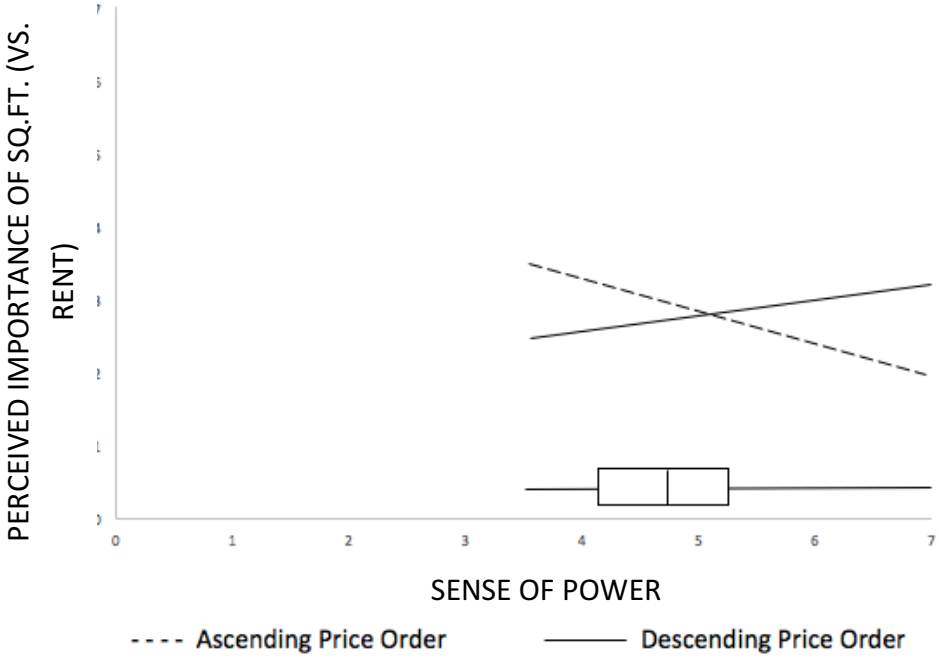
In a general linear model with two fixed factors (price order and choice task) and a random/continuous factor (sense of power), we identify a significant three-way interaction ($F(1, 143) = 11.86$, $p = .001$). In support of the robustness of the study 5 findings, we find a significant interaction between price order and sense of power when the choice task involves choosing for self ($F(1, 71) = 15.28$, $p < .001$), but the interaction is not significant when choosing for other ($F(1, 72) = 2.32$, $p = .13$). A Johnson-Neyman significance analysis helps unpack the significant interaction between the price order and sense of power in the choosing for self condition. Two regions were identified (figure 10). Region 1 associated with sense of power values of 4.67 or lower, accounts for 56.00% of the participants and shows that as prevention focus increases, the perceived importance of the loss attribute (rent (square footage) in ascending (descending)) increases. Region 2 associated with sense of power values of 6.13 or higher, accounts for 2.67% of the participants and shows that as promotion focus increases, perceived importance of the gain attribute (rent (square footage) in descending (ascending)) increases.

FIGURE 10

STUDY 6, SELF CONDITION: JOHNSON-NEYMAN REGIONS (SENSE OF POWER)



STUDY 6, OTHER CONDITION: INTERACTION NOT SIGNIFICANT



This study provides further support for our proposed process of loss aversion by showing that the price order effect is moderated by (a) the situational factor of choosing for self vs. other, and (b) individual difference factors of regulatory focus and sense of power – all of which have been shown to moderate loss aversion.

3.12 GENERAL DISCUSSION

Consumers are often presented with multiple prices in a sequential order. This research shows that the order in which prices are presented can influence the consumer decision making process. This research documents a price order effect: a descending (vs. ascending) price presentation order results in significantly greater perceived importance of the quality-related attribute (vs. price). We argue and show that the effect is caused by a greater sensitivity to the attribute that represents a loss in each of the price presentation sequences – quality (price) in the descending quality - descending price (ascending quality – ascending price) presentation order. We also rule out an alternative explanation in the form of construal level priming.

