



# The scarcity of beauty: how and why product aesthetics mobilize consumer acquisition effort

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## Abstract

While physical beauty has been argued to represent a scarce commodity due to genetic differences in physical attractiveness, we contend that the same notion of scarcity can apply to product aesthetics. In the current research, we investigate how the scarcity inherent in product aesthetics mobilizes the exertion of effort to acquire beautiful products. In other words, to what lengths are consumers willing to go to obtain beautiful products and, more importantly, why? Our work identifies two affective mechanisms that drive the relationship between aesthetics and acquisition effort. Specifically, consumers expend more effort to acquire beautiful products because of the pride they expect to experience from owning something beautiful, along with the instantaneous desire for beauty that compels them to possess the object. We provide convergent support for our conceptualization across a series of eight studies, using a multimethod investigation that incorporates archival, field, and lab data.

**Keywords** Aesthetics · Scarcity · Acquisition effort · Anticipated ownership pride · Instantaneous desire · Motivation

Physical beauty, by its nature, has long been argued to represent a scarce commodity (Sigall & Landy, 1973; Waller, 1937). The economist Hamermesh (2011) reasoned that since people enjoy beauty but cannot easily find a sufficient supply of it, they are willing to expend considerable resources to acquire more if it. Given this demand, it follows that beauty is scarce. While the extant scarcity literature has focused on the scarcity of specific, quantifiable resources such as money, assets, and natural resources (Goldsmith et al., 2021; Hamilton et al., 2019), it is worth noting that a resource like beauty, which is neither specific nor quantifiable, may nonetheless be perceived as scarce due to its low base rate of occurrences in everyday life.<sup>1</sup>

Importantly, the assertion that beauty is in short supply has traditionally been made in the context of physical beauty,

where the scarcity of beauty stems from genetic differences in physical attractiveness (Hamermesh, 2011). However, can the same notion of scarcity extend to product aesthetics, where the existence of beauty does not hinge on unpredictable genetic factors?<sup>2</sup> On one hand, given that modern industrialization has made it feasible to produce massive quantities of virtually any product (StartupBooster, 2016), including beautiful ones, it could be argued that product aesthetics is no

<sup>2</sup> A central assumption of the present work is that beauty is equal to aesthetics. We contend that consumers respond to beauty and aesthetics in a similar manner given the same areas of the brain that process physical attractiveness are also implicated in the perception of beautiful products (Aharon et al., 2001; Kampe et al., 2001; Lacey et al., 2011; Reimann et al., 2010), suggesting they are conceptually equivalent.

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longer objectively scarce. Further, intuition suggests that beauty and aesthetics are subjective and often lie in the eye of the beholder (Kumar & Garg, 2010), making it difficult to ascertain what is beautiful and, hence, scarce.

On the other hand, even in the context of products, beauty is not necessarily easy to achieve. Companies invest considerable resources into the aesthetics and design of their products, and firms that differentiate their products through aesthetically superior designs (e.g., Apple, Tesla) often achieve financial success (Bloch, 1995). Consumers, in turn, recognize that beautiful products (even those with designs they do not personally admire) often require considerable design and production effort (Wu et al., 2017). Thus, beautiful products are rightfully perceived as harder to obtain, and consequently scarcer, than their less attractive counterparts. In other words, to the extent that firms have a finite amount of resources that could be allocated to product aesthetics (Chernev, 2007; Chernev & Carpenter, 2001), the effort required to create beautiful products should imbue them with an authentic form of scarcity. Notably, the relationship between beauty and scarcity has also been shown to work in reverse, such that resource scarcity (e.g., economic recessions) can systematically increase the desire for beauty and appearance-enhancing products (Hill et al., 2012; Netchaeva & Rees, 2016). Following the above reasoning, we contend that product aesthetics is a theoretically and substantively intriguing domain within which to study scarcity, because beauty essentially represents an effective means to manipulate scarcity—or, as Hamermesh (2011) puts it, beauty is equivalent to scarcity. As such, in the current research, we will be using product aesthetics as a lens through which to study scarcity.

To provide further support for our claim that beauty is scarce, we conducted a pilot study ( $N = 200$ ) to investigate the relationship between aesthetics and perceived scarcity across a variety of products, including the higher aesthetic stimuli (i.e., coffee makers, smartwatches, and photographic prints) later used in our main studies. We found that the more beautiful a product was considered to be, the greater was its perceived scarcity ( $r \geq .26$ ;  $p < .0003$ ), a pattern that held across all products (see [Web Appendix A](#) for results). The findings from this pilot study indicate that beauty and scarcity are indeed linked in consumers' minds.

In the current research, we examine how the association between aesthetics and scarcity can impact consumer behavior. First, we investigate the *extent* to which the scarcity inherent in aesthetics mobilizes effortful behavior, particularly during the acquisition stage. Building on the scarcity literature (Cannon et al., 2018; Kristofferson et al., 2017), which asserts that consumers are motivated to acquire scarce resources, we examine the lengths to which consumers are willing to go to acquire beautiful products and, relatedly, the kinds of effortful activities they might exhibit in pursuit of this scarce commodity. While recent work has uncovered an empirical relationship between product aesthetics and production effort (Wu

et al., 2017), such that beautiful products elicit greater perceptions of effort in their creation, we contend that the relationship between aesthetics and effort is not limited to the production process and can be observed among consumers themselves in their acquisition of beauty.

