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Exposing consumers to extreme prices can influence the price they are willing to pay for both related and unrelated products. Drawing on previous theories of anchoring and adjustment and selective accessibility of judgment-relevant knowledge, the authors provide an account of both asymmetries in the impact of price anchors across product categories and contingencies in the occurrence of these asymmetries. Four studies show the deliberate consideration of price anchors that can play a key role in whether the effect of the anchors will generalize across product categories. Specifically, an explicit comparison of a product to a price anchor increases the accessibility of features that represent a product available at this price. In turn, these thoughts influence the price that consumers are willing to pay for these products. In the absence of this deliberation, however, anchors influence *both* related and unrelated products, provided no other cognitive activity occurs in the interim.

Keywords: pricing, anchoring and adjustment, selective accessibility, context effects, automaticity

Conscious and Nonconscious Comparisons with Price Anchors: Effects on Willingness to Pay for Related and Unrelated Products

Does exposure to extreme product prices in a given category influence the price that consumers are willing to pay for products in the same or different categories? For example, suppose consumers pass a store window and happen to notice designer handbags on display for \$499. Although they might not intend to purchase such an expensive bag, they might nevertheless wonder whether other bags in the store are more or less expensive than those in the window. Would these thoughts influence the price that they are willing to pay for a handbag they subsequently consider? More importantly, would these thoughts also affect the price they are willing to pay for a DVD player they are considering purchasing? Finally, would similar effects occur if consumers happen to notice the high prices while walking past

the handbag display but do not devote much thought to them? The research reported here attempts to answer these questions.

Customers' susceptibility to the influence of externally provided reference prices has drawn the attention of both researchers and policy makers. Although such prices can often influence the price a person is willing to pay for products in the same category (Krishna et al. 2006; Lichtenstein and Bearden 1989; Urbany, Bearden, and Weilbaker 1988), their influence on products in a different category is less clear. Only two articles (Krishna et al. 2006; Nunes and Boatwright 2004) explicitly examine the impact of exposure to prices of one type of product on the price that consumers are willing to pay for a different type of product. The results of these studies are somewhat mixed. For example, Nunes and Boatwright (2004) find that passersby on a beachfront offered to pay a higher price for a CD if the sweatshirts on display at an adjacent stand cost \$80 than if they cost \$10. Thus, the price they were willing to pay for a product was influenced by the prices of other products that were objectively unrelated to it. Conversely, Krishna et al. (2006) show that although the price that participants were willing to pay for a camera was affected by the prices of products of the same type, the price of context products of a different type

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(e.g., binoculars) had less influence. Consequently, the conditions in which objectively irrelevant prices should theoretically have an effect have not been fully articulated.

In this article, we examine the extent to which consumers' exposure to externally provided prices can influence the price they are willing to pay for products in either the same or a different category. We assume that these externally supplied prices are used to form an "internal standard of comparison" that is used in subsequent price judgments. This standard can be formed through consideration of a specific anchor price that is provided to consumers in a judgmental context (e.g., "Is the price of a German car greater or less than DM 40,000?") [see Mussweiler and Strack 1999]. It can also be formed through previous exposure to contextual prices (Adaval and Monroe 2002, Monroe 2003; for a description of incidental anchors, see also Epley and Gilovich 2010). In the latter case, the internal standard that consumers form after exposure to such incidental price information might not be an explicit price but rather might take the form of a more vaguely defined price-relevant concept with fuzzy boundaries (e.g., "must cost around \$60–\$70"). We use the term "price anchor" to discuss both types of price exposure conditions.

To account for how and when such price anchors influence consumers' willingness to pay for products in the same or a different product category, we draw on both anchoring-and-adjustment processes (postulated by Tversky and Kahneman 1974) and the theory of selective accessibility (proposed by Strack and Mussweiler 1997; see also Mussweiler 2003). These theories suggest that external price anchors can have two types of effects. First, they can provide a standard relative to which the price of other products is evaluated. Second, they can stimulate thoughts about the features of products that might be sold at these prices. Both these factors can influence the price that consumers are willing to pay for products from related and unrelated categories. We propose an additional factor that might be relevant, namely, the extent to which the internal standard that is used to make the judgment is considered deliberately with full awareness of where it comes from or spontaneously without awareness of where it comes from. Consumers might be aware that they are using a standard to make a judgment. However, the key difference lies in the ability to identify *where* the standard they are using comes from. In some cases, consumers might be aware that the standard they are using is based on the price of a specific type of product, as might be the case when a merchant or an experimenter provides a product's price. In this case, features that represent a product of this type might be activated, and anchoring-like effects might generalize only to product categories in which these features are applicable. In other cases, a consumer's inability to identify where the standard comes from precludes the activation of such product features. In this case, anchoring-like effects might generalize over product categories. Four experiments provide support for this conceptualization.

CONCEPTUAL FRAMEWORK

Contextual Influences of Prices: Different Theoretical Perspectives

As we noted previously, two theoretical formulations can be brought to bear on the influence of price anchors on the price consumers are willing to pay for a product: Tversky and

Kahneman's (1974) anchoring-and-adjustment conception and Strack and Mussweiler's (1997) selective-accessibility formulation (see also Mussweiler and Strack 1999; for a review, see Mussweiler 2003). Because the mechanisms that these formulations imply occur at different points in the overall judgment process, their effects are not incompatible. Therefore, an understanding of how consumers arrive at an estimate of the price they are willing to pay for a product might need to take the implications of both formulations into account.

Anchoring and adjustment. Tversky and Kahneman (1974) assume that when people are asked to judge a stimulus along an attribute dimension and do not have a specific a priori value in mind, they first select an extreme (anchor) value along this dimension and then adjust either upward or downward from this anchor until they arrive at a value they consider plausible. This value typically lies at the boundary of a range that they consider viable (Quattrone et al. 1984). However, once people have identified a plausible value, they are often unmotivated to consider other possible values. Consequently, they are likely to assign a greater value to a stimulus if the anchor they have selected is high (thus, the first plausible value they identify is at the upper boundary of the range they consider reasonable) than if it is low (Epley and Gilovich 2006).

