

The Impact of Resource Scarcity on Price-Quality Judgments

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Consumers routinely encounter situations in which they perceive that resources are scarce. However, little is known about how this perception influences consumers' use of price in their purchase decisions. The present research seeks to fill this gap by examining the link between scarcity and the tendency to use price to judge product quality, and the mechanisms underlying that link. Six studies (and five more reported in the [web appendix](#)) using multiple product categories and a variety of operationalizations of both scarcity and price-quality judgments show that scarcity decreases consumers' tendency to use price to judge product quality. This occurs because scarcity induces a desire to compensate for the shortage and seek abundance, and thereby reduces an individual's general categorization tendency (because categorizing brings about a feeling of reduction); this, in turn, hinders consumers from viewing products as belonging to different price-tier groups, and thus lowers their tendency to use price as a basis for judging product quality. Boundary conditions for the proposed effect are also identified. The current research makes fundamental contributions to the literatures on scarcity, price-quality judgments, and categorization.

Keywords: scarcity, resource, price-quality judgments, price-quality perception, categorization, desire for abundance

Consumers often perceive that resources are scarce. Monthly bills often remind them of limited monetary resources, and approaching deadlines create the perception that time is scarce ([Shah, Mullainathan, and Shafir 2012](#)).

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More broadly, people regularly experience or hear about economic crises, natural disasters, and social disturbances ([Griskevicius et al. 2013](#)), which evokes a general perception that resources in the world are scarce ([Laran and Salerno 2013](#)). However, despite its prevalence, little is known about how scarcity influences consumers' use of price in their purchase decisions. The present research seeks to address this issue by examining the link between scarcity and consumers' tendency to use price to judge product quality (i.e., price-perceived quality correlation or price-quality judgments; [Lalwani and Shavitt 2013](#)).

Although no previous research has directly examined the link between scarcity and price-quality judgments, some research suggests that scarcity might increase the tendency to make price-quality judgments. Specifically, research indicates that scarcity limits an individual's cognitive capacity ([Cialdini 1993](#); [Easterbrook 1959](#); [Mani et al. 2013](#)), and that reduced cognitive capacity increases the use of mental shortcuts such as price-quality heuristics ([Kardes et al. 2004](#); [Rao 2005](#); [Rao and Monroe 1988](#)).

Collectively, these works point to a possible positive association between scarcity and price-quality judgments.

In contrast, we propose that scarcity decreases the tendency to make price-quality judgments. Specifically, we postulate that scarcity is aversive and triggers the desire to compensate for the shortage, and to seek abundance (Cialdini 2001). This abundance-seeking reduces individuals' general tendency to categorize objects and to view products as belonging to different price-tier groups, and thus lowers their tendency to use price as a basis for judging products' quality.

The present research advances theoretical understanding of several research domains. First, it is the first to directly examine the impact of scarcity on price-quality judgments. In addition, although the scarcity literature suggests that scarcity may activate its own mindsets and psychological processes (Shah et al. 2012), little is known about these processes (Roux, Goldsmith, and Bonezzi 2015). The current research addresses this gap by identifying a new psychological process activated by scarcity: a reduction in general categorization tendency. Second, this research adds to the literature on price-quality judgments, as it identifies a new mechanism that may underlie consumers' tendency to make price-quality judgments (hereafter, this tendency will simply be referred to as "price-quality judgments"). Third, this work adds to the categorization literature by providing a multidimensional view of categorization. We suggest that people may differ not only in terms of *how* they categorize, but also in terms of the *extent* to which they categorize. This multidimensional view may broaden the understanding of consumer categorization processes in a variety of marketing settings. Moreover, we also identify an important antecedent (i.e., scarcity) and an important consequence (i.e., price-quality judgments) of the categorization process.

THEORETICAL BACKGROUND

We argue that scarcity decreases price-quality judgments, and propose that this relationship is driven by a desire for abundance, which reduces general categorization tendency. Specifically, first, scarcity is an aversive state, and thus induces the desire to compensate for the shortage and seek abundance. Second, the desire for abundance reduces an individual's general categorization tendency because categorization creates a feeling of reduction (i.e., categorization reduces many objects into fewer groups). Third, a reduction in general categorization tendency inhibits consumers from viewing products as belonging to different price-tier groups, which in turn lowers their tendency to use price as a basis for judging product quality. Thus, we organize the theoretical background section as follows: the first part discusses the link between scarcity and general categorization tendency, and the second part

discusses the link between general categorization tendency and price-quality judgments.

Scarcity and General Categorization Tendency

As Heider (1958) noted, all humans have a basic motive to seek structure and order in their overly complex stimulus environment. One way to achieve such structure and order is through categorization (Moskowitz 1993), a simplifying process of dividing the world into manageable groups of entities (Gutman 1982; Rosch 1978). Categorization has been shown to influence people's perceptions, motivations, judgments, and choices (Cheema and Soman 2008; Simonsohn and Gino 2013; Tu and Soman 2014), and is thus considered a fundamental process underlying consumer decision making (Brough and Chernev 2012).

We propose that scarcity is closely and uniquely associated with this fundamental human process. Specifically, we theorize that scarcity may reduce general categorization tendency because scarcity induces a desire for abundance, whereas categorization involves a feeling of reduction. A basic property of scarcity is that it makes people seek abundance (Cialdini 2001), a notion that has been evidenced in a variety of behavioral domains. Small budgets to play a game lead participants to excessively borrow resources in terms of both money and time (Shah et al. 2012), limited opportunities to consume food trigger a focus on consuming as much food as possible (Sevilla and Redden 2014), low stocking levels of apparel items facilitate in-store hoarding behaviors (Gupta and Gentry 2016), and the perception that resources in the world are scarce leads individuals to seek and consume high-calorie foods (Laran and Salerno 2013). These findings suggest that scarcity—regardless of whether the source of scarcity is money, time (or opportunity), food, product, or general perceptions—induces the desire to compensate for the lack and, hence, to seek abundance.

In contrast, categorization can lead to a feeling of reduction by inducing perceptions that fewer objects are available (e.g., a reduction of 18 DVD players into three categories based on small/medium/large display size). A notable aspect of categorization is that it predisposes people to think of and enumerate objects in terms of the formed categories (e.g., "medium-display-size DVD players"; Moreau, Markman, and Lehmann 2001). Because the number of formed categories (e.g., three) is smaller than the number of individual items (e.g., 18), and because people have an innate tendency to spontaneously quantify items (Isaac and Schindler 2013), categorization may induce a psychological feeling that fewer objects are available. In line with this reasoning, research on basic human perceptions shows that creating categories among items such as by varying the color or shape of the items breaks up the Gestalt whole (Wertheimer 1938), and thereby leads to the perception that the item set contains fewer items (Redden and Hoch 2009). The desire for

abundance induced by scarcity should make the feeling of reduction associated with categorization particularly aversive, and thus scarcity should reduce general categorization tendency.¹

General Categorization Tendency and Price-Quality Judgments

How might reduced general categorization tendency influence price-quality judgments? Research suggests that price is a dominant and salient attribute that profoundly influences judgments (Lalwani and Monroe 2005). Price is also an important alignable attribute that readily enables comparisons between brands, and can be organized from smallest to largest, and thus is more easily structured compared to other non-numeric attributes (Lalwani and Forcum 2016). Hence, people with a high (vs. low) tendency to categorize may be more likely to use price as a cue for categorizing brands (*ibid.*) and accordingly form price tiers of those brands (e.g., high-priced brand, low-priced brand). Indeed, research shows that when faced with a number of alternatives, consumers often categorize them into distinct price tiers on an expensiveness continuum (Brough and Chernev 2012).