Second, we shed light on *why* consumers might be motivated to pursue aesthetically appealing products in the first place. Despite the critical role of product aesthetics in shaping commercial success (Orth & Malkewitz, 2008; Reimann et al., 2010; Warren & Reimann, 2019) and the vast amount of interest that aesthetics has generated in consumer research over the last decade (cf. Hoegg & Alba, 2008; Patrick & Peracchio, 2010; Patrick et al., 2019; Reimann & Cao, 2016 for special issues and literature reviews), this question has remained largely unanswered. This empirical gap may exist because the extant research has largely focused on examining how product aesthetics bias consumer information processing (e.g., Crolic et al., 2019; Hoegg et al., 2010), while devoting relatively less attention to understanding the psychological processes that motivate consumers to approach and pursue such products. Consequently, our field still lacks a comprehensive framework explicating when and how product aesthetics mobilize acquisition effort (e.g., Kumar & Garg, 2010; Patrick et al., 2019; Patrick & Peracchio, 2010). The current investigation represents a first step toward addressing this research gap by identifying two affective mechanisms that drive the relationship between aesthetics and acquisition effort. Specifically, we contend that consumers expend more effort to acquire beautiful products because of the pride and sense of achievement they expect to experience from owning something beautiful, in addition to the sudden desire for beauty that compels them to possess the attractive object.

Our work makes several theoretical and substantive contributions. First, while the scarcity literature has primarily examined consumer responses to limited resources that are both specific and quantifiable in nature (e.g., money; Goldsmith et al., 2021; Hamilton et al., 2019), we are the first to document an empirical association between scarcity and beauty—a resource that is neither specific or quantifiable—and to show that beauty has the potential to evoke perceptions of scarcity. In doing so, we validate a novel antecedent to scarcity perceptions, one that exists independent of actual resource levels, thereby adding to the growing body of work in this area (Goldsmith et al., 2018). Second, building on prior work highlighting the importance of aesthetics in predicting sales success (Bloch, 1995), we demonstrate the lengths to which consumers are willing to go to pursue beautiful products, thus enriching our understanding of the relationship between aesthetics and effort (Samper et al., 2018; Wu et al., 2017). Third, our research unearths two distinct affective processes that mediate the relationship between aesthetic appeal and acquisition effort: the anticipated pride of owning a beautiful product and the instantaneous desire for beauty that aesthetic appeal

evokes. By highlighting these two processes, we advance a formal comprehensive framework that integrates previously disparate concepts in the literature, including suggestions that consumers enjoy showing off their beautiful possessions (Bloch, 1995), feel a sense of pride based on the crispness of their money (Di Muro & Noseworthy, 2013), and experience increased activation of the brain's reward circuitry upon exposure to aesthetically appealing stimuli (Lacey et al., 2011; Reimann et al., 2010). Fourth, by better understanding the mechanisms through which product aesthetics mobilize acquisition effort, we contribute managerially by equipping managers with the tools to position and promote their high design offerings more effectively. In other words, by recognizing that consumers respond favorably to beautiful products due to anticipated feelings of pride and instantaneous desire, managers can more effectively design promotional materials to selectively induce these emotions in their marketing efforts.

## Theoretical background

### The scarcity of product aesthetics

One of most fundamental and prominent elements of a product is its exterior form or design, as this is the first characteristic of a product with which a potential buyer makes a connection (Bloch, 1995). While product design itself is a broad term that spans various dimensions, such as functionality, symbolism, and aesthetics (Homburg et al., 2015), the focus of the present work is on visual product aesthetics, defined as the perceived physical beauty of a product, or the pleasurable stimulation or even 'perfection' of the visual senses in the absence of any reasoning about the object's utility (Holbrook & Zirlin, 1985; Reber et al., 2004; Reimann et al., 2010). Notably, it is precisely such stimulation of the visual senses that should increase perceptions of scarcity (Brock, 1968; Jung & Kellaris, 2004; Lynn, 1992), as confirmed in our pilot study, which in turn should increase consumer interest (John et al., 2018). Although product aesthetics may include a wide range of nonvisual attributes, including auditory, haptic, gustatory, and olfactory elements (Reimann & Cao, 2016), we limit our focus to visual aesthetics, given the ubiquity of visual aesthetic elements in the marketplace and their relevance to the widest selection of products (Bloch et al., 2003), and we contend that the scarcity inherent in beautiful products motivates consumers to expend substantial effort to acquire them.