In much of this research, the selected anchor is arbitrary and externally generated (i.e., presented by the experimenter). Early research attempts focused on understanding the nature of the adjustment process and came to the realization that there is often insufficient evidence for adjustment (Epley and Gilovich 2006), leading to a search for alternative mechanisms to explain the phenomena.

Selective accessibility. In an attempt to explain the anchoring effect, Strack and Mussweiler (1997) suggest that an anchor can operate like a semantic prime. That is, comparing the value of a stimulus with an anchor stimulates people to think about features of a stimulus with values similar to that of the anchor. Once these features become accessible in memory, they are used as a basis for judgments that people report subsequently. For example, people spontaneously think about features of expensive cars when they consider whether the typical price of a German car is higher or lower than 40,000 German marks, but they think about features of cheaper cars when they consider whether the typical price is higher or lower than 20,000 German marks (Mussweiler and Strack 1999). Once this selective subset of exemplars becomes accessible in memory, it is used as a basis for assessing the price of German cars in general.

Input versus output processes. Although the selective-accessibility conceptualization provides a viable account of some anchoring phenomena, it localizes the effect of anchors at an early stage of processing without fully explaining the anchoring effects that occur at the output stage. In a study by Schwarz and Wyer (1985), for example, participants rank-ordered a set of social issues either from high importance to low importance or from low importance to high importance. Then, they rated each issue individually along a category response scale. Ranking stimuli from high to low disposed participants to use the high end of the response scale as an anchor when making their subsequent ratings, whereas ranking stimuli from low to high disposed them to use the low end as an anchor. This was true regard-

less of the nature of the scale. Thus, participants who had ranked from high to low importance rated the stimuli not only as relatively more important along a scale defined in units of importance but also as relatively more trivial along a scale defined in units of triviality. Furthermore, the effects of rank ordering on the importance of stimuli in one domain (i.e., social issues) influenced ratings of stimuli both in this domain and in a significantly different one (i.e., the qualities of a marriage partner).

This set of studies suggests that anchoring effects can also be the result of processes that occur at the output stage of processing, when people transform the implications of their subjective perceptions of the stimulus into an overt response. Furthermore, although the process of applying an anchor value can often be conscious and deliberate, and people might be aware that they are judging a target with a standard in mind, the selection of the standard itself can sometimes occur without awareness of where it came from and may be independent of respondents' perception of the stimulus being rated (for an account of how incidental anchors exert an influence, see Critcher and Gilovich 2008).

A Theoretical Integration: Why Conscious Consideration Matters

To understand the interplay of the factors that we postulate to influence anchoring effects, suppose that consumers explicitly consider whether the price of a leather handbag is typically greater (or less) than the \$499 bags they recently saw in a store window. In the course of making this comparison, consumers are likely to think about features of a product that could conceivably be sold at the anchor price they are considering (Strack and Mussweiler 1997). If they subsequently think about the price they would be willing to pay for this type of product, they are likely to recall a subset of product features that easily come to mind (i.e., high-quality leather bags) and base their judgments on their perception of a product that has these features. Thus, the price consumers consider acceptable is likely to be greater when the previously considered price was high than when it was low.

Similar processes might underlie consumers' estimates of how much they would be willing to pay for a *different* type of product than for one previously considered. This might occur if the features activated during the course of thinking about the anchor product are also applicable to the target product and are perceived as a valid basis for evaluating it. Some attributes are general (e.g., prestige, quality) and can be applied to products from any category. Others, however, are category specific. If conscious comparisons to a price anchor activate exemplars that possess these general attributes, cross-category effects might occur. However, if these price anchor comparisons activate category-specific features, these effects are less likely.

The selective-accessibility processes we described previously occur when consumers first receive information about a product and consciously deliberate on its price. When consumers are merely exposed to a price anchor without explicitly considering it, it is unlikely to activate judgment-relevant concepts (or, for that matter, any concepts at all). In this case, selective accessibility is unlikely to have much impact, and anchoring effects that typically occur at the output stage of processing might be more evident. That is, exposure to a high (or low) price is likely to increase the accessibility of

this price in memory and, therefore, increase the likelihood of the price being spontaneously used as an anchor when consumers report the price they are willing to pay for the product. This should produce the anchoring effects that Tversky and Kahneman (1974) propose. Moreover, this effect, unlike the effect of selective accessibility, should generalize across product categories, regardless of whether the features of the target and anchor stimuli are similar or dissimilar.

Blankenship et al. (2008) provide additional support for this conception. These authors find significant cross-object anchoring effects when participants were under high cognitive load but not when they were under low cognitive load. The anchoring effects obtained under high cognitive load are presumably the result of other processes, such as numeric priming (Wong and Kwong 2000) and magnitude priming (Adaval and Monroe 2002; Oppenheimer, LeBoeuf, and Brewer 2008). It is conceivable that when consumers are exposed to incidental anchors and are not aware of where the standard they are applying comes from, similar processes might dominate, leading to anchoring effects that generalize over related and unrelated products.

These considerations suggest that the effects of price anchors can be localized at different stages of processing. Therefore, by manipulating (1) the similarity between the products to which anchors pertain and the target product, (2) the amount of cognitive activity that accompanies exposure to the anchor price, and (3) the amount of cognitive activity that intervenes between exposure to the anchor and the target judgment, it is possible to identify the factors that affect price estimates of related and unrelated products. We conducted four experiments that examined this possibility. Experiments 1 and 2 focus on how conscious comparisons of a product to a price lead to selective accessibility of thoughts and the impact of thoughts on price judgments of similar and different products. Experiments 3 and 4 use subliminal priming procedures to ensure that participants do not make conscious comparisons to a specific price. This manipulation enables us to determine the effects of high versus low price anchors on consumers' willingness to pay for products in the same or different categories under these low-level exposure conditions. These experiments also examine how the intrusion of other product-related thoughts influenced the anchoring effect.