Categorization of brands into price tiers may increase people's price-quality judgments.² The creation of price tiers should boost a sense of hierarchy among brands, leading consumers to arrange those brands in a methodical fashion and to mentally order or rank them (Lalwani and Forcum 2016). To be cognitively consistent, consumers may use the mentally formed price orders as a cue to associate brands from lower price tiers with lower quality and brands from higher price tiers with higher quality, resulting in increased price-quality judgments. Consistent with this prediction, Lalwani and Forcum (2016) find that people high (vs. low) in need for structure are more likely to use price to infer the quality of brands. The relation between categorization (price-tier grouping) and increased price-quality judgments is also supported by research on biased information processing. The mere act of categorizing based on price may strengthen beliefs that price is a meaningful variable that predicts other brand characteristics such as quality (Lalwani and Forcum 2016), which may further inflate price-quality judgments.

1 Note that this reduction in general categorization tendency focuses on the *extent* to which people categorize. This conceptualization of categorization should be distinguished from operationalizations of *how* people categorize, such as the breadth of categorization (Liberman and Trope 2008; Ülkümen, Chakravarti, and Morwitz 2010) or the number of subcategories (Redden 2008). In other words, general categorization tendency can vary, regardless of how broadly categories are formed or how many subcategories are created.

2 We focus on price-quality judgments that are driven by a motivational construct (i.e., desire for abundance), and thus it should be conceptually distinguished from the broad term "price-quality heuristics," which does not necessarily entail motivational aspects.

Importantly, this proposed relation between categorization (price-tiering) and increased price-quality judgments might also hold in some other cases where a nonprice attribute is used as the categorization base. This is because attributes used to infer product quality, in many cases, can serve as an "informational chunk" that represents a composite of information about several other attributes (Olson 1976; Sujan and Dekleva 1987). For example, if consumers categorize alternatives by brand, both the brand-quality relation (e.g., "well-known brands have high quality") and the brand-price relation (e.g., "well-known brands have high prices") are likely to be strengthened, which may also activate price-quality inferences (e.g., "high-priced brands have high quality").

The preceding evidence suggests that those who have a high general categorization tendency are more likely to form price tiers of brands, and thereby are more likely to infer stronger price-quality associations. Thus, those who have a low general categorization tendency (those who are in a psychological state of scarcity) are expected to make lower price-quality judgments. Collectively, we propose that scarcity reduces general categorization tendency, which in turn decreases price-quality judgments.

Overview of Studies

Six studies (and five more reported in the [web appendix](#)) using a variety of operationalizations of both scarcity and price-quality judgments were conducted to demonstrate the robustness and generalizability of the proposed phenomenon and its underlying mechanism. Study 1A demonstrated that scarcity decreases price-quality judgments. Study 1B replicated this finding and further added conceptual clarity to our theoretical model by addressing two scarcity-related accounts: (1) naïve theory account, and (2) impeded learning account (see study 1B for details). Studies 2A–2B shed light on the underlying mechanism by testing the full causal model employing both mediation and moderation approaches. Study 3 further bolstered the process by manipulating general categorization tendency. Finally, study 4 tested a boundary condition. Specifically, it showed that evaluating objects that others consider for purchase (vs. evaluating objects for one's own purchases) increases (vs. decreases) general categorization tendency, and thus reverses the effect of scarcity on price-quality judgments.

STUDY 1A: THE EFFECT OF SCARCITY ON PRICE-QUALITY JUDGMENTS

A preliminary test indicated a negative association between measured scarcity and price-quality judgments (see [web appendix B](#) for details). In study 1A, we sought to provide causal evidence of this relationship by manipulating scarcity and testing its effect on price-quality judgments.

Method

Participants and Design. Eighty-seven Amazon Mechanical Turk (MTurk) panelists ($M_{\text{Age}} = 38.68$, Male = 45.98%) successfully completed the study in exchange for a small monetary reward. Participants were randomly assigned to either the control or scarcity condition.

Scarcity Manipulation. Following Mehta and Zhu (2015), participants in the scarcity condition took three minutes to write an essay about growing up having scarce resources. Participants in the control condition wrote about the things they did during the past week.

Stimuli and Measure. Thereafter, following Lalwani and Shavitt (2013), participants were shown a list of 33 camcorders. The list included information purportedly from *Consumer Reports* on brand name (e.g., Panasonic), country of origin (e.g., Japan), model number, price, and quality (on a scale of 1 to 100) (see web appendix J for stimuli). Participants were told to review the provided information carefully. Then, participants were given an average retail price for an anonymous camcorder brand (e.g., “camcorder brand A”) and, solely based on the given price information, were asked to rate this brand’s quality on a scale of 1 to 100. Participants repeatedly rated a total of 10 different camcorder brands in this way. The correlation between the provided retail prices of the anonymous brands and participants’ subjective quality estimates for those brands was used as the price-quality judgments measure.

Results and Discussion

A pretest using 86 participants drawn from the same population as those in the main study confirmed the effectiveness of the scarcity manipulation. Five items adapted from previous research (Laran and Salerno 2013; Mehta and Zhu 2015; Roux et al. 2015) were used to check the scarcity manipulation. A sample item, measured on a seven-point scale (1 = strongly disagree, 7 = strongly agree), was “My thoughts at this time are geared towards the scarcity issues I experienced in the past” ($\alpha = .77$; see web appendix O for all items). Participants in the scarcity condition ($M = 4.39$, $SD = 1.41$) reported a greater scarcity perception than those in the control condition ($M = 3.60$, $SD = 1.26$; $F(1, 84) = 7.65$, $p = .007$, partial $\eta^2 = .083$).

Participants in the scarcity condition gave quality estimates that were less strongly correlated with the given prices ($M = .46$, $SD = .50$) than those in the control condition ($M = .65$, $SD = .34$; $F(1, 85) = 4.46$, $p = .038$, partial $\eta^2 = .050$), indicating that scarcity decreases price-quality judgments. To demonstrate generalizability of this effect, we also tested it using a different

operationalization of price-quality judgments (see study 5 in web appendix C).

STUDY 1B: THE INFLUENCE OF COGNITIVE CONSTRAINTS ON THE EFFECT OF SCARCITY ON PRICE-QUALITY JUDGMENTS

Study 1B tested two alternate accounts for the effect of scarcity on price-quality judgments: (1) naïve theory account, and (2) impeded learning account. First, it is possible that limited cognitive resources under scarcity (Cialdini 1993; Easterbrook 1959; Mani et al. 2013) may lead one to rely more on the naïve theory that there is a strong positive price-quality correlation (Pechmann and Ratneshwar 1992), which suggests that scarcity should increase price-quality judgments. Second, one may argue that constrained cognitive resources may instead impede an individual’s learning of the price-quality correlation presented in the data, and thereby decrease price-quality judgments.

Method

Participants and Design. One hundred eighty-five undergraduate students ($M_{\text{Age}} = 22.26$, Male = 54.05%) at the University of Texas at San Antonio (UTSA) successfully completed the study for course credit. A 2 (scarcity: control vs. scarcity) \times 2 (cognitive constraints: control vs. high cognitive constraints) between-subjects design was used.