### Product aesthetics mobilize acquisition effort

Bloch (1995) proposed that behavioral responses to aesthetics can be broadly conceptualized along an approach–avoidance continuum, such that consumers engage in approach

behaviors when they are attracted to a certain design and avoidance behaviors when they experience negative attitudes toward a product. This framework is consistent with work on retail atmospherics (Bitner, 1992; Donovan & Rossiter, 1982), which theorized that consumers similarly exhibit approach and avoidance behaviors toward visually pleasing and displeasing retail and service environments, respectively. Building on this seminal work, the current research systematically unpacks the notion of approach motivation by explicating one specific form of approach response that is particularly relevant in a consumption context: the exertion of effort to acquire a product. While the extant literature has revealed that aesthetics can increase evaluations, perceived product performance, purchase intentions, and choice (Bloch et al., 2003; Buechel & Townsend, 2018; Hagtvedt & Patrick, 2008; Reimann et al., 2010; Sundar et al., 2020; Veryzer Jr & Hutchinson, 1998), less is known about whether and to what extent aesthetics mobilize effortful behavior, particularly during the acquisition stage. We posit that aesthetic attributes are particularly effective at mobilizing consumer acquisition effort, defined as the volitional and deliberate expenditure of physical, mental, and financial resources to obtain a product (Cardozo, 1965; Clarke & Belk, 1979). Indeed, Cannon et al. (2018) argued that when consumers recognize that a certain resource is scarce but believe that it is possible to reduce this discrepancy through hard work, they will expend more effort to acquire that scarce resource. Likewise, given that aesthetics constitute an inherently scarce resource, we believe that consumers will exert more effort to acquire a beautiful product to the extent that it is attainable. We hypothesize:

**H1** Consumers are willing to exert more effort to acquire a product with higher (vs. lower) aesthetic appeal.

### Why might product aesthetics be particularly effective at increasing acquisition effort?

In the current research, we identify and test two affective mechanisms that underlie the relationship between aesthetics and acquisition effort—anticipated ownership pride and instantaneous desire. These two processes are particularly relevant given their inextricable associations with aesthetics and scarcity, as well as their inherently motivational roots. Pride often motivates the exertion of effort to enhance one's social value and is associated with a sense of achievement (Williams & DeSteno, 2009), while desire is a powerful motivating force that sparks the relentless pursuit of consumer goals (Belk et al., 2003; Berridge, 2009). Indeed, possessing a scarce resource is a necessary foundation for pride to emerge, as it enables consumers to set themselves apart from others and helps offset feelings of inferiority (Fromkin & Snyder, 1980). Meanwhile, the scarcity of a product naturally instills a desire to own it (Cialdini, 2001), which should be especially

the case when the object is aesthetically appealing and thus intrinsically rewarding (Reimann et al., 2010). As discussed in detail next, we expect these dual drivers to play a critical role in motivating the acquisition of beautiful products.

**Anticipated pride of ownership** We predict that consumers will anticipate feeling greater pride over their ownership of beautiful products, which in turn will increase acquisition effort. Bloch (1995) first alluded to the relationship between aesthetics and pride in his conceptual model, where he posited that consumers frequently display attractive possessions in prominent locations of their homes and enjoy showing off their acquisitions to visitors (Belk, 1988), suggesting that consumers are proud to own and display goods that they consider beautiful. Consistent with this conjecture, work on financial decision making revealed that aesthetically appealing financial documents (e.g., company annual reports) can induce a sense of psychological ownership, which in turn increases company valuations (Townsend & Shu, 2010). Likewise, while their focus was not on product design per se, Di Muro and Noseworthy (2013) demonstrated that consumers value crisp currency because they take pride in bills that are presentable in the presence of others, suggesting that the appearance of one's possessions can shape the experience of pride, particularly when such possessions are subject to public scrutiny (Webster et al., 2003). Moreover, scarcity increases the value of pride because pride cultivates a sense of personal agency and counteracts the weakened sense of control associated with scarcity (Salerno & Escoe, 2020), further suggesting that the scarcity inherent in aesthetics should induce greater anticipated ownership pride.

In the present research, we expect this emotion to play a key role in mobilizing the exertion of acquisition effort. Prior work has shown that pride motivates the exertion of costly efforts as a way to increase one's value in a given social setting (Williams & DeSteno, 2009). In other words, pride propels individuals to incur short-term costs, typically through the expenditure of high effort, in pursuit of longer-term rewards like social capital. While prior literature has primarily focused on the acquisition of specific abilities (e.g., leadership skills) as the outcome of such efforts (Williams & DeSteno, 2009), we contend that the acquisition of beautiful products could reasonably be another potential outcome of pride-induced labor. After all, the mere choice of beautiful products can affirm and improve consumers' sense of self (Townsend & Sood, 2012), suggesting that the acquisition of beautiful products should similarly be viewed as an accomplishment. Further, Zeelenberg (1999) found that the more effortful a certain outcome was to attain, the more relevant anticipated emotions become in motivating behavior, with prior work specifically identifying anticipated pride as one such emotion (Bagozzi et al., 1999). In sum, we propose that consumers are willing to invest considerable effort toward acquiring

beautiful products because of the pride they expect to experience from owning such possessions. We hypothesize:

**H2** The positive effect of product aesthetics on acquisition effort will be mediated by anticipated ownership pride.

**Instantaneous desire** In addition to the pride that consumers may expect to experience from owning beautiful products, we identify another psychological process that motivates consumers: the ability of aesthetics to generate an instantaneous desire for the product. Although the relationship between aesthetics and immediate desire has not been empirically established, evidence for this link exists. First, several authors have theorized that the mere sight of an aesthetically appealing object can evoke an immediate desire to own that object, often in the absence of more rational considerations of its functionality (Norman, 2004; Wagner, 1999). This desire response is expected to be strong enough to be accessible to consumers' awareness, an argument supported by the observation that people regularly use terms such as "passionate," "lustful," or "seductive" when describing their feelings about beautiful objects (Belk et al., 2003; Norman, 2004). Indeed, individual differences in visualization ability have recently been shown to strongly predict product desire (Richins & Balducci, 2021), suggesting that the visual and aesthetic properties of a product or product bundle help sustain consumer desire (Reimann et al., 2015; Reimann et al., 2016; Reimann & Lane, 2017). Additional evidence for this relationship comes from neuroimaging studies revealing that beautiful stimuli, ranging from attractive faces to artwork, spontaneously engage parts of the brain's reward circuitry that regulate desire responses (Kampe et al., 2001; Lacey et al., 2011; Reimann et al., 2010). Since the reward circuitry of the brain is inextricably associated with desire (Berridge, 2009; Berridge & Robinson, 2016; Litt et al., 2010), these findings lend further support linking aesthetics with the experience of immediate desire.

In the present research, we expect such instantaneous desire to play a crucial role in motivating the exertion of acquisition effort. Consistent with this notion, work on unplanned purchases demonstrates that impulse buying frequently involves products that feature salient aesthetic or styling components (Patrick & Hagtvedt, 2011; Rook, 1987), suggesting that aesthetics can evoke a strong desire for a product that in turn propels its sudden acquisition. Finally, given that the level of effort that people invest to achieve a certain outcome is often commensurate with their desire for that outcome (Atkinson, 1957; Higgins, 1997), we propose that the desire for beautiful products should in turn motivate the exertion of effort to attain them. In summary, we predict that beyond anticipated ownership pride, a second factor that mobilizes acquisition effort is the instantaneous desire that arises from exposure to beautiful products. We hypothesize:

**H3** The positive effect of product aesthetics on acquisition effort will be mediated by instantaneous desire.

Importantly, we posit that both mechanisms are essentially emotional-motivational states (Berridge, 2018). While often conflated with other affective states such as mood, emotions have a distinctly motivational basis, as suggested by its etymology that roots the term emotion in the Latin word *emovere*, from *e-* (out) and *movere* (move) (Merriam-Webster, 2021). In this sense, emotions motivate people to approach or avoid certain cues in their environment. We propose that anticipated ownership pride and instantaneous desire both represent discreet, positive emotional-motivational states that occur in response to aesthetic stimuli. However, whereas anticipated ownership pride is future-oriented and interpersonal in nature (Bagozzi & Pieters, 1998; Griskevicius et al., 2010; Knutson & Greer, 2008), instantaneous desire is a spontaneous affective response occurring intrapersonally and in real time (Wiggin et al., 2019). By isolating these two affective mechanisms, we also differentiate our conceptualization from other potential accounts, including cognitive (e.g., thought processes, appraisals, and sense-making about the underlying meaning of the aesthetic design) and behavioral explanations (e.g., the act of signaling status).

## Overview of studies

Across a series of eight studies, we investigate when and how the scarcity inherent in product aesthetics mobilizes acquisition effort and elucidate the psychological underpinnings of this phenomenon. To this end, we employ a multimethod approach, using archival, field, and lab data to examine why and how consumers expend effort to obtain beautiful products, while utilizing various approaches to operationalize product aesthetics, measure and manipulate the underlying mechanisms, and capture the exertion of effort. Following pertinent recommendations in marketing research (Davis et al., 2011), we believe that this multimethod investigation enables us to better triangulate our focal phenomenon by offering both high internal and external validity. Specifically, we (1) test H1 by documenting the various actual forms of effort that consumers willingly expend in pursuit of aesthetically appealing products (studies 1A–1C); (2) demonstrate that this phenomenon is rooted in aesthetics by showing that the exertion of acquisition effort is moderated by an individual difference variable capturing the level of importance assigned to visual product aesthetics (study 2); (3) further elucidate the association between aesthetics and scarcity by showing that the positive impact of aesthetics on acquisition effort is contingent on its perceived rarity (study 3); and (4) examine H2 and H3 by identifying anticipated ownership pride and instantaneous desire as dual drivers of acquisition effort (studies 4, 5A, and 5B). Figure 1

illustrates our conceptual framework with reference to each study.