EXPERIMENT 1

We conducted Experiment 1 using the standard anchoring paradigm. We assumed that when consumers deliberately consider a particular anchor price, specific features of a product that might be sold at this price are activated. If these features are retrieved at the time participants judge how much they are willing to pay for a target product, they are likely to bias their estimates in anchor-consistent directions. To demonstrate that selective accessibility of anchor-consistent thoughts drives participants' estimates, we stimulated one group of participants to think of a wide range of product features before they were exposed to a price anchor, consciously considered it, and provided estimates of the price they would be willing to pay. The second group simply considered the price anchor and provided their estimates of how much they would be willing to pay. We expected that thinking about a wide range of features a priori would

ensure that these general features remained accessible at the time of judgment and could be used as a basis for judgment either in lieu of or in addition to those features activated by comparisons with the anchor price. Consequently, the effect of the anchor price on subsequent price estimates should be attenuated in these conditions. This type of effect would show that selective accessibility of anchor-consistent thoughts is responsible for the anchoring effect. In contrast, suppose the effect of the price anchor on judgments is only a result of effects that occur at the output stage. Then, the anchor should influence estimates regardless of whether participants have thought extensively about the product or not. Thus, this experiment enables us to examine the effects of selective accessibility over and above any effect that anchoring might have at the output stage.

Method

Sixty-seven North American business students participated in Experiment 1. To introduce the experiment, participants were told that we were interested in their expectations for the products available in the market, as well as the prices they were willing to pay for them. We assured them that we were interested in people's price expectations, not their accuracy, and we urged them to respond on the basis of prices they expected to find in the marketplace.

Participants in the no-thought-listing conditions considered a 35 mm–75 mm camera with flash and were asked to indicate whether its average price was greater or less than either a very high value (US\$419) or a very low value (US\$49). After doing so, they estimated the price they would be willing to pay for a camera of a general type (i.e., a 35 mm–75 mm camera with flash), a familiar brand of camera of this general description (i.e., Nikon, 35 mm–75 mm camera with flash), or an unfamiliar brand of this general description (i.e., Vivitar, 35 mm–75 mm camera with flash). Participants in this experiment also estimated the average price of the products in the marketplace. However, the effects of anchors on these estimates were identical to those on the price that participants were willing to pay. For ease of exposition, therefore, we do not report these data.

The procedure under the thought-listing conditions was similar. In this case, however, participants were asked to think about the type of product being judged ("e.g., an automatic, 35 mm–75 mm camera with flash") and to write down all the knowledge they had about this type of product *before* being exposed to the high (or low) anchor value. They were told that this knowledge could be related to previous experiences they had had with the product, information acquired from advertising or other sources, or attributes of the product. They were told to write down the information in complete sentences, in the order it came to mind. After participants wrote down these thoughts, they were asked to indicate whether the average price was greater than or less than a high (or low) anchor price and then were asked to estimate the price they would be willing to pay for such a camera.

Results

Table 1 summarizes participants' estimates of the price they would be willing to pay. These estimates were greater when the price anchor was high than when it was low (US\$181 vs. US\$68, $M_{\text{diff}} = \text{US\$113}$; $F(1, 66) = 32.09$, $p <$

Table 1
EXPERIMENT 1: THE PRICE PARTICIPANTS ARE WILLING TO PAY AS A FUNCTION OF TARGET TYPE AND THOUGHT CONDITIONS

| Thought Conditions | Characteristics of the Target | | | M |
|------------------------------|-------------------------------|----------------|------------------|-----|
| | Product Category | Familiar Brand | Unfamiliar Brand | |
| <i>Thought Generation</i> | | | | |
| High price anchor | 163 | 124 | 155 | 147 |
| Low price anchor | 60 | 64 | 81 | 68 |
| Difference | 103 | 60 | 74 | 79 |
| <i>No Thought Generation</i> | | | | |
| High price anchor | 317 | 164 | 161 | 214 |
| Low price anchor | 78 | 64 | 64 | 68 |
| Difference | 238 | 100 | 97 | 146 |

Notes: Prices are in U.S. dollars.

.01). This difference was greater when price estimates pertained to the product category as a whole ($M_{\text{diff}} = \text{US\$171}$) than when they pertained to a specific brand ($M_{\text{diff}} = \text{US\$83}$, pooled over familiar and unfamiliar brands). However, the interaction of price anchors and target type was not significant ($F(1, 66) = 2.02$, $p > .10$).

More important, however, the price anchor had less effect when participants listed their thoughts before exposure to it ($M_{\text{diff}} = \text{US\$79}$) than when they did not ($M_{\text{diff}} = \text{US\$146}$). The interaction corresponding to this difference was significant ($F_{\text{dir}}(1, 66) = 2.77$, $p < .05$), and we evaluated it with a directional F-test, which is equivalent to a one-tailed t-test, where $F = t^2$ (Keppel 1991). Although the difference was particularly evident when the general category was judged ($M_{\text{diff}} = \text{US\$103}$ vs. $\text{US\$238}$, when thoughts were listed vs. not listed, respectively; $F_{\text{dir}}(1, 66) = 3.27$, $p < .05$), the contingency of this effect on the type of target was not significant ($p > .10$). Nevertheless, the interaction is solely a result of the impact of thought on the influence of high price anchors ($M = \text{US\$147}$ vs. $\text{US\$214}$ in the thought-listing vs. the no-thought-listing conditions; $F_{\text{dir}}(1, 66) = 5.89$, $p < .05$); judgments in low-price-anchor conditions were identical in both thought conditions ($M = \text{US\$68}$). The attributes that were activated by deliberately thinking about the type of product being evaluated were apparently similar to the implications of attributes that were called to mind by comparing the product's price with a low anchor. Consequently, generating these thoughts had little additional effect.