Scarcity Manipulation. Following Roux et al. (2015), participants in the scarcity condition wrote about times when they “didn’t have enough of something” or “resources were scarce.” Participants in the control condition wrote about the things they did during the past week.

Cognitive Constraints Manipulation. We manipulated cognitive constraints as part of a quality estimation task similar to that used in study 1A. Specifically, in the beginning of the quality estimation task, participants in the high cognitive constraints condition were told that an additional objective of the task is to investigate how well people can perform two different tasks simultaneously. They were told that, as another task, they would be given an eight-digit number and asked to perform the quality estimation task while holding this eight-digit number in memory (Gilbert and Hixon 1991; Lalwani 2009). Participants in the control cognitive constraints condition were given no instructions about the eight-digit number and directly performed the quality estimation task.

Stimuli and Measures. We assessed price-quality judgments using stimuli similar to those used in study 1A. For generalizability purposes, participants judged brands in one of two product categories: camcorders or DVD

players. Participants were shown a list of brands described along several attributes, including price and quality rating (see [web appendix J](#) for stimuli). As in study 1A, the correlation between the provided retail prices of the anonymous brands and participants' subjective quality estimates for those brands was used as the price-quality judgments measure. Because this measure did not differ between camcorders and DVD players in either the control or the scarcity condition ($ps > .25$), the responses were combined across the two product categories.

After participants completed the quality estimation task, we assessed their general categorization tendency using a seven-point (1 = strongly disagree, 7 = strongly agree), three-item scale: "I tend to categorize things (e.g., objects, events, personalities, products)," "I enjoy grouping things in mind," and "It is usually easy for me to see similarities between things." The ratings for these items were averaged ($\alpha = .79$) to form the general categorization tendency score. The same five items ($\alpha = .71$) used in study 1A were used to check the scarcity manipulation. Three items ($\alpha = .68$) adapted from previous research ([Chun and Kruglanski 2006](#)) were used to check the cognitive constraints manipulation; for example, "How distracted were you by other thoughts while estimating quality of the [camcorders] / [DVD players]?" (1 = not distracted at all, 7 = very distracted) (see [web appendix O](#) for all items).

Results

A separate pretest using 172 participants drawn from the same population as those in the main study confirmed the effectiveness of both the scarcity and the cognitive constraints manipulations (see [web appendix P](#) for results).

A 2×2 ANOVA predicting participants' price-quality judgments indicated a significant main effect of scarcity ($F(1, 181) = 10.47, p = .001$, partial $\eta^2 = .055$) and a significant main effect of cognitive constraints ($F(1, 181) = 3.98, p = .048$, partial $\eta^2 = .021$; [Figure 1](#)). Importantly, the scarcity by cognitive constraints interaction was not significant ($F < 1$). Contrasts showed that scarcity decreased price-quality judgments both in the control cognitive constraints condition ($M_{\text{control}} = .79, SD = .24$ vs. $M_{\text{scarcity}} = .68, SD = .34; F(1, 90) = 3.39, p = .069$, partial $\eta^2 = .036$) and in the high cognitive constraints condition ($M_{\text{control}} = .88, SD = .13$ vs. $M_{\text{scarcity}} = .74, SD = .26; F(1, 91) = 8.74, p = .004$, partial $\eta^2 = .088$). These results indicate that scarcity decreases price-quality judgments regardless of whether cognitive resources are constrained (as opposed to the naïve-theory-based prediction that scarcity may increase price-quality judgments). Furthermore, contrasts showed that the cognitive constraints manipulation increased price-quality judgments of those in the control condition ($M_{\text{high cognitive constraints}} = .88, SD = .13$ vs. $M_{\text{control cognitive constraints}} = .79, SD = .24; F(1, 89) = 4.16, p = .044$, partial $\eta^2 = .045$), consistent with previous

research ([Kardes et al. 2004; Rao 2005](#)). Importantly, this suggests that impeded learning due to cognitive constraints may actually increase, rather than decrease, price-quality judgments. Thus, impeded learning cannot account for our effect. Second, cognitive constraints increase price-quality judgments, and even in the presence of this opposing force, the proposed effect of scarcity on decreased price-quality judgments is still present. In other words, the results suggest that despite scarcity's influence to increase price-quality judgments through limited cognitive resources, scarcity's influence to decrease price-quality judgments through the proposed categorization process is dominant, which yields an overall decrease in price-quality judgments. Thus, the naïve theory account could not account for our scarcity effect.

We further tested the mediating role of general categorization tendency. Consistent with our theoretical account, across the two cognitive constraints conditions, general categorization tendency was lower in the scarcity than in the control condition ($M_{\text{control}} = 5.00, SD = 1.35$ vs. $M_{\text{scarcity}} = 4.61, SD = 1.30; F(1, 183) = 4.07, p = .045$, partial $\eta^2 = .022$). The mediation analysis revealed that the conditional indirect effect (i.e., scarcity dummy \rightarrow general categorization tendency score \rightarrow price-quality judgments) obtained by resampling the data 10,000 times was significantly negative (bias-corrected 95% CI = $[-.0221, -.0002]$). This result further suggests that scarcity decreases price-quality judgments through reduced categorization tendency, even in the presence of cognitive constraints increasing price-quality judgments.

Discussion

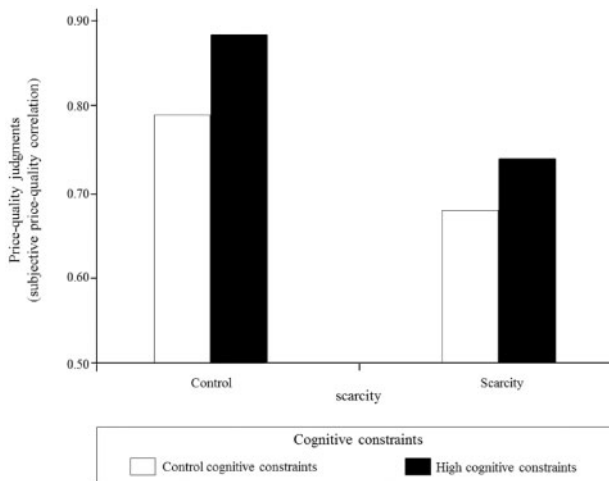
Study 1B provides a clearer account for our scarcity effect in several ways. First, it addresses the naïve theory account by demonstrating that scarcity decreases price-quality judgments via reduced categorization tendency, and this effect is independent of cognitive constraints that may increase reliance on the naïve theory. Second, it successfully rules out the impeded learning account by demonstrating that cognitive constraints (which produce impeded learning) increase, rather decrease, price-quality judgments. Third, it enhances the conceptual clarity of our theoretical model by suggesting that although scarcity, through increased cognitive constraints, might potentially increase price-quality judgments, scarcity's influence to decrease price-quality judgments through the proposed categorization process is dominant, which yields an overall decrease in price-quality judgments.

To provide further support for our categorization account, we conducted two additional studies. See the footnote for the first additional study.³ The second additional

3 One hundred ninety-five MTurk panelists ($M_{\text{Age}} = 36.25$, Male = 54.36%) completed a 2 (scarcity: control vs. scarcity) $\times 2$ (objective

FIGURE 1

THE EFFECTS OF SCARCITY AND COGNITIVE CONSTRAINTS ON PRICE-QUALITY JUDGMENTS (STUDY 1B)



study shows that abundance (a mental state opposite to scarcity), through increased general categorization tendency, increases price-quality judgments, further bolstering our categorization account (see study 6 in [web appendix D](#)).