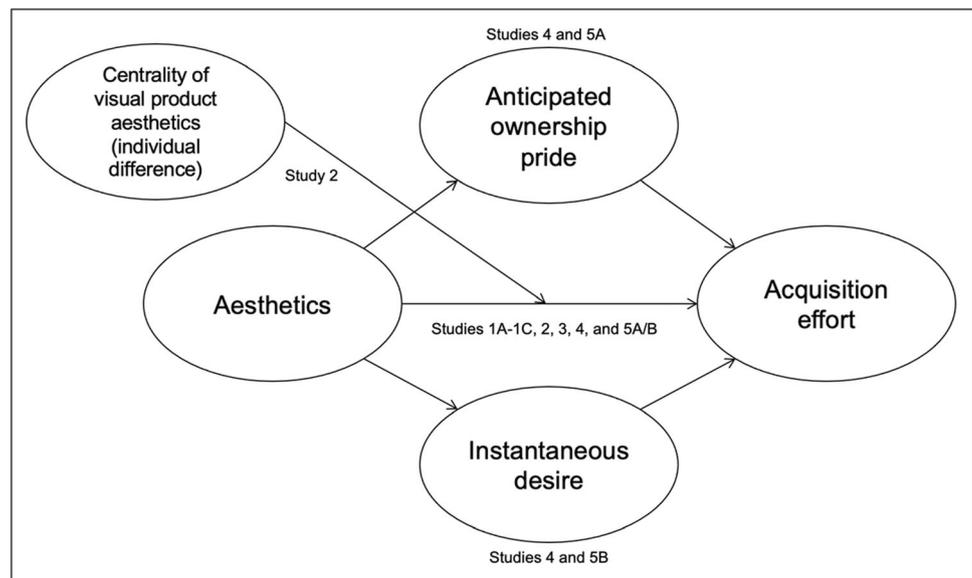
**Perceptions of scarcity** First, to establish that our experimental stimuli (i.e., coffee makers, smartwatches, and photographic prints) do in fact differ on perceptions of scarcity, we recruited a total of 202 adult online panelists from CloudResearch, randomly assigned them to one of two different conditions (i.e., higher vs. lower aesthetics), and asked them to rate each stimulus along the following dimensions (1 = not at all, 7 = extremely): limited, rare, precious, and scarce. Their responses were averaged to form a scarcity index ( $\alpha = .90$ ). Results revealed that, consistent with our theorization and corroborating our pilot study, the higher aesthetic stimuli elicited greater perceptions of scarcity than did the lower aesthetic stimuli ( $M_{\text{higher aesthetic}} = 3.60$ ,  $SD = 1.10$  vs.  $M_{\text{lower aesthetic}} = 2.39$ ,  $SD = 1.02$ ;  $t(200) = -8.14$ ,  $p < .0001$ ).

**Data collection procedures** To achieve high-quality data in our empirical investigations, we established specific parameters prior to data collection and analyses. First, sample sizes for online panel studies were determined a priori, while sample sizes for lab studies were based on subject availability. No additional data were collected after data analyses began. Second, online data collection was carried out using survey panel providers that accounted for potential quality issues such as participant inattentiveness or fraudulent responses (i.e., bots). Third, participants who did not complete all dependent measures were excluded from the analyses. Fourth, detailed study materials are reported in the web appendices accompanying this work; both reported and supplementary measures (e.g., manipulation checks) can be found in Web Appendix F. Finally, careful pretesting of our experimental stimuli ensured that the higher aesthetic stimuli were in fact more beautiful than their lower aesthetic counterparts (see Web Appendix B).

## Study 1

The objective of study 1 is to examine the motivational impact of aesthetics on consumer acquisition effort. We argue that this investigation is warranted given aesthetics does not necessarily increase acquisition effort in all situations, such as when a beautiful one-of-a-kind product is unobtainable (e.g., a piece of artwork hanging in a museum), or when consumers do not have the means to acquire something they consider appealing (e.g., due to financial constraints). As such, highlighting contexts in which aesthetics does mobilize acquisition effort will enhance our understanding of its motivational prowess. To this end, we conducted three studies, each using a different method to quantify the exertion of actual effort, to provide convergent support for our proposition. Study 1A,

**Fig. 1** Conceptual framework: Anticipated ownership pride and instantaneous desire jointly predict the positive impact of aesthetics on acquisition effort



which was conducted in the lab, demonstrates that consumers are willing to invest more time to acquire something that they consider beautiful. Study 1B, which utilizes an archival data set, provides real market evidence for the phenomenon through online auction sales, finding that consumers expend more financial effort (operationalized as actual bid prices) to acquire beautiful products. Study 1C then investigates behavior in the field, finding that people exhibit greater engagement with an advertisement on a real-life social media platform when it features a beautiful product.

### Study 1A

Study 1A provides initial evidence for the motivational influence of aesthetics on consumer acquisition effort. Given that time is a common form of effort that is regularly dedicated to the pursuit of products and services (Antonides et al., 2002; Beatty & Smith, 1987), we examine the extent to which consumers are willing to invest their own discretionary time to acquire something that they consider beautiful.

**Method** A total of 338 undergraduate students at two U.S. universities participated in a 2-cell (aesthetics vs. control) between-subjects study for partial course credit (38% female, median age = 20, aged 18-29; 7 participants did not report age or gender, but their otherwise complete responses were retained for the main analysis).