Discussion

Our results do not negate the possibility that anchoring processes that typically occur at the output stage influence the effects of price anchors. The evidence that anchoring effects were present, even when participants generated product-relevant thoughts before price anchor exposure, could be attributable to such processes. However, it seems reasonable to conclude that selective accessibility contributed to anchoring effects over and above any impact that output-type processes might have had.

It is worth noting that the effects of selective accessibility were substantially diminished when participants had an opportunity to think more extensively about the product they were considering before being exposed to the anchors. This cognitive activity presumably activated a wide range of

product features that overrode the product knowledge that was selectively activated by comparisons to the anchor prices, at least under high-price-anchor conditions. Thus, the effect of selective accessibility on the impact of a price anchor is pronounced only if consumers do not think extensively about the product they are considering before exposure to the anchor.

In principle, the process of thinking a priori about the product could activate a concept of the product's typical price, leading participants to use this price as an anchor to estimate the price they would be willing to pay. However, the price that is selected as an anchor is theoretically the price that is most accessible in memory at the time of judgment. It seems unlikely that prices activated by previously generated thoughts would override the effects of the comparative judgment processes that participants subsequently performed (for evidence that anchoring-and-adjustment effects are transitory and disappear when participants have engaged in other cognitive activity before making judgments, see Schwarz and Wyer 1985). Nevertheless, this ambiguity suggests the need for further evidence that selective accessibility overrides other output processes that could lead to anchoring effects under conditions in which participants are likely to engage in cognitive deliberation. Experiment 2 accomplishes this.

EXPERIMENT 2

According to our conceptualization, the features that are activated by explicitly comparing a target product with a high-price-anchor (or low-price-anchor) product might also influence the price that participants are willing to pay for products in other categories. As Strack and Mussweiler (1997) postulate, however, this influence should occur only if the features that are activated in the course of making the comparisons are diagnostic. This is a well-recognized contingency (Krishna et al. 2006; Strack and Mussweiler 1997); however, in the current context, it has unique implications. In particular, it raises the possibility of "asymmetries" in cross-category effects of price anchors. These asymmetries can occur if features activated by making comparative judgments of one product are relevant to evaluations of a second, but the features activated by making comparisons of the second product are *not* typically considered when evaluating the first.

For example, electronic products are typically evaluated on the basis of product-specific features that are often not applicable to products of other types (e.g., a notebook computer is normally evaluated on the basis of its hard drive capacity, RAM, weight, and so forth). Conversely, clothing is often evaluated on the basis of experiential criteria (e.g., attractiveness, style, prestige, the pleasure that comes from wearing it) that are potentially applicable to other products as well. Although these latter criteria might not be considered when estimating the price of electronic products, they are nonetheless applicable to an evaluation of these products and can be used if they come to mind at the time of judgment. In contrast, the features that are typically activated by thinking about electronic products are normally inapplicable to evaluations of clothing. Note that the asymmetry predicted by this example would not be evident if output-type processes are responsible for the anchoring effect, because

such processes occur regardless of the diagnosticity of people's thoughts elicited by the price anchor.

Experiment 2 examines this possibility. Some participants were asked whether the average price of an electronic product was greater or less than a high (or low) price anchor; then, they indicated how much they would be willing to pay for the same electronic product, a different type of electronic product, or an article of clothing. Others were asked whether the average price of an article of clothing was greater or less than a high (or low) price anchor; then, they estimated the price they would be willing to pay for the same article of clothing, a different article of clothing, or an electronic product.

We expected that when participants were asked to estimate the price they would be willing to pay for a target product, the product category associated with the price anchor would cue the retrieval of a subset of judgment-relevant features to use as a basis for their estimate. If the features activated in the course of considering this product with a high (or low) anchor price are relevant to this estimate, participants are likely to include these features in the subset of judgment-relevant features they apply to the judgment. In this case, the anchor value (or the features associated with it) should affect price estimates in the manner implied by selective-accessibility considerations. Suppose, however, that the features activated in the course of considering the price anchor are irrelevant to the judgment that participants are later asked to make. Then, the anchor value should have relatively little influence.

These considerations suggest an asymmetry in the effects of price anchors, depending on the products to which the anchors pertain. As we noted previously, the features activated by comparing an electronic product with a price anchor are specific to this type of product. Therefore, they should affect judgments of the price that participants are willing to pay for this type of product alone but should not influence the price that they would be willing to pay for other electronic products or clothing articles. In contrast, making comparisons involving articles of clothing is likely to activate experiential features also applicable to evaluating other types of products. To this extent, comparing an article of clothing with an anchor price should affect participants' subsequent estimates of the price they are willing to pay not only for this product but also for other articles of clothing and even electronic products. (Note that although some clothing items, such as raincoats and hiking boots, are evaluated on the basis of utility, in this study we restricted our attention to products that met the aforementioned criteria.)

Pretest

To confirm the assumption that thoughts about electronic products and articles of clothing differ in terms of the emphasis on functional and experiential characteristics, 27 Hong Kong business majors were given either a high or a low price anchor and were asked to indicate whether the typical product in the category of electronic products (e.g., a DVD player, a Palm Pilot) was higher or lower than the anchor price. Twenty-eight other participants made similar judgments pertaining to several articles of clothing (e.g., running shoes, a sweater). In each case, participants were asked to write down all the features they considered when answering this question. Two independent judges then coded

these features into five categories pertaining to price, brand, quality, function, and aesthetic/experiential characteristics.