STUDY 2A: TESTING THE FULL CAUSAL CHAIN—SERIAL MEDIATION

Study 2A was designed to provide further evidence for our proposed process by adding a measure of desire for abundance and testing the full causal chain, in which scarcity induces a desire to seek abundance, which in turn reduces general categorization tendency and thereby decreases price-quality judgments.

price-quality correlation: .80 vs. .20) between-subjects design. General categorization tendency was measured. Price-quality judgments were assessed as in previous studies. The scarcity main effect was significant ($F(1, 191) = 8.33, p = .004$, partial $\eta^2 = .042$); neither the objective price-quality correlation main effect nor the interaction was significant ($F_s < 1$). Contrasts showed that participants' subjective price-quality associations were significantly lower in the scarcity (vs. control) condition for both .80 and .20 objective price-quality correlations ($M_{\text{control}} = .84, SD = .15$ vs. $M_{\text{scarcity}} = .72, SD = .39$; $F(1, 95) = 4.14, p = .045$, partial $\eta^2 = .042$; $M_{\text{control}} = .80, SD = .25$ vs. $M_{\text{scarcity}} = .67, SD = .35$; $F(1, 96) = 4.19, p = .043$, partial $\eta^2 = .042$, respectively). Also, the overall mediation was significant (95% bias-corrected CI = $[-.0247, -.0019]$; across both .80 and .20 conditions). These results suggest that our proposed scarcity effect is not sensitive to the actual price-quality correlations. We speculate that this occurs because our account based on categorization—that is, the process of forming price tiers of brands based on distinct categories of prices and subsequent hierarchical processes of associating low (high) price with low (high) quality—is primarily mentally driven rather than data-driven. Future research could investigate this issue.

Method

Participants and Design. One hundred forty-nine MTurk panelists ($M_{\text{Age}} = 36.13$, Male = 57.72%) successfully completed the study in exchange for a small monetary reward. Participants were randomly assigned to either the control or scarcity condition.

Scarcity Manipulation. A scarcity manipulation similar to that used in study 1B was used. Participants in the scarcity condition wrote three episodes in which they “didn’t have enough of something” or “resources were scarce,” then chose one of the episodes and described it in detail, explaining what they experienced and what it felt like to be in that situation. Participants in the control condition listed three things they did during the past week, then chose one of those things and described it in detail.

Stimuli and Measures. Price-quality judgments were measured as in studies 1A and 1B, except that we used a different product category: computer monitors (see [web appendix J](#) for stimuli).

We assessed desire for abundance using a seven-point (1 = not at all, 7 = definitely), three-item scale: “I desire to have a lot of things,” “I desire to own a lot of things,” and “Having a lot of things makes me happy.” The ratings for these items were averaged ($\alpha = .95$) to form the desire for abundance index.

We assessed general categorization tendency using a behavioral categorization measure we developed. Specifically, participants were shown a set of four geometric figures across two shapes and two colors: a) a black circle, b) a white square, c) a white circle, and d) a black square. Participants responded to each of the following four items (1 = strongly disagree, 7 = strongly agree): “I would not group object a) with either c) or d),” “I would not group object d) with either a) or b),” “Object a) is dissimilar to both c) and d),” and “Object d) is dissimilar to both a) and b).” The premise was that those who have a higher general categorization tendency would be more likely to categorize the given figures using shape or color (the two most salient categorization dimensions in this case), and thus all items were reverse-coded so that higher scores would indicate stronger general categorization tendency. The ratings for these items were averaged ($\alpha = .81$) to form the general categorization tendency score. As in previous studies, participants' subjective price-quality correlation was used as the price-quality judgments measure.

Results and Discussion

A pretest using 113 participants drawn from the same population as those in the main study confirmed the effectiveness of the scarcity manipulation (see [web appendix P](#) for results).

The Full Causal Chain (Serial Mediation). Consistent with our account, participants in the scarcity condition ($M = .63$, $SD = .44$) gave quality estimates that were less strongly associated with the given prices than those in the control condition ($M = .78$, $SD = .29$; $F(1, 147) = 5.57$, $p = .020$, partial $\eta^2 = .036$). The desire for abundance index was higher in the scarcity condition ($M = 4.52$, $SD = 1.65$) than in the control condition ($M = 3.74$, $SD = 1.78$; $F(1, 147) = 7.78$, $p = .006$, partial $\eta^2 = .050$), and the general categorization tendency score was lower in the scarcity condition ($M = 4.23$, $SD = 1.69$) than in the control condition ($M = 5.15$, $SD = 1.42$; $F(1, 147) = 13.21$, $p < .001$, partial $\eta^2 = .082$). A serial mediation analysis (model 6 in PROCESS; Preacher and Hayes 2008) revealed that the conditional indirect effect (i.e., scarcity dummy \rightarrow desire for abundance index \rightarrow general categorization tendency score \rightarrow price-quality judgments) obtained by resampling the data 10,000 times was significantly negative (bias-corrected 95% CI = $[-.0324, -.0007]$).

Mediation Predicting General Categorization Tendency. To further strengthen the mediating role of desire for abundance in the relationship between scarcity and general categorization tendency, we tested the mediation path from scarcity to general categorization tendency. The mediation analysis revealed that the indirect effect (i.e., scarcity dummy \rightarrow desire for abundance index \rightarrow general categorization tendency score) obtained by resampling the data 10,000 times was significantly negative (bias-corrected 95% CI = $[-.5791, -.0830]$), confirming that desire for abundance mediates the relationship between scarcity and general categorization tendency.

Study 2A provides strong evidence for the proposed full causal chain by demonstrating that desire for abundance and general categorization tendency serially mediate the relationship between scarcity and price-quality judgments, and that desire for abundance mediates the relationship between scarcity and general categorization tendency. Furthermore, we show these effects using a behavioral measure of general categorization tendency, which attests to the robustness of our process account.

STUDY 2B: DESIRE FOR ABUNDANCE MANIPULATED

To provide further causal support for the mediating role of desire for abundance, study 2B manipulated desire for abundance. Specifically, we predicted that, for people who perceive resources to be scarce, lowering desire for abundance via experimental manipulation (vs. not lowering it) should increase general categorization tendency and price-quality judgments. However, for people who do not perceive resources to be scarce, such a manipulation is not expected to influence the general categorization tendency and price-quality judgments because these individuals

already have a relatively low desire for abundance, and thus their desire for abundance is unlikely to be further decreased by this manipulation.

Method

Participants and Design. Fifty-nine undergraduate students ($M_{\text{Age}} = 22.27$, Male = 45.76%) at UTSA successfully completed the study for course credit. Scarcity was measured and desire for abundance was manipulated to be either low or unchanged (i.e., in a control condition).

Desire for Abundance Manipulation. Desire for abundance was manipulated first. Participants in the low desire for abundance condition read that “There are times when having a lot of things can make life very inconvenient, like when you are moving to a new house, when you are packing for travel, or when you are choosing between too many choice options.” Then, participants imagined such a situation and wrote in detail about the ways in which having a lot of things might make their life worse. Participants in the control desire for abundance condition wrote about the things they did during the past week.

Stimuli and Measures. We measured scarcity by asking the following four questions: “I feel that I do not have enough of something,” “I grew up with scarce resources,” “I often think of the scarcity issues I experience,” and “I feel I might lack resources in the future,” on a seven-point scale (1 = not at all, 7 = definitely). The ratings for these items were averaged ($\alpha = .72$) to form the scarcity measure.