We conducted a series of seven studies to test our hypotheses. Studies 1A, 1B, 2, 3, 4, 5, and 6 show the robustness of price order effect, while studies 3, 4, 5, and 6 also provide process evidence. We manipulate the order in which an assortment of services (studies 1A and 1B) and products (2) are presented to consumers and show that the perceived relative importance of the quality-related attribute information (vs. price), is greater in the case of descending (vs. ascending) price presentation order. Also, for each of these studies, we show that the difference in the decision making process (in terms of the difference in the perceived relative importance of quality-related attribute vs. price) mediates the influence of price presentation order on

consumption choices. Further, Study 1B shows that the effect is not due to the differential priming of desirability vs. feasibility focus.

Studies 3, 4, 5, and 6 provide evidence for the process involving prospect theory driven greater sensitivity to losses. Study 3 shows that the effect holds regardless of the attributes being tradeoff – price vs. quality or quality vs. quality. This not only hints that the underlying process involves loss focus based sensitivity to attributes, it also rules out differential priming of desirability vs. feasibility focus as the alternative process which should hold only for tradeoff involving price and quality. Study 4, 5, and 6 present a more direct process evidence. Study 4 shows that the price order effect is attenuated when respondents are asked to focus on gains as each option is presented. Study 5 shows that the price order effect is moderated by regulatory focus and sense of power – both of which have been shown by extant research to moderate loss aversion. Finally, study 6 shows that the price order effect is attenuated when the choice task involves choosing for other. This is in line with extant research which shows that choosing for other attenuates loss aversion. Further, study 6 also replicates the finding in the previous study regarding the moderation of price order effect by regulatory focus and sense of power.

3.12.1 THEORETICAL AND MANAGERIAL IMPLICATIONS

This research makes important contributions to both theory and practice. First, it shows that the sequential order (ascending vs. descending) in which prices are presented to consumers can systematically influence the relative weighting of the quality-related attribute vs. price information. Given that extant research on multiple price presentation has not studied how the price presentation order can influence the decision making process, this contributes to the

existing research on sequential price presentation by showing that the price presentation order can influence the decision making process by influencing relative importance of quality-related attribute vs. price. Second, it also shows how the initial presented price interacts with the sequence of presented options in influencing decision making. Extant research does contend that the initial presented price acts as an anchor for the willingness-to-pay in the multiple price presentation context, however it is not clear how the level of the initial price influences decision making. This research fills this gap. Further, this research also extends the current research on loss aversion to show how it is relevant in the context of relative weighting of product attributes. Finally, this research also shows interesting new ways in which individual difference variables such as regulatory focus and sense of power influence consumer decision making.

This research also has substantial managerial implications. By utilizing a multitude of different types of real-world marketing offerings, from products such as voice activated coffee maker and digital camera, to services such as internet, mobile, and television service plans and hotels, this study provides several useful insights that are directly applicable to the marketers. It also informs marketers as to how consumer decision making differs for ascending vs. descending price order. Based on the insights offered by this research, marketers can choose between ascending and descending price orders, depending upon the strategic positioning of their products/services, while presenting their offerings to consumers. For products that are positioned as being superior in terms of attributes (price), it would be more beneficial to present the products in the descending (ascending) order of prices.

3.12.2 LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Future research needs to test whether the results obtained in this paper can be applied to simultaneous price presentation context. Consumers can be simultaneously presented with a suite of products priced at different price levels, whether they are shopping in store or online. Thus the results regarding the price order effect should be tested in the context of simultaneous price presentation.

Future research can also study how other individual difference related variables, such as thinking styles (McElroy and Seta 2003) and emotional-regulation ability (Sokol-Hessner et al. 2009), which have been shown to influence loss aversion, moderate the price order effect.

CONCLUSION

This research attempts to further the understanding of factors that affect how consumers perceive prices (essay 1) and how perceptions about prices influence product inferences (essay 2) and decision making (essay 3). This research contributes to the existing consumer research on price framing and price perception by identifying two new framing effects and by studying how perceptions regarding self-decided prices influence product evaluations.