As we expected, participants generated significantly more function-related thoughts about electronic products than about articles of clothing (averaged over products, $M = 1.89$ vs. $.11$) and more general, aesthetic/experiential thoughts about articles of clothing than about electronic products ($M = 3.00$ vs. $.99$; in each case, $F(1, 52) > 11.56, p < .05$). No differences emerged for other types of thoughts.

Method

Seventy-four Hong Kong business majors participated in Experiment 2 for course credit. In each case, participants received instructions and made ratings similar to those in Experiment 1. We constructed stimulus materials for this experiment on the basis of the pretest. We selected four electronic products (a stereo, a DVD player, a Palm Pilot, and a cell phone) and four articles of clothing (dress shoes, a wool sweater, jeans, and a windbreaker). We selected the high and low price anchors associated with these stimuli, which were beyond the range that participants considered plausible, on the basis of pretesting. For example, the price anchors for a DVD player were HK\$6,500 and HK\$600, and for a Palm Pilot, the anchors were HK\$10,000 and HK\$500; anchors for dress shoes were HK\$4,500 and HK\$100, and for a wool sweater, the anchors were HK\$5,500 and HK\$200 (note that US\$1 = HK\$7.8).

We then used these stimuli to construct 16 forms. Each form contained questions pertaining to three anchor products (e.g., "Is the price of a stereo greater than or less than X?" where X was a high or low price anchor), each of which was followed (on a separate page) by a question about the price that participants were willing to pay for the target product. However, the relationship of the target product to the product specified in the anchor question varied. In eight forms, each of the three anchor questions referred to a different electronic product, and the target item that followed them referred to (1) the same electronic product as the anchor, (2) an electronic product that differed from the anchor, or (3) an article of clothing. In four of these forms, the anchor price that preceded a target of the same type was implausibly high, and the anchor price that preceded the other two targets was implausibly low. In the other four forms, the anchor prices were reversed so that the anchor price that preceded the target of the same type was implausibly low and the other two anchor prices were implausibly high.

The other eight forms were analogous, except that the anchor questions all pertained to articles of clothing and the target items pertained to the same article of clothing, a different article of clothing, or an electronic product. We counterbalanced the particular products used to construct the 16 forms so that no form contained more than one item pertaining to any given product. Pooled over forms, however, each electronic product and each article of clothing appeared equally often as a target and an anchor item at each combination of anchor (high vs. low) and target (same vs. related vs. unrelated).

Results and Discussion

The products evaluated in this study varied considerably in terms of the price at which they were typically sold. To

permit meaningful comparisons, we converted participants' estimates of the price they would be willing to pay for each of the eight types of target products to standard scores for each target separately. Table 2 summarizes these scores. The top half of Table 2 shows the effects of deliberating on anchors pertaining to electronic products on price estimates of the same electronic product, a different electronic product, and an unrelated product (an article of clothing). The bottom half of Table 2 shows analogous effects of deliberating on anchors pertaining to clothing.

We hypothesized that comparing the price of an electronic product with a high (or low) anchor value would affect the price that participants would be willing to pay for the same type of product but that this effect would not generalize to either other types of electronic products or articles of clothing. In contrast, we expected that comparing an article of clothing with a high (or low) anchor value would affect the price that participants would be willing to pay for both this and other types of products. The results summarized in Table 2 are consistent with these hypotheses.

Because the design of the study precluded a single analysis of the effects of anchors on all three types of target products, we evaluated the hypotheses by comparing the anchor effect on judgments of a given type of target with its effect on judgments of each of the other types separately. The effect of comparing an electronic target with a high versus low anchor had a substantial effect on the price participants would be willing to pay for products of the same type ($F(1, 34) = 5.78, p < .01$), whereas its effect on the price they would be willing to pay for either other electronic products or articles of clothing was negligible ($F < 1$). The predicted interaction of anchor and product type was significant in analyses comparing judgments of the same type of product with judgments of related types ($F_{\text{dir}}(1, 34) = 8.67, p < .01$) and also in analyses comparing judgments of the same type of product with judgments of clothing ($F_{\text{dir}}(1, 34) = 2.98, p < .05$). The effects of anchor on judgments of both related products and unrelated products were negligible ($F < 1$).

In contrast, the effects of comparing articles of clothing with a high (or low) anchor were similar regardless of the type of target judged (see Table 2). The overall effect of anchor was significant in analyses comparing judgments of the same article of clothing with both judgments of other

Table 2
EXPERIMENT 2: THE PRICE PARTICIPANTS ARE WILLING TO PAY AS A FUNCTION OF TYPE OF TARGET PRODUCT, TYPE OF COMPARISON PRODUCT, AND PRICE ANCHOR

| | Same Target | Related Target | Unrelated Target |
|--------------------------------------|-------------|----------------|------------------|
| <i>Electronic Comparison Product</i> | | | |
| High price anchor | .62 (3330) | .21 (2536) | -.04 (272) |
| Low price anchor | -.51 (1442) | .24 (2644) | -.16 (290) |
| Difference | 1.13* | -.03 | -.12 |
| <i>Clothing Comparison Product</i> | | | |
| High price anchor | .17 (330) | .27 (325) | -.16 (2035) |
| Low price anchor | -.10 (267) | -.11 (268) | -.57 (1407) |
| Difference | .27* | .38* | .41* |

*Difference is significant at $p < .05$.

Notes: Data are in standard scores. Raw scores, in Hong Kong dollars, are indicated in parentheses. US\$1 = HK\$7.8.

types of clothing ($F_{dir}(1, 32) = 3.64, p < .05$) and judgments of electronic products ($F_{dir}(1, 32) = 5.40, p < .05$). However, the interaction of anchor value and product type was negligible ($F < 1$) in each case.