General categorization tendency was assessed via a behavioral categorization measure we developed. Specifically, participants imagined that they are planning a vacation and saw nine vacation destination images presented in a 3×3 grid format (nine entities; from (1, 1) position to (3, 3) position). These vacation destinations consisted of three different types of destinations—ruins, sea resorts, and waterfalls—and each type had three options. They were positioned in a 3×3 grid such that the three ruins destinations were on the diagonal (i.e., (1, 1), (2, 2), and (3, 3) positions), the three sea resort destinations were in the upper-right corner (i.e., (1, 2), (1, 3), and (2, 3) positions), and the three waterfall destinations were in the lower-left corner (i.e., (2, 1), (3, 1), and (3, 2) positions). After viewing these vacation destinations, participants moved to the next page where an identical 3×3 grid format was provided but with only the destination image for the ruins option positioned at (1, 1) shown. The other eight positions were blank. Participants were then asked to pick two positions (letters indicating positions) that could be grouped together with the shown destination (see web appendix N for the measure). Our reasoning was that participants with a higher general categorization tendency would be more likely to recognize the groupings (i.e., different

categories) in the original list, and thus more likely to later pick the destinations that would belong in the same category as the shown destination when asked unexpectedly. Thus, we used the number of selected destinations that were the same type as the shown destination (i.e., ruins) as the general categorization tendency score—the choice of the other two remaining ruins destinations was coded as 2, the choice of only one ruins destination was coded as 1, and the choice of no ruins destinations was coded as 0.

We measured price-quality judgments similarly to previous studies, using DVD players as the product category (see [web appendix J](#) for stimuli).

We tested the effectiveness of the desire for abundance manipulation using a seven-point (1 = strongly disagree, 7 = strongly agree), five-item scale ($\alpha = .94$); for example, “At this moment, I desire to own a lot of things” (see [web appendix O](#) for all items).

Results

A pretest using 93 participants drawn from the same population as those in the main study confirmed that participants in the low desire for abundance condition ($M = 3.09$, $SD = 1.63$) indicated a weaker desire for abundance than those in the control desire for abundance condition ($M = 4.19$, $SD = 1.52$; $F(1, 91) = 11.35$, $p = .001$, partial $\eta^2 = .11$).

In the control desire for abundance condition, scarcity was negatively associated with both general categorization tendency ($B = -.30$ with 95% CI of $[-.57 \text{ } -.023]$, $SE = .13$, $t = -2.22$, $p = .035$, $r^2 = .15$) and price-quality judgments ($B = -.15$ with 95% CI of $[-.31 \text{ } -.002]$, $SE = .074$, $t = -2.08$, $p = .047$, $r^2 = .13$; [Figure 2](#)), as in previous studies. In the low desire for abundance condition, however, scarcity was not significantly associated with either general categorization tendency ($B = -.049$ with 95% CI of $[-.30 \text{ } .20]$, $SE = .12$, $t = -.41$, $p = .69$) or price-quality judgments ($B = -.042$ with 95% CI of $[-.046 \text{ } .13]$, $SE = .043$, $t = .99$, $p = .33$). A moderated mediation analysis (model 8 in PROCESS; [Preacher and Hayes 2008](#)) revealed that in the control desire for abundance condition, the conditional indirect effect (i.e., scarcity [continuous variable] \rightarrow general categorization tendency score [continuous variable] \rightarrow price-quality judgments [continuous variable]) obtained by resampling the data 10,000 times was significantly negative (bias-corrected 95% CI = $[-.1087, \text{ } -.0012]$), replicating our previous mediation results. However, in the low desire for abundance condition, the conditional indirect effect was not significant (bias-corrected 95% CI = $[-.0446, \text{ } .0116]$).

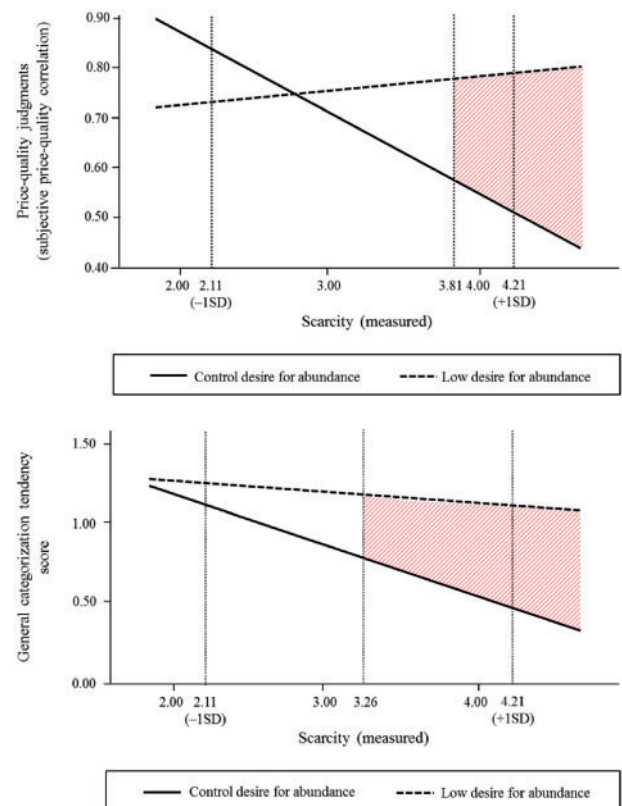
Next, we ran follow-up spotlight analyses ([Spiller et al. 2013](#)) for both price-quality judgments and general categorization tendency, separately. A spotlight analysis using the Johnson-Neyman technique showed that at 1SD above the mean of the scarcity measure (4.21), participants made

greater price-quality judgments in the low versus the control desire for abundance condition ($B = -.28$ with 95% CI of $[-.53 \text{ } -.03]$, $SE = .12$, $t = -2.29$, $p = .026$), while at 1SD below the mean of the scarcity measure (2.11), participants' price-quality judgments did not differ between the low and the control desire for abundance conditions ($B = .13$ with 95% CI of $[-.11 \text{ } .37]$, $SE = .12$, $t = 1.06$, $p = .29$). The difference in price-quality judgments between the low and the control desire for abundance conditions was significant for any value of the scarcity measure greater than 3.81 ($B = -.21$ with 95% CI of $[-.41 \text{ } .00]$, $SE = .10$, $t = -2.00$, $p = .05$), which included 28.81% of participants in the experiment. These results indicate that when desire for abundance is held low, scarcity no longer decreases price-quality judgments.

Second, we performed the same analyses for price-quality judgments. A spotlight analysis using the Johnson-Neyman technique showed that at 1SD above the mean of the scarcity measure (4.21), general categorization tendency was significantly higher in the low versus the control desire for abundance condition ($B = -.61$ with 95% CI of

FIGURE 2

THE EFFECTS OF SCARCITY AND DESIRE FOR ABUNDANCE ON PRICE-QUALITY JUDGMENTS AND GENERAL CATEGORIZATION TENDENCY (STUDY 2B)



$[-1.15 \text{ } -.068]$, $SE = .27$, $t = -2.26$, $p = .028$), while at 1SD below the mean of the scarcity measure (2.11), general categorization tendency did not differ between the low and the control desire for abundance conditions ($B = -.09$ with 95% CI of $[-.62 \text{ } .43]$, $SE = .26$, $t = -.36$, $p = .72$). The difference in general categorization tendency between the low and the control desire for abundance conditions was significant for any value of the scarcity measure greater than 3.26 ($B = -.38$ with 95% CI of $[-.75 \text{ } .00]$, $SE = .19$, $t = -2.00$, $p = .05$), which included 45.76% of participants in the experiment. These results indicate that when desire for abundance is held low, scarcity no longer reduces general categorization tendency.