Essay 1 introduces a new framing effect – the *upper limit* framing effect. I show that equivalent semantic framing (*less than* vs. *not more than*) of the upper limit of a cost estimate results in differential cost perceptions. I show that when the estimate amount is small (vs. large), *less than* (vs. *not more than*) results in contracted perceptions of the underlying costs. Further, I provide process evidence for the underlying effect. I show that the processing fluency forms the underlying process for the interactive effect of upper limit frame and estimate amount on cost perception. This research makes important contributions to the negation literature and to consumer research on temporal and monetary cost framing.

Essay 2 shows that the reverse direction of the expected relationship between product inference and willingness to pay is surprisingly robust. Specifically, I show that contextual factors that influence consumers' self-decided prices in turn affect their inferences about the

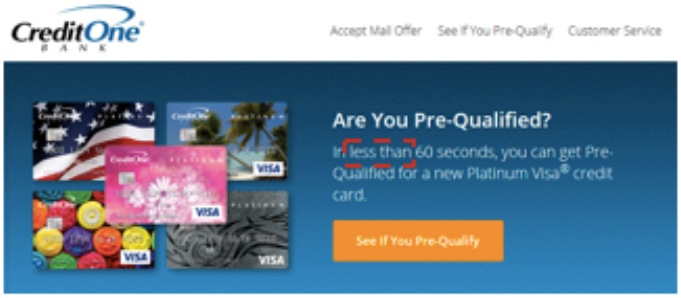
product, with the effect of contextual factor on product inferences being mediated by self-decided prices. Further, I show that this occurs to due to mindless over-application of the price-quality heuristic, which is relevant for marketer-provided prices, to the case of self-decided prices. I also provide evidence that the two alternative mechanisms rooted in self-perception, cognitive dissonance, and selective accessibility theories are not the underlying reason why self-decided prices influence product inferences. This research contributes to the existing perceived price-quality research and to the research on ascending vs. descending price presentation order.

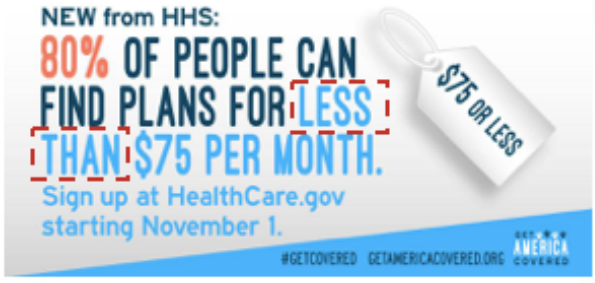
Essay 3 presents a new framing effect: the *price order* effect. I show that the price presentation order (ascending vs. descending) influences how consumers make purchase decisions. Specifically, I show that due to prospect theory based loss aversion, multiple prices presented sequentially in the descending (vs. ascending) order results in lower perceived importance of price in the decision making. This research contributes to the existing research on price presentation order, and to research studying application of loss aversion in the consumer research domain.

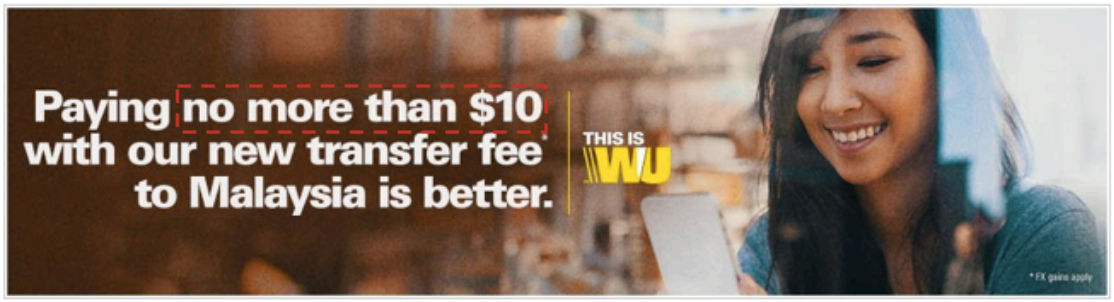
Overall, this research contributes to the existing research by identifying two new price frames affecting price perception (essay 1), product inferences (essay 2), and decision making (essay 3).