The results of this study strengthen our conclusions from Experiment 1 regarding the role of selective accessibility in the effect of price anchors. They further circumscribe the conditions in which the effect occurs. The indication that the effects can be asymmetric is particularly provocative. That is, thinking about the price of one type of product might influence the price a consumer would be willing to pay for a second type, but thinking about the price of the second type of product might *not* influence the price a consumer would be willing to pay for the first. This asymmetry would be difficult to explain on the basis of anchoring effects that result from output processes alone. However, the impact of such output processes is more apparent in the next two experiments we report.

EXPERIMENT 3

When consumers do not make explicit comparisons with a high (or low) price anchor, anchor-related thoughts might not be spontaneously activated. Then, anchoring effects that result from output processes are likely to dominate, and the effects of these should theoretically generalize over product categories. To examine this possibility, it is necessary to expose participants to either high or low anchor prices without making them aware of the relevance these price anchors have to the price of the product they subsequently consider. We expected that this would lead participants to use these prices as an internal standard at the time of judgment without being conscious of the reason for doing so. We accomplished this using subliminal priming procedures similar to those that Adaval and Monroe (2002) employ. Subliminal priming can increase the accessibility of semantic concepts and knowledge that influences the interpretation of information (Bargh 1997). However, exposure to high and low prices out of context is unlikely to activate knowledge that is specific to a particular type of product (Adaval and Monroe 2002). Thus, we assumed that in the absence of conscious cognitive activity, subliminally primed high and low prices would influence the value that participants would select as a price anchor at the time of judgment without activating product-relevant knowledge.

To evaluate this assumption, we subliminally primed either high or low prices while participants performed an unrelated task. We then gave participants a second task in which they were asked, in counterbalanced order, to indicate the price they would be willing to pay for both a pair of shoes and a DVD player. We expected that the effects of subliminally primed price anchors would affect judgments of the price that participants were willing to pay for both products and that these anchoring effects would be due primarily to output processes. Although Mussweiler and Englich (2005) show that the subliminal presentation of price anchors while participants thought about the price of a car led to the activation of anchor-consistent thoughts, the subliminal primes in the current study were presented before participants knew they would be asked to estimate the prices they would be willing to pay for products. We discuss the implications of Mussweiler and Englich's study in more detail subsequently.

Method

Fifty-five Hong Kong business students participated in Experiment 3 for course credit. Participants were subliminally exposed to high and low numerical prices while performing a letter identification task. Then, as part of a different experiment, they estimated the price they would be willing to pay for both a DVD player and a pair of shoes. We analyzed data as a function of subliminal anchor (high vs. low) and judgment order (DVD player first vs. shoes first).

Participants were told that the experiment was intended to determine how quickly and accurately people could respond to visual stimuli. Participants were told that they would see a series of letter strings on the computer screen, some of which consisted of vowels and others of which consisted of consonants. They then identified whether the series they saw was a string of vowels or consonants by pressing a designated key.

The priming procedure was similar to that employed by Adaval and Monroe (2002). That is, participants were shown a series of letter strings composed of either vowels or consonants (e.g., "aaaaaa," "ccccc") in a small box on the screen. They were told that after they responded to each stimulus (i.e., after they indicated whether the letter string was a string of vowels or consonants), a series of dashes (e.g., "- - - -") would appear on the screen, followed by a second letter string. They were told that this would continue for several trials and that they should respond as quickly as possible without making errors. The computer ostensibly recorded the speed and accuracy of their responses.

Before each trial, however, a high price anchor or a low price anchor was primed subliminally. Specifically, after a letter string appeared, a series of dashes appeared on the screen for 1.5 seconds to refocus their attention. A number was then flashed in the box for 16 milliseconds, followed immediately by a mask that remained on the screen for 120 milliseconds to prevent an after image. After the mask, the next word to be judged was presented. In the low-price priming conditions, the prices and the digits composing them were low (e.g., HK\$100, HK\$111, and HK\$112), and under the high-price priming conditions, they were high (e.g., HK\$9,779, HK\$9,799, and HK\$9,999).

After performing this task, participants were given an ostensibly unrelated questionnaire with instructions that we were interested in how students perceive the prices of several different types of products but that, because of time constraints, they would be asked about only two of these products. In one version of the questionnaire, participants indicated how much they would be willing to pay for a DVD player if they were interested in purchasing one. Then, they answered a similar question about a pair of sports shoes. In the second version of this questionnaire, the order of the questions was reversed.

After participants answered the questions, they were given a questionnaire to assess whether they had noticed the subliminal primes. As a cover story, participants were told that because of a programming error, some of the images that had been used for a previous study had not been completely eliminated. On this pretense, they were told to go through 20 trials of the computer program again (i.e., identify strings of vowels and consonants) and to write down

whatever they saw after each trial. No participants reported seeing any of the subliminal primes, even when forewarned.

Results

We analyzed participants' estimates of the prices they would be willing to pay for both a DVD player and a pair of shoes as a function of anchor value (high vs. low) and judgment order (DVD player first vs. shoes first). As we expected, estimates increased with the valence of the subliminally primed numbers to which participants were exposed. That is, participants estimated that they would be willing to pay more for a DVD player if high prices were subliminally primed ($M = \text{HK}\$1,108$) than if low prices were primed ($M = \text{HK}\$717$; $F(1, 51) = 5.12, p < .03$). Participants also estimated that they would be willing to pay more for a pair of shoes in the former condition than in the latter ($\text{HK}\$481$ vs. $\text{HK}\$410$; $F(1, 51) = 2.78, p < .10$). These effects did not depend on judgment order ($p > .10$). Although priming seemed to have less effect on the price that participants would be willing to pay for shoes than on the price they would be willing to pay for a DVD player, a multivariate analysis involving both judgments revealed a significant effect of anchor value ($F(2, 50) = 3.44, p < .04$) that was independent of product type.