Participants in the aesthetics (vs. control) condition were told that they would be participating in a study about aesthetic appeal (vs. color perception). Participants in both conditions were instructed to browse the internet for a certain image and were given three minutes to complete this task. Participants in the aesthetics condition were told to search for an image that they found aesthetically appealing, whereas those in the

control condition were told to search for an image of a solid color (see [Web Appendix E](#) for sample images). Once participants found the image, they were instructed to upload the image onto the survey website and were then asked to describe the image they had just uploaded.

Participants were then told that the behavioral lab would like to give them the opportunity to have the image that they just uploaded made into a postcard that would be mailed to them, which they in turn could send to a friend, parent, or other loved one. To claim the postcard, they simply had to complete an additional survey about their overall experience with research participation (i.e., the lab or our online research sign-up system). Importantly, participants were told that this bonus survey was completely optional and would have no impact on the survey that they were currently completing for course credit, thereby making the decision to complete this additional survey completely voluntary and enabling us to capture the participants' use of their discretionary time toward acquiring the focal product. A separate browser window opened for individuals who chose to complete the additional survey for the postcard, which contained several questions gauging their research participation experience. Finally, participants who completed the bonus survey were directed to a separate page where they entered their address and contact information. At the end of data collection, the postcards were made and sent to these individuals.

**Results** Since we collected data across two samples to reach the desired sample size, we first examined whether the focal manipulation interacted with university affiliation. Given that the interaction was not significant ( $p = .7074$ ), the analyzed data were collapsed across universities. Using a chi-square test to compare the decision to complete the additional survey between the two conditions (aesthetic condition = 1, control

condition = 0), we found that participants in the aesthetic (vs. control) condition were more likely to complete the additional survey to receive the postcard (21.76% vs. 13.69%;  $\chi^2(1) = 3.77$  ( $N = 338$ ),  $p = .0521$ ,  $\phi_c = .106$ ), providing initial evidence that consumers are willing to invest more of their own personal time to acquire something that is aesthetically appealing.

**Discussion** Using an experimental paradigm, study 1A provides initial evidence that consumers willingly exert more effort, in this case using their own discretionary time, to obtain a product that they consider aesthetically appealing. Of note, given the declining popularity of postcards (Mo, 2019), the low percentage of respondents who were willing to dedicate their time towards acquiring the product, regardless of condition, is perhaps not surprising. However, the fact that we still found differences in actual effort between conditions, even with a relatively underappreciated product, speaks to the motivational power of beauty. In our next study, we turn to an actual market context to examine how aesthetics mobilizes another common form of acquisition effort.

## Study 1B

While study 1A offered initial evidence that aesthetics can mobilize consumer effort in a controlled lab environment, study 1B provides further support for the motivational impact of aesthetics in a real market setting. Specifically, study 1B examines online auction sales of original oil paintings that naturally vary in their aesthetic appeal. All the paintings were sold by the same merchant on eBay, an e-commerce auction platform. We believe this dataset is particularly suited to our investigation for two reasons. First, because all paintings were advertised as originals with no reproductions or prints available, they were one-of-a-kind pieces and thus equally unique regardless of their aesthetic appeal. As such, study 1B allows us to disentangle objective scarcity from perceived scarcity, because while each painting was equally unique and thus objectively scarce, we contend that the more beautiful a product is, the scarcer it will be perceived, providing a conservative test of our predictions. Second, since all paintings were produced by the same professional artist, we can rule out any potential differences in creator expertise.

**Method** With the help of a data extraction service company, we scraped the data from online eBay auction sales from March 14, 2020 to June 12, 2020 (eBay auction data are publicly available for a three-month window at any given time). This procedure yielded a total of 2,054 auction sales; each sale price was accompanied by a photograph of the oil painting sold, the sale date and time, and the painting size. The photograph for one auction could not be retrieved during the scrape, yielding a final dataset of 2,053 unique auction sales.

We next quantified aesthetic appeal in two ways. First, two research assistants, blind to the study hypotheses and the price data, independently rated each painting based on its aesthetic appeal (1 = not appealing at all, 10 = very appealing). The interrater agreement was comparatively low, albeit significant ( $r = .13$ ,  $p < .0001$ ), corroborating the notion that aesthetic judgments are inherently subjective (Kumar & Garg, 2010); however, we obtained the same pattern and significance of effects when their ratings were analyzed separately. As an additional robustness check, we used the Neural Image Assessment (Talebi & Milanfar, 2018), a machine learning algorithm that relies on deep object recognition networks, to quantify the aesthetic appeal of each image using the same set of anchors. Notably, this deep convolutional neural network is trained to predict which images a typical user would rate as visually appealing and has been shown to reliably correlate with human perceptions.<sup>3</sup>