Discussion

The results of study 2B provide further support for the role of desire for abundance as the mechanism underlying the relation between scarcity and reduced categorization tendency, by demonstrating that when desire for abundance is held low via experimental manipulation, scarcity no longer reduces general categorization tendency or price-quality judgments. This result provides additional empirical evidence supporting our process account, and collectively, studies 2A and 2B provide strong support for the full causal chain.

STUDY 3: BOLSTERING THE MEDIATING ROLE OF GENERAL CATEGORIZATION TENDENCY

To further support the causal role of general categorization tendency as the underlying mechanism, study 3 manipulated general categorization tendency. We predicted that increasing general categorization tendency via experimental manipulation (vs. not increasing it) would increase price quality judgments for both people who perceive resources to be scarce and people who do not perceive resources to be scarce. Furthermore, lowering general categorization tendency via experimental manipulation should decrease price-quality judgments for people who do not perceive resources to be scarce, but might not impact people who perceive resources to be scarce because these individuals already have a relatively low general categorization tendency.

Method

Participants and Design. Three hundred ninety-one MTurk panelists ($M_{\text{Age}} = 37.32$, Male = 40.41%) successfully completed the study in exchange for a small monetary reward. A 2 (scarcity: control vs. scarcity) \times 3 (categorization tendency: control categorization tendency vs. high categorization tendency vs. low categorization tendency) between-subjects design was used.

Scarcity Manipulation. As in study 1A, participants in the scarcity condition wrote an essay for up to three minutes about growing up having scarce resources, and participants in the control condition wrote about the things they did during the past week.

Categorization Tendency Manipulation. We used a categorization task adapted from Liberman, Sagristano, and Trope (2002). Participants in the high categorization tendency condition were shown a list of 30 random items (e.g., chairs, fish tank) and asked to sort the items into any number of subgroups in any way that made sense to them. The survey software allowed participants to drag each item into numbered boxes of subgroups (i.e., subgroup 1, subgroup 2, etc.). Participants were allowed to put as many items as they liked in each box, but not allowed to put the same item in different boxes. Participants in the control categorization tendency condition were shown the same list of 30 items, but were asked to select any five items from the list that they had relevant experience with and write a sentence about it. Participants in the low categorization condition were shown nine items (drawn from the original list of 30 items) that were preorganized into three groups (three boxes), where each group (box) included three items. They were asked to “un-categorize” the nine items by dragging each item out of its respective group and, while doing that, to think about why the particular item would not belong in the respective group or why that particular grouping would not be useful. After dragging all nine items, participants wrote about why each item did not belong in its group or why that grouping would not be useful (see [web appendix L](#) for high and low categorization tendency manipulations).

Stimuli and Measures. In study 3, we assessed price-quality judgments using both camcorders and DVD players for generalizability purposes. Participants were shown a list of 18 camcorders. As in previous studies, participants were given an average retail price for each of a series of 10 anonymous camcorder brands and asked to rate each brand’s quality on a scale of 1 to 100. Participants then repeated this process for DVD players (see [web appendix J](#) for stimuli). Because participants’ subjective price-quality correlations for the two products were significantly correlated ($r = .50$, $p < .001$), we averaged these correlations ($\alpha = .66$) to indicate participants’ price-quality judgments across the two product categories.

The same scarcity manipulation checks were used as in previous studies. The categorization tendency manipulation was checked using a five-item scale ($\alpha = .81$); for example, “At this moment, my attention is focused on grouping things” (see [web appendix O](#) for all items).

Results

A pretest using 98 (103) participants drawn from the same population as those in the main study confirmed the effectiveness of the scarcity (categorization tendency) manipulation (see [web appendix P](#) for results).

A 2×3 ANOVA on price-quality judgments showed a marginally significant interaction between scarcity and categorization tendency ($F(2, 385) = 2.43, p = .090$, partial $\eta^2 = .012$), and a significant main effect of categorization tendency ($F(2, 385) = 6.43, p = .002$, partial $\eta^2 = .032$; [Figure 3](#)). The main effect of scarcity was not significant ($F < 1$). Contrasts showed that participants in the control categorization tendency condition made lower price-quality judgments in the scarcity condition ($M = .64, SD = .42$) than in the control condition ($M = .75, SD = .29$; $F(1, 150) = 3.93, p = .049$, partial $\eta^2 = .026$), as in our previous studies. However, participants' price-quality judgments did not differ between the scarcity and the control conditions in either the high categorization tendency condition ($M_{\text{control}} = .82, SD = .17$ vs. $M_{\text{scarcity}} = .79, SD = .27$; $F < 1$) or the low categorization tendency condition ($M_{\text{control}} = .65, SD = .29$ vs. $M_{\text{scarcity}} = .70, SD = .32$; $F < 1$).

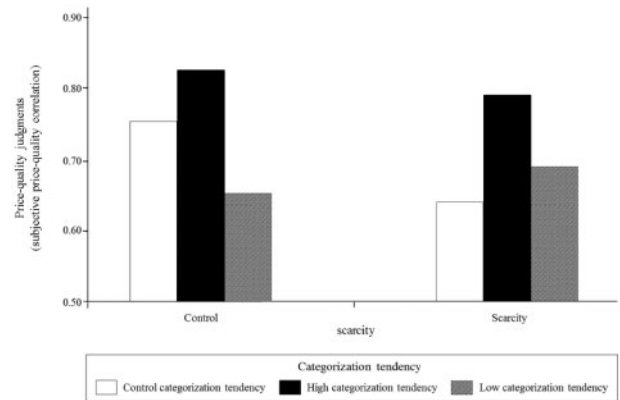
Furthermore, compared to the control categorization tendency condition, participants made higher price-quality judgments in the high categorization tendency condition, in both the control condition ($M_{\text{control categorization}} = .75, SD = .29$ vs. $M_{\text{high categorization}} = .82, SD = .17$; $F(1, 142) = 2.75, p = .099$, partial $\eta^2 = .019$) and the scarcity condition ($M_{\text{control categorization}} = .64, SD = .42$ vs. $M_{\text{high categorization}} = .79, SD = .27$; $F(1, 144) = 6.25, p = .014$, partial $\eta^2 = .042$). Compared to the control categorization tendency condition, participants made lower price-quality judgments in the low categorization tendency condition, in the control condition ($M_{\text{control categorization}} = .75, SD = .29$ vs. $M_{\text{low categorization}} = .65, SD = .29$; $F(1, 122) = 3.95, p = .049$, partial $\eta^2 = .031$), providing further support for the mediating role of general categorization tendency. However, participants' price-quality judgments did not differ between the control and the low categorization tendency conditions, in the scarcity condition ($M_{\text{control categorization}} = .64, SD = .42$ vs. $M_{\text{low categorization}} = .70, SD = .32$; $F < 1$), suggesting that general categorization tendency among those in the scarcity condition is already low and thus is unlikely to be further decreased by a manipulation lowering categorization tendency.