Discussion

The results of this study suggest that when subliminal price anchors are presented *before* a price estimation task, the effect of the anchors generalizes across product categories. These results are worth noting in light of Mussweiler and English's (2005) findings. In their study, participants were asked to think about the average price of a car while high (or low) price anchors were primed subliminally. This procedure seems likely to have led participants to generate an internal representation of a type of car that was characterized by the anchor price, producing selective-accessibility effects. In our study, however, the primes were presented *before* participants performed the price estimation task. The finding that the anchoring effect generalized across different product categories suggests that the subliminally presented price anchors merely became more accessible in memory and were not associated with any attribute *per se*.

EXPERIMENT 4

The impact of subliminally primed anchors on willingness-to-pay estimates in Experiment 3 indicates that the effects of exposure to incidental anchors can generalize over categories. A question is whether these effects depend on the cognitive activity in which consumers are engaged. Experiment 4 examines this question. Price anchors were again presented subliminally. In this case, however, while participants were exposed to the priming stimuli, they were also overtly primed with a product (sports shoes) and told to think about either (1) the price they were willing to pay for this product or (2) more general experiences they have had with the product.

We assumed that when participants have sufficient time to think about the price that they would be willing to pay for a product (e.g., sports shoes), they will be likely to recall a relatively wide range of prices that are often charged for this type of product and that they have personally paid for the product in the past. Consequently, when they are asked to

report the price they would be willing to pay for the product at a later time, they are more likely to use these prices as a basis for the judgments, and the subliminally presented anchors should have little impact. In contrast, participants who focus only on general experiences with a type of product are less likely to think about prices they have previously paid for these products. Therefore, when participants are asked to indicate how much they would be willing to pay, they are likely to use the subliminally primed prices as anchors at the time of judgment, and so the effect of anchoring and adjustment should be more evident.

Our predictions assume that when participants are asked to think about the price of the product, they have sufficient time and resources to retrieve a wide range of possible prices of the product from memory and to evaluate the implications of that range. If this is not the case, the effects of price anchors might still dominate, as Mussweiler and English (2005) suggest. To provide participants sufficient time to retrieve such prices, we lengthened the subliminal priming procedure to approximately five times the length of that in Mussweiler and English's (2005) study. Thus, participants had ample time to think about a full range of product prices while performing this task. We expected that the prices retrieved from memory should offset the effects of the subliminally priced anchors.

Method

Seventy-nine Hong Kong business students participated in Experiment 4 for extra course credit. They were randomly assigned to conditions of a 2 (subliminally primed price: high vs. low) \times 2 (instructional set: think about price willing to pay for shoes vs. think about general experiences with shoes) design.

We introduced participants to the experiment with instructions that the study was being conducted for a manufacturer of consumer goods that was interested in how font color used in advertising affects recognition and liking for a product. Participants were told that to test this, we developed a program that would show the words "sports shoes" in either red or blue on the screen. Participants were told that they should identify the color of the word as quickly as possible and that speed and accuracy were equally important. They were also told that in real marketing situations, consumers often think about different things while they examine brands. To simulate such conditions, participants in general-focus conditions were told to think about all the experiences they have had with sports shoes. In price-focus conditions, participants were told to think about the price they would be willing to pay for the sports shoes. The priming procedure we used lasted for five minutes, thus giving participants ample opportunity to think about either prices or general experiences, depending on the focus condition involved.

After these preliminary instructions, participants performed the task using the procedure outlined in Experiment 3. In this case, however, the words "sports shoes" appeared on the screen (in either red or blue font) for all 46 stimulus trials and were preceded in one condition by subliminally primed high prices and in the other condition by subliminally primed low prices. After completing the priming task, participants completed a product evaluation questionnaire

that asked them to indicate the price they would be willing to pay for sports shoes.

Results

We analyzed participants' estimates of the price they would be willing to pay for the sports shoes as a function of the primed numbers and instructional set. The overall effect of price anchors on these estimates was not significant ($F < 1$). However, the interaction of primed prices and instructional set was reliable ($F(1, 75) = 4.62, p < .05$) and of the form expected. Specifically, the subliminal primes had a positive effect on willingness-to-pay estimates when the interpolated cognitive activity led general thoughts about the product to be accessible in memory (HK\$492 vs. HK\$403 when primes were high vs. low, respectively; $F(1, 37) = 3.79, p < .06$). However, the subliminal primes had a nonsignificant opposite effect when participants had been thinking about what price they would be willing to pay for the product (HK\$450 vs. HK\$515, respectively; $F(1, 38) = 1.40, p > .10$).

Discussion

The results of Experiment 4 showed that interpolated cognitive activity can interfere with the anchoring effect that is elicited by exposure to subliminally presented prices. However, the nature of this activity makes a difference. If the thoughts that participants generate while engaging in this activity are general in nature, participants are likely to retrieve and use the prices that have been made more accessible by the subliminally primed price anchors to estimate the price they are willing to pay. In this case, anchoring effects are likely to occur. Suppose, however, participants are thinking about the price they would be willing to pay for products in the category. In this case, they are more likely to use the prices generated in the course of this activity as a basis for judgment, and subliminally presented price anchors will not have much influence.

Two aspects of our findings are noteworthy. First, there was no apparent association between the prices that were presented subliminally and the product being evaluated, even though they were presented one after the other in the priming task. Rather, these prices were activated independently of the sport shoes they rated and were used as anchors only when participants did not have any other price knowledge in memory.

Second, participants who were told to think about price had ample time to retrieve and evaluate their prior knowledge of prices that the product they considered could have, and so anchor values had little effect. In contrast, price anchors might have a greater effect if participants do not have much opportunity to consult their prior knowledge about the price the product could have, as in Mussweiler and Englich's (2005) study.