**Results** We conducted a regression analysis on the price data with aesthetic ratings (i.e., averaged human ratings) as the predictor variable and painting size, sale date, and sale time as control variables (following Reich et al., 2018). Consistent with our predictions, results revealed a significant effect of aesthetic appeal, such that consumers invested more financial effort (i.e., placed higher bids) to acquire paintings with higher aesthetic appeal, controlling for painting size, sale date, and sale time ( $b = 5.44$ ,  $SE = .70$ ,  $t(2048) = 7.82$ ,  $p < .0001$ ). Results also revealed significant effects of painting size and sale date on sale price, such that larger ( $b = .11$ ,  $SE = .01$ ,  $t(2048) = 8.75$ ,  $p < .0001$ ) and more recent paintings ( $b = .32$ ,  $SE = .05$ ,  $t(2048) = 6.57$ ,  $p < .0001$ ) sold for larger amounts of money. There was no significant effect of sale time ( $b = .00$ ,  $SE = .00$ ,  $t(2048) = .65$ ,  $p = .5155$ ). Importantly, the same analysis with the Neural Image Assessment ratings as the predictor variable revealed the same pattern of results ( $b = 12.46$ ,  $SE = 3.02$ ,  $t(2048) = 4.13$ ,  $p < .0001$ ; see Web Appendix C for more details). Finally, the averaged human ratings correlated significantly with the machine learning ratings ( $r = .12$ ,  $p < .0001$ ), confirming the validity of the algorithmic ratings (Talebi & Milanfar, 2018).

**Discussion** Using archival data scraped from an actual online marketplace, study 1B extends study 1A's findings by demonstrating that beyond the investment of time, aesthetics can

<sup>3</sup> To further establish the robustness of the Neural Image Assessment ratings, we conducted a between-subjects post-test where we randomly assigned 301 CloudResearch participants to evaluate the aesthetic appeal of either the five most appealing or five least appealing paintings according to Neural Image Assessment. Ratings across the five paintings were then combined to form an aesthetic appeal index ( $\alpha = .94$ ). Results confirmed that the five most appealing paintings were more aesthetically appealing than the five least appealing paintings ( $M_{top 5} = 4.75$ ,  $SD = 1.21$  vs.  $M_{bottom 5} = 4.20$ ,  $SD = 1.36$ ;  $t(299) = 3.74$ ,  $p = .0002$ ), further attesting to the reliability of the machine learning ratings. See Web Appendix C for more details.

also mobilize the exertion of financial effort, operationalized as higher bids placed, to acquire aesthetically appealing products. This result expands on Bloch et al.'s (2003) finding that consumers report higher willingness to pay for beautiful products; here, we use actual sales data to show that consumers do in fact expend more financial resources to acquire beautiful products in a real-life market setting. Further, given that product uniqueness and creator expertise are factors that could presumably increase product value (Cho & Schwarz, 2010; Sharma & Alter, 2012; Tian et al., 2001), we intentionally examined one-of-a-kind paintings by the same professional artist, thereby enabling us to rule out these factors as alternative accounts for our focal effect. While studies 1A and 1B provide compelling support for our predictions across two different forms of acquisition effort, a limitation shared by both studies is their inability to control the types of stimuli to which individuals were exposed. Thus, in our next study, we conduct a field experiment on a social media platform, where we could exert exact control over the aesthetic stimuli that were shown to users.

### Study 1C

To provide additional evidence for our predictions, in study 1C we conducted a field experiment on a real-life social media platform, thereby further enhancing external validity with the real behavior of actual users (Morales et al., 2017). Specifically, we ran advertisements on Facebook that promoted a coffee maker and encouraged consumers to click on the advertisement to learn more about the product. Given that most consumers are exposed to around 4,000 to 10,000 ads each day and likely do not have the motivation nor the mental capacity to process this amount of information (Simpson, 2017), we note that the decision to click on any particular ad represents a significant investment of time to learn more about that product, which provides us with yet another opportunity to assess consumer effort in the real world. Accordingly, we operationalize effort via actual clicks to learn more about the product, a behavior that reflects consumers' willingness to acquire the endorsed product (Mitchell & Valenzuela, 2005; Zhang & Mao, 2016). In addition, since Facebook likes have a positive causal effect on offline customer behavior (Mochon et al., 2017), we capture user reactions (e.g., likes, hearts) and sharing decisions (i.e., reposting the ad on one's own Facebook page), both of which are critical engagement metrics that marketers regularly track (Shleyner, 2020). In sum, we predict greater overall willingness to engage with the online ad when it depicts a more aesthetically appealing product.

As such, study 1C builds on the previous studies in two important ways. First, we control our stimuli more carefully by systematically varying the aesthetic appeal of the products

depicted in the ads. Second, unlike the previous two studies, where aesthetics and design were integral to the product's functionality (i.e., postcards and paintings), study 1C utilizes coffee makers, a utilitarian product for which aesthetic appeal should arguably play a much less central role (Dhar & Wertenbroch, 2000). Nonetheless, we expect to observe our predicted effects even in a utilitarian context, thereby providing a more conservative test of our predictions.

**Method** Using Facebook Ad Manager's Split Test function, we assessed the effectiveness of two coffee maker ads in a 2-cell (aesthetics: higher vs. lower) between-subjects design, holding constant other variables, such as audience, placement, and delivery settings. Users were unaware that a study was being conducted or that their behavior was being observed, fulfilling the conditions for both a field experiment (Morales et al., 2017) and what Facebook calls an "A/B Test."