Discussion

Study 3 bolsters the causal role of general categorization tendency as the underlying mechanism by demonstrating that (1) increasing categorization tendency via experimental manipulation increases price-quality judgments (for both people who perceive resources to be scarce and

FIGURE 3

THE EFFECTS OF SCARCITY AND GENERAL CATEGORIZATION TENDENCY ON PRICE-QUALITY JUDGMENTS (STUDY 3)



people who do not perceive resources to be scarce), and (2) lowering categorization tendency via experimental manipulation lowers price-quality judgments (but only for people who do not perceive resources to be scarce).

Furthermore, in study 3 we tested and ruled out several alternative explanations (i.e., price consciousness, rationalization, and desirability of products vs. experiences) (see ancillary analyses for study 3 in [web appendix F](#)). To provide more rigorous process support, we further conducted an analysis to show that (1) categorization indeed brings about a feeling that things reduce, and (2) the act of reversing categorization brings about a feeling that things increase (see study 7 in [web appendix E](#)).

STUDY 4: OWN VERSUS OTHERS' PURCHASES AS A MODERATOR

Study 4 examined a factor that may increase (vs. decrease) people's general categorization tendency under scarcity, and thus reverse the effect of scarcity on price-quality judgments. It is widely accepted that total resources in the world are finite ([Kotler 2011](#)). Thus, perceptions of resource scarcity should reinforce the idea that the total availability of resources is limited—both for oneself and for others ([Duarte 2011](#)). This should engender a simple recognition—the more others get, the less is left over for oneself. Consistent with this proposition, previous research has shown that scarcity-induced recognition of finite resources leads individuals to expend more time and effort competing with others for those resources ([Grossman and Mendoza 2003](#)), and to be less likely to share resources with others ([Aarøe and Petersen 2013](#)).

We have theorized that a perception of scarcity increases a desire for abundance for oneself, which in turn reduces general categorization tendency. Because scarcity prompts the thought that the more others get, the less is left over for oneself, individuals who face scarcity—who have a desire for abundance for oneself—should also have desire for others to have less (thus leaving more available for oneself, given finite resources; Han, Lalwani, and Duhachek 2017). This suggests that, in situations where an individual under scarcity evaluates objects that are to be owned by others (vs. themselves), the individual may be motivated to do the opposite—categorize the objects *more* (instead of less) so that others are perceived as getting less (because categorization is associated with the feeling of reduction).

Based on this reasoning, we predicted the following reversal effect: when individuals who face scarcity evaluate brands that others consider for purchase (vs. evaluate brands for their own purchases), scarcity *increases* (not *reduces*, as in the previous studies) general categorization tendency, which in turn *increases* (vs. *decreases*) price-quality judgments.

Method

Participants and Design. Two hundred forty-one undergraduate students ($M_{\text{Age}} = 21.90$, Male = 63.90%) at UTSA successfully completed the study for course credit. A 2 (scarcity: control vs. scarcity) \times 2 (own vs. others' purchases: own-purchase, others'-purchases) between-subjects design was used.

Scarcity Manipulation. Participants in the scarcity (control) condition wrote about growing up having scarce resources (about the things they did during the past week).

Own versus Others' Purchases Manipulation, Stimuli, and Price-Quality Judgments Measure. Own versus others' purchases was manipulated as part of the quality estimation task. As in previous studies, participants were shown a list of brands described along several attributes, including price and quality rating. Participants in the own-purchase condition imagined that they were looking at those brands for their own purchases. Participants in the others'-purchases condition imagined that other shoppers were looking at those brands for their purchases. Afterward, participants were given an average retail price for each of a series of 10 anonymous brands in the same product category and asked to rate each brand's quality on a scale of 1 to 100. The correlation between the provided retail prices of the anonymous brands and participants' subjective quality estimates for those brands was used as the price-quality judgments measure. For generalizability purposes, this process was repeated for three product categories—camcorders, computer monitors, and DVD players. We averaged these correlations ($\alpha = .90$) to indicate

participants' price-quality judgments across the three product categories.

General Categorization Tendency Measure. We assessed general categorization tendency using a seven-point (1 = strongly disagree, 7 = strongly agree), three-item scale: "I find myself geared toward categorizing things (e.g., objects, products, events, personalities)," "I enjoy grouping things in my mind," and "It feels easy for me to see similarities between things." The ratings for these items were averaged ($\alpha = .80$) to form the general categorization tendency score. The same scarcity manipulation checks were used as in previous studies.

Results and Discussion

A pretest using 57 participants drawn from the same population as those in the main study confirmed the effectiveness of the scarcity manipulation (see [web appendix P](#) for results).

A 2 \times 2 ANOVA on average price-quality judgments showed a significant scarcity by own vs. others' purchases interaction ($F(1, 237) = 8.07, p = .005$, partial $\eta^2 = .033$), and a significant main effect of own vs. others' purchases ($F(1, 237) = 4.45, p = .036$, partial $\eta^2 = .018$); the main effect of scarcity was not significant ($F < 1$). Contrasts showed that when participants evaluated brands for their own purchases, participants made lower price-quality judgments in the scarcity ($M = .57, SD = .44$) than in the control condition ($M = .70, SD = .28; F(1, 121) = 4.23, p = .042$, partial $\eta^2 = .034$), which replicates our previous effect of scarcity on decreased price-quality judgments. Consistent with our theoretical account, participants indicated a lower general categorization tendency in the scarcity ($M = 3.99, SD = 1.31$) than in the control condition ($M = 4.46, SD = 1.30; F(1, 121) = 4.05, p = .046$, partial $\eta^2 = .042$).

When participants evaluated brands that others consider for their purchases, participants made higher price-quality judgments in the scarcity ($M = .78, SD = .20$) than in the control condition ($M = .67, SD = .36; F(1, 116) = 3.99, p = .048$, partial $\eta^2 = .033$), which shows a reversal effect to our previous findings. Consistent with our theoretical account, participants indicated a higher general categorization tendency in the scarcity ($M = 4.81, SD = .94$) than in the control condition ($M = 4.38, SD = 1.20; F(1, 116) = 4.57, p = .035$, partial $\eta^2 = .038$).

Lending further support to our process account, a moderated mediation analysis (model 7 in PROCESS; Preacher and Hayes 2008) revealed that in the own-purchase condition, the conditional indirect effect (i.e., scarcity \rightarrow general categorization tendency score [continuous variable] \rightarrow price-quality judgments [continuous variable]) was significantly negative (bias-corrected 95% CI = $[-.0444, -.0001]$), while in the others'-purchases condition, the

conditional indirect effect was significantly positive (bias-corrected 95% CI = [.0002, .0388]).

The results of study 4 bolster our process account by demonstrating that a condition that increases (vs. reduces) people's general categorization tendency under scarcity reverses the proposed effect of scarcity on price-quality judgments. Further, the use of multiple product categories adds robustness to the proposed theoretical model.

GENERAL DISCUSSION

The present research examines how scarcity influences consumers' tendency to use price to judge product quality. Six studies (and five more reported in the [web appendix](#)) using multiple product categories and a variety of operationalizations of scarcity and price-quality judgments provide converging evidence that scarcity decreases price-quality judgments, and that this occurs because scarcity induces a desire for abundance, which in turn reduces general categorization tendency. We provide strong support for our proposed process and also demonstrate a theoretically driven reversal effect.

The present research has several theoretical implications. To our knowledge, the current research is the first to directly examine the influence of scarcity on price-quality judgments. Furthermore, contrary to what might be predicted by prior literature (e.g., scarcity limiting cognitive capacity, leading to increased reliance on the price-quality heuristic), we show that scarcity decreases price-quality judgments.