ESSAY 1 APPENDICES

APPENDIX 1.1 (MARKETERS USE NEGATION AND EQUIVALENT AFFIRMATION FRAMES FOR UPPER LIMIT ESTIMATES INTERCHANGEABLY)






Paying no more than $10
with our new transfer fee
to Malaysia is better.
THIS IS
WU
* FX rates apply


40+
Activities
for kids that
cost less than
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GLUE
cloud·b


thegoodstuff
12
things that
changed
my life
and
cost less than
$30


DOOR TO DOOR
IT SIMPLY
MAKES
SENSE!
Pay no more than
$30
for a one-month
supply*
Mirapex
pramipexole dihydrochloride tablets


Eligible patients pay
no more than $50*
on their NICOTROL Inhaler
prescriptions and refills†
PAY
NO MORE THAN
$50*
BUILD YOUR WEBSITE FOR LESS THAN $100.
HERE'S A SNAPSHOT OF WHAT YOU WILL LEARN.....
How to build your website without any knowledge of programming.
Why you must pay for web hosting services, and why are some companies better than others?
How you can instantly be known as an expert and increase your credibility by building this type of website.
Where to get the best free website templates, saving you hundreds on a custom web design.
Why creating an email marketing strategy will instantly start generating sales leads?
How to use Facebook ads and get started for little or no money.
What's new with Google and how to get ranked with their new patent?
"The Magic Formula for Driving Traffic to Your Website."
BUILD YOUR WEBSITE FOR LESS THAN $100.
100% FREE
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APPENDIX 1.2 (SAMPLE STIMULI FROM STUDY 1.3)

SMALL ESTIMATE AMOUNT

Press the RIGHT SHIFT BUTTON to answer Yes and the LEFT SHIFT BUTTON to answer No.

Less than $20

$22

No Yes

Press the RIGHT SHIFT BUTTON to answer Yes and the LEFT SHIFT BUTTON to answer No.

No More than $20

$22

No Yes

LARGE ESTIMATE AMOUNT

Press the RIGHT SHIFT BUTTON to answer Yes and the LEFT SHIFT BUTTON to answer No.

Less than $200,000

$220,000

No Yes

Press the RIGHT SHIFT BUTTON to answer Yes and the LEFT SHIFT BUTTON to answer No.

No More than $200,000

$220,000

No Yes

APPENDIX 1.3 (DETAILED STIMULI FROM STUDY 1.3)

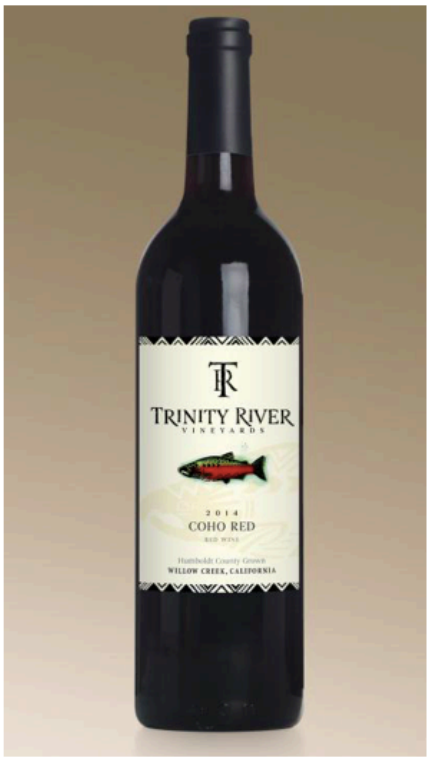
SMALL AMOUNT		LARGE AMOUNT	
ESTIMATE FRAME	**COMPARISON TARGET**	**ESTIMATE FRAME**	**COMPARISON TARGET**
STUDY SCREENS			
Less than $10	$9	Less than $100,000	$90,000
Less than $20	$22	Less than $200,000	$220,000
Less than $30	$27	Less than $300,000	$270,000
Less than $40	$44	Less than $400,000	$440,000
Less than $50	$45	Less than $500,000	$450,000
Less than $60	$66	Less than $600,000	$660,000
Less than $70	$63	Less than $700,000	$630,000
Less than $80	$88	Less than $800,000	$880,000
Less than $90	$81	Less than $900,000	$810,000
Less than $100	$110	Less than $1,000,000	$1,100,000
No more than $10	$9	No more than $100,000	$90,000
No more than $20	$22	No more than $200,000	$220,000
No more than $30	$27	No more than $300,000	$270,000
No more than $40	$44	No more than $400,000	$440,000
No more than $50	$45	No more than $500,000	$450,000
No more than $60	$66	No more than $600,000	$660,000
No more than $70	$63	No more than $700,000	$630,000
No more than $80	$88	No more than $800,000	$880,000
No more than $90	$81	No more than $900,000	$810,000
No more than $100	$110	No more than $1,000,000	$1,100,000