GENERAL DISCUSSION

The four experiments we report provide a coherent picture of the conditions in which the price people are willing to pay for a product is influenced by exposure to prices of the same or a different product. We considered two cognitive mechanisms that might underlie this influence: selective accessibility (Strack and Mussweiler 1997) and anchoring that occurs as a result of output processes (Tversky and

Kahneman 1974). Because the mechanisms operate at different stages of processing, they could, in principle, contribute independently to the overall effects of anchoring. However, different factors might influence each effect.

When consumers consciously consider whether the price of a product is higher or lower than an arbitrary value, they presumably activate concepts of products that might be sold at this price. Once this selective subset of knowledge is accessible in memory, consumers are likely to use it as a basis for deciding the price they would be willing to pay for the product. However, the effect of this knowledge decreases when consumers have the opportunity to think about the product before making comparative judgments, thus making salient a more representative set of product features at the time a price estimate is computed (Experiment 1). The features selectively activated by comparing a product with a high (or low) anchor price can sometimes influence other types of product judgments as well. However, this effect may be asymmetric, as Experiment 2 indicates. Thus, comparing the price of an article of clothing with a high or low value, which activates general attributes of relevance to a wide variety of products, is likely to influence the acceptable price of a DVD player. However, comparing the price of a DVD player with a high or low value, which activates concepts that are specific to this type of product, is unlikely to influence the acceptable price of an article of clothing.

These results extend the implications of Strack and Mussweiler's (1997) selective-accessibility formulation. These authors report that asking participants to make a comparative judgment with respect to one attribute of an object (e.g., the height of the Brandenburg Gate) had little effect on their absolute judgments of this object with respect to other attributes (e.g., the width of the Brandenburg Gate). In their research, however, the thoughts that were activated by making comparative judgments were apparently dimension specific. In contrast, comparisons with price anchors are likely to activate features that vary along several different dimensions. Consequently, the effects of these anchors on price estimates might sometimes generalize over diverse sets of stimuli, depending on the particular features that are activated.

The effects of selective-accessibility processes occur at the time consumers retrieve knowledge about the product they are evaluating and compute an estimate of its value. Other anchoring effects could occur at the time consumers report their judgment. To investigate these effects at the output stage under conditions that are minimally confounded with selective accessibility, we constructed situations in which high and low anchor values were primed subliminally. Subliminally priming prices that are not specific to a particular type of stimulus is unlikely to activate general bodies of declarative knowledge (Adaval and Monroe 2002). Thus, this procedure should decrease the likelihood that participants would activate anchor-related concepts and values before judgments were made and, consequently, should lead the effects of price anchors to generalize across product categories.

This type of anchoring effect is particularly evident in Experiments 3 and 4. Experiment 3 confirms the assumption that subliminally primed high and low price anchors affect the price that participants are willing to pay for products encountered immediately afterward. These results are also worth noting in the context of Blankenship et al.'s

(2008) work. They also obtained cross-object anchoring effects, particularly when participants were under cognitive load. However, participants in their studies were aware of the anchors and appeared vulnerable to experimenter intent. The price anchors we presented were subliminal, and thus no such experimenter demand effects were likely. Nevertheless, the convergence of these findings is noteworthy.

Experiment 4 shows that the effects of such subliminally presented price anchors are diminished when participants are explicitly asked to think about the price of the products they are being asked to evaluate. This suggests that the activation of previously acquired price-related knowledge eliminates the effects of subliminally primed values on anchoring phenomena.

Perhaps the most important theoretical implication of our research pertains to the assumption that anchoring effects are the result of either processes that occur at an earlier stage of processing or those that occur when participants report their judgments. Because these effects occur at different stages of processing, judgments could, in principle, reflect the contributions of both. However, there was little evidence of this in the current research. In Experiment 2, for example, exposure to high (or low) prices had a nonsignificant, negative effect on judgments under conditions in which selective accessibility was unlikely to play a role (see Table 2). As we noted, the interpolated cognitive activity that underlies selective-accessibility effects might override the transitory effects of anchoring and adjustment (Schwarz and Wyer 1985). Nevertheless, the possibility that both processes could operate makes salient the need to specify the factors that influence their relative contributions rather than focusing on conditions in which they do or do not operate at all (Epley and Gilovich 2010).

Purchase decisions outside the laboratory may be based not only on the actual price for which a product is available but also on the subjective perception that the product is expensive relative to others that might be available. Several studies (e.g., Higgins and Lurie 1983; Sherman et al. 1978) show that once a subjective judgment of a stimulus is made, this judgment might persist in memory and later influence judgments and decisions independently of the information on which it was initially based (for a theoretical basis for this tendency, see Wyer and Srull 1989). This suggests that although the effect of a price anchor on numerical price estimates might be transitory, subjective perceptions of expensiveness that accompany these estimates might persist and, therefore, might influence later purchase decisions independently of the arbitrary price anchors that initially gave rise to these perceptions. Studies in consumer research (Adaval and Monroe 2002; Janiszewski and Lichtenstein 1999; Lynch, Chakravarti, and Mitra 1991) and elsewhere (Helson 1964; Ostrom and Upshaw 1968; Parducci 1965) suggest that people judge a particular product as less "expensive" in the context of products that cost a lot compared with the context of products that cost very little. In the current context, this means that inducing participants to consider whether a product's typical price is greater or less than a high value not only might increase the price a consumer is willing to pay for it but also might simultaneously decrease estimate judgments of the product's expensiveness.

Our research also helps reconcile the different findings obtained in previous pricing studies (Krishna et al. 2006;

Nunes and Boatright 2004). In some of this work, price anchors influenced participants' estimates of the price they would be willing to pay for products in other categories. In other studies, anchors seem to have less effect. According to the current research, the extent to which thinking about a product with reference to these anchors produces anchoring effects that generalize across categories is likely to depend on the nature of the concepts activated by these thoughts and their general relevance to product evaluations. In addition, not thinking about them might actually have a more general, cross-category effect.

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