We also contribute to the scarcity literature by proposing a novel process driven by scarcity. Although the scarcity literature suggests that scarcity activates its own mindsets and psychological processes ([Shah et al. 2012](#)), many of these processes remain underexplored ([Roux et al. 2015](#)). The present research fills this gap by identifying a new psychological process driven by scarcity: a reduction in general categorization tendency. Because categorization is a fundamental human process that pervades all levels of mental functioning ([Brough and Chernev 2012](#)), the present finding that scarcity reduces general categorization tendency may enrich our understanding of the psychology of scarcity by providing a more fundamental explanation for scarcity's impact on other human processes and subsequent behaviors.

This research also adds to the literature on price-quality judgments. As [Lalwani and Forcum \(2016\)](#) note, the focus of recent research in this area has been to examine how consumers' processing tendencies affect the way they make price-quality inferences ([Bornemann and Homburg 2011](#); [Lalwani and Shavitt 2013](#); [Lalwani and Wang 2019](#)). Our theoretical account suggests that reduced categorization tendency decreases price-quality judgments by

hindering tier-based thinking (i.e., price-tiering), a mechanism that has been unexplored in the price-quality literature.

The present research also adds theoretical understanding to the categorization literature. Prior research on categorization in the marketing area has largely focused on *how* people categorize. Previous categorization research typically focuses on how broadly or narrowly people categorize ([Ülkümen et al. 2010](#)), or the number of subcategories people generate ([Liberman and Trope 2008](#); [Redden 2008](#)). Other research examines the composition of categorized objects, focusing on how and when the same objects can be grouped differently ([Barsalou 1982](#); [Gutman 1982](#)). Relatively little research focuses on the *extent* to which people categorize. That is, individuals may vary both in terms of how likely they are to categorize and in terms of how they categorize given that they do categorize. This multidimensional view of categorization may broaden our understanding of consumer categorization processes in a variety of marketing settings, along with how those processes influence behavior. Moreover, we also identify both an important antecedent (i.e., scarcity) and a consequence (i.e., price-quality judgments) of the categorization process.

Our findings have several implications for managers. In many situations, managers may want their customers to make strong price-quality inferences. Specifically, managers of high-end stores or whose goal is to increase sales of high-priced items should desire that customers perceive expensive products as higher in quality and thus become more likely to purchase those high-priced products. In such circumstances, the mediating variables in our theoretical framework suggest some possibilities for using the store environment to increase price-quality inferences. For example, categorizing assortments by price (e.g., low price, high price) may facilitate the use of price tiers as a basis for judging a product's quality, and therefore may increase people's willingness to purchase high-priced options. More generally, product displays that are highly and visibly categorized (e.g., product shelves using structured presentation with clear attribute-based grouping labels, such as large/moderate-sized/small screen TVs) can increase consumers' general categorization tendency and thereby make price-quality associations more salient in the consumer's mind. The same objective could also be attained by reducing consumers' desire for abundance. For example, inside the store, managers could have portraits, displays, or ads with slogans such as "buy small, be happy" and "less can be more." As our theoretical model suggests, doing so may increase customers' price-quality inferences. Furthermore, our findings suggest that when stronger price-quality inferences are desired, retailers are advised to avoid utilizing scarcity messages (e.g., "sale ends this week" or "while supplies last") especially for product categories in which the proportion of high-priced items is high, as priming

scarcity among consumers may decrease their price-quality inferences.

Conversely, managers may also find times when they wish to reduce customers' price-quality inferences to encourage those customers to perceive relatively more value in lower-priced items (i.e., lowering the tendency to view lower prices as signaling poorer quality). For example, stores focused on low price, discount brands (e.g., Dollar Tree or 99 cents stores) would benefit by having consumers buy one of those low-price options rather than taking their shopping search elsewhere to look for and purchase higher-priced options; also, any store may find itself with a supply surplus of a low-priced brand, and thus a desire to sell that brand and reduce excess inventory. In situations like these, our theoretical framework again suggests some possible managerial tactics: (1) decrease consumers' categorization tendency, for example by presenting products in a difficult-to-organize or unlabeled array, or by avoiding presentation arrays that facilitate organization by price (e.g., don't organize items in a high to low price sequence); (2) increase desire for abundance (e.g., with messages like "more is always better," "you can never have too much," or "stock up before the holiday season"); and (3) increase consumer feelings of scarcity, for example by store messaging (e.g., "limited time only") or by intentionally leaving vacant spots on shelving to imply out-of-stock products.

Some may have concerns with the relatively small samples in some of the studies (e.g., study 2B); however, consistent support for both our proposed effect and process across 11 studies (six in the main article and five in the [web appendix](#)) provides evidence for the robustness of our effect. Further, although we tested the price-quality effect in a variety of product categories, a possible threat to generalizability is that these are primarily utilitarian products. Future research could replicate our findings using other product categories.

Although we have shown that scarcity decreases price-quality judgments, one may still wonder which end(s) of the price-quality continuum becomes weakened under scarcity—that is, whether the high-priced brand is rated as lower quality, the low-priced brand is rated as higher quality, or both. Our theoretical framework suggests that people who face scarcity are less likely to view less versus more expensive options as belonging to different categories, and thus is open to differences at either or both ends of the price continuum. We believe that several variables can potentially influence the direction of the relationship, including aspects of the scarcity manipulation (e.g., strength of the scarcity manipulation, whether it completely or partially overrides people's default categorization tendency), construal level ([Lalwani and Wang 2019](#)), product category-related factors (e.g., symbolic products; [Lalwani and Shavitt 2013](#); [Yang et al. 2019](#)), or

brand familiarity (e.g., people may anchor on a more familiar option and adjust from that when assessing other options). For example, if the most familiar option is an inexpensive brand, consumers under scarcity might be more likely to lower perceived quality of more expensive brands; conversely, if the most familiar option is an expensive brand, consumers under scarcity might be more likely to increase perceived quality of less expensive brands. Future research should investigate this interesting question.

Our theoretical account raises another intriguing question about choice experiences. Because scarcity triggers the desire for abundance, individuals with scarce resources might prefer to keep all available options active, and thus be less inclined to narrow options down. This might indicate that they have a lower tendency to form consideration sets. Because the formation of consideration sets makes the choice process more efficient by reducing the cognitive burden to compare all available options ([Hauser and Wernerfelt 1990](#)), those who do not form consideration sets are likely to experience high decision complexity and choice difficulty. On the other hand, one might argue that those who lack resources may simply choose cheaper options, which should make the choice process simple. So, does scarcity complicate or simplify choice? Future research should investigate this question as well.

DATA COLLECTION INFORMATION

All authors managed the collection of data for the preliminary test, study 1A, study 2A, study 3, study 5 [[web appendix C](#)], study 6 [[web appendix D](#)], study 9 [[web appendix H](#)], and supporting data for study referenced in footnote 3 using the Qualtrics panel described in the methods section in the spring of 2016, spring of 2016, spring of 2018, winter of 2017, spring of 2016, winter of 2017, winter of 2017, and winter of 2017, respectively. The first author and the third author jointly supervised the collection of data for study 1B, study 2B, study 4, study 7 [[web appendix E](#)], and study 8 [[web appendix G](#)] by research assistants at the University of Texas at San Antonio Research Lab in the fall and winter of 2017. All data were primarily analyzed by the first author in discussion and consultation with the second and third authors.

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