FILLER SCREENS			
Not less than $10	$11	Not less than $100,000	$110,000
Equal to $20	$20	Equal to $200,000	$200,000
Not less than $30	$27	Not less than $300,000	$270,000
Equal to $40	$36	Equal to $400,000	$360,000
Not less than $50	$55	Not less than $500,000	$550,000
Equal to $60	$60	Equal to $600,000	$600,000
Not less than $70	$63	Not less than $700,000	$630,000
Equal to $80	$88	Equal to $800,000	$880,000
Not less than $90	$99	Not less than $900,000	$990,000
Equal to $100	$100	Equal to $1,000,000	$1,000,000

ESSAY 2 APPENDICES

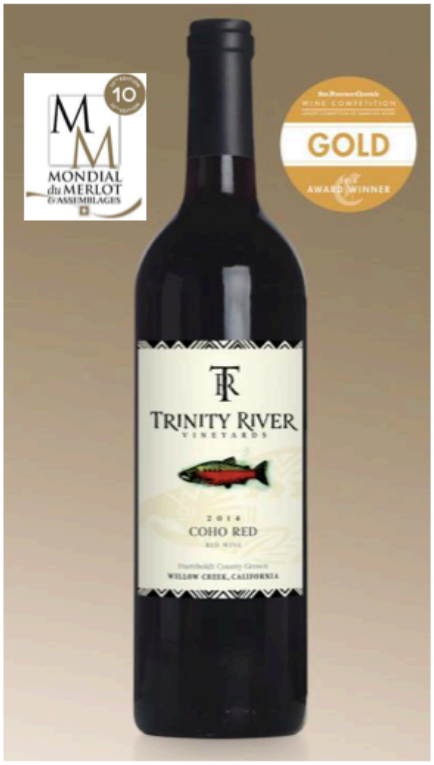
APPENDIX 2.1 (STUDY 2.2 STIMULI)

APPENDIX 2.2 (STUDY 2.3 STIMULI)



- Grape variety: Merlot
- Country of Origin: California, USA
- Price Range: $15 - $60

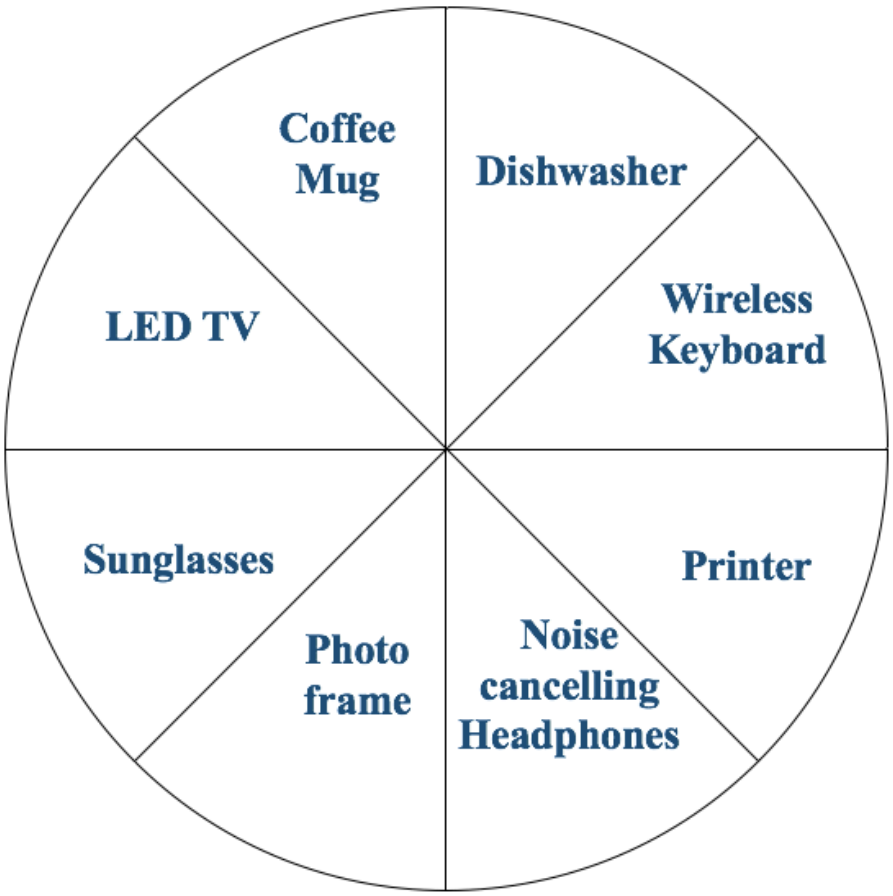
(Actual price revealed at checkout)



- Awards:
  - Gold Class
  - Mondial du Merlot & Assemblages
- Grape variety: Merlot
- Country of Origin: California, USA
- Price Range: $15 - $60

(Actual price revealed at checkout)

APPENDIX 2.3 (WHEEL OF FORTUNE)



APPENDIX 2.4 (PRICE–QUALITY SCHEMA SCALE)

Please indicate the extent to which you agree or disagree with each of the statements presented below:

- Generally speaking, the higher the price of the product, the higher is the quality.
- The old saying "you get what you pay for" is generally true.
- The price of a product is a good indicator of its quality.
- You always have to pay a bit more for the best.

Notes: Each item used Likert scales from 1 = "Strongly Disagree" to 7 = "Strongly Agree." Items were adapted from Lichtenstein and Burton (1983) and Lichtenstein, Ridgway, and Netemeyer (1993).

ESSAY 3 APPENDICES

APPENDIX 3.1 (REGULATORY FOCUS SCALE)

Please indicate the extent to which you agree or disagree with each of the statements presented below:

Promotion Focus:

- When it comes to achieving things that are important to me, I find that I don't perform as well as I would ideally like to do. (Reverse-coded)
- I feel like I have made progress toward being successful in my life.
- When I see an opportunity for something I like, I get excited right away.
- I frequently imagine how I will achieve my hopes and aspirations.
- I see myself as someone who is primarily striving to reach my "ideal self" to fulfill my hopes, wishes, and aspirations.

Prevention Focus:

- I usually obeyed rules and regulations that were established by my parents.
- Not being careful enough has gotten me into trouble at times. (Reverse-coded)
- I worry about making mistakes.
- I frequently think about how I can prevent failures in my life.
- I see myself as someone who is primarily striving to become the self I "ought" to be - fulfill my duties, responsibilities and obligations.

Notes: Each item used Likert scales from 1 = “Strongly Disagree” to 7 = “Strongly Agree.” Items were taken from Higgins et al. (2001).

APPENDIX 3.2 (SENSE OF POWER SCALE)

Please indicate the extent to which you agree or disagree with each of the statements presented below:

- In my relationships with others, I can get people to agree with what I say.
- In my relationships with others, my wishes do not carry much wait. (Reverse-coded)
- In my relationships with others, I can get others to do what I want.
- In my relationships with others, even if I voice them, my views have little sway. (Reverse-coded)
- In my relationships with others, I think I have a great deal of power.
- In my relationships with others, my ideas and opinions are often ignored. (Reverse-coded)
- In my relationships with others, even when I try, I am not able to get my way. (Reverse-coded)
- In my relationships with others, if I want to, I get to make the decisions.

Notes: Each item used Likert scales from 1 = “Strongly Disagree” to 7 = “Strongly Agree.” Items were taken from Anderson and Galinsky (2006).

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