Consistent with prior work (Hardisty & Weber, 2020; Kupor & Laurin, 2020; Sevilla & Meyer, 2020), we treated click-through rate (i.e., the number of times each ad was clicked divided by the number of individuals reached by the ad) as the primary dependent variable. Following Hardisty and Weber (2020), if a given person encountered the same ad more than once, we treated such cases as a single observation. Second, we assessed the cost per click for each ad, which Facebook computes based on the effectiveness of each ad. Third, given our focus on the exertion of consumer effort, we also examined the level of ad engagement via user reactions and sharing decisions.

We budgeted \$66 per ad per day for two days (i.e., \$264 total budget for the study), and 64,737 users viewed one of the two ads. Both ads featured the same company Facebook page (Coffee Gear), company website, primary text ("The coffee maker you've been waiting for"), headline ("The Ultimate Coffee Experience"), and call to action ("LEARN MORE" button underneath the image); they differed only in the coffee maker image itself. More details on the ad settings that we utilized, as well as images of the ads, are available in Web Appendices D and E, respectively. Participants who clicked on the ad were brought to an actual registered domain that we purchased and created for this study. On the landing page, we clarified the purpose of the experiment and included links to various real coffee maker reviews.

**Results** Results revealed that the ad featuring the higher aesthetic coffee maker generated a higher click-through rate (5.01%,  $n = 32,424$ ) compared to the one featuring the lower aesthetic coffee maker (3.31%,  $n = 32,313$ ;  $\chi^2(1) = 116.81$  ( $N = 64,737$ ),  $p < .0001$ ,  $\phi_c = .042$ ). While the overall click-through rates may seem low, they are in fact higher than those observed in recent research (e.g., Hardisty & Weber, 2020, reported from .40% to 1.06%; and Sevilla & Meyer, 2020, reported from .51% to .90%).

Second, examining cost per click, the higher aesthetic ad (cost per click = \$.07) outperformed the lower aesthetic ad (cost per click = \$.11), indicating that the higher aesthetic ad was more effective at increasing engagement than the lower aesthetic ad. Next, analyses of user reactions (e.g., likes, hearts) revealed that users who encountered the higher aesthetic ad were also more likely to react to the ad (.23%) compared to those who encountered the lower aesthetic ad (.09%;  $\chi^2(1) = 21.32$  ( $N = 64,737$ ),  $p < .0001$ ,  $\phi_c = .018$ ). Finally, the same analysis revealed that users who encountered the higher aesthetic ad were more likely to share the post on their Facebook page (.04%) compared to those who encountered the lower aesthetic ad (.01%;  $\chi^2(1) = 5.52$  ( $N = 64,737$ ),  $p = .0188$ ,  $\phi_c = .009$ ).

**Discussion** By documenting the influence of product aesthetics on consumer ad engagement in a real social media context using managerially relevant metrics (Mitchell & Valenzuela, 2005; Mochon et al., 2017), study 1C increases the generalizability of our phenomenon while highlighting its implications for real-world behavior. Further, we show that the impact of aesthetics on acquisition effort extends to utilitarian products for which aesthetics and design typically do not play a central role (Chitturi et al., 2007).

While study 1C provides additional external validity by examining naturalistic consumer behavior (Morales et al., 2017), we recognize that the nature of Facebook experiments lends itself to endogeneity issues. Specifically, because these ads are treated as “live” posts on Facebook, users were able to react to, comment on, and share the ads as they were running, essentially changing the stimuli as the experiment unfolded. However, taken together, studies 1A–1C offer realism and external validity while providing corroborating evidence that aesthetics can increase the actual amount of time, money, and online engagement that consumers willingly invest to acquire beautiful products. Having documented this phenomenon with real behavior across multiple consumption domains, our remaining studies leverage controlled experimental methods to increase internal validity.

## Study 2

Study 2 has two main objectives. First, using a different product category (i.e., smartwatches), study 2 attempts to conceptually replicate the results of studies 1A–C with more tightly controlled stimuli and more rigorous experimental methods to rule out an alternative explanation based on novelty. Specifically, it is possible that consumers responded more positively to the higher aesthetic product in study 1C not because it was more beautiful but because it was more novel (Mukherjee & Hoyer, 2001; Nowlis & Simonson, 1996), so we control for perceptions of novelty in our stimuli.

Second, to provide additional convergent evidence that it is indeed the scarcity inherent in aesthetics that mobilizes acquisition effort, we examine a theoretically-relevant individual difference variable—the centrality of visual product aesthetics (CVPA). CVPA captures the level of importance that consumers assign to visual product aesthetics and should therefore shape the amount of effort that consumers willingly invest to procure aesthetic products (Bloch et al., 2003). If visual product aesthetics are indeed at the crux of our phenomenon, we would expect acquisition effort to be moderated by this individual difference variable.

## Method

We opted to use a relatively large sample to detect a statistically significant interaction effect and ensure that our individual difference moderator study would not be underpowered (e.g., Sarason et al., 1975). Because we expected attenuation (but neither elimination nor reversal) of the simple effect of aesthetics, we aimed to recruit a final sample of 1,216 participants, consistent with recommendations by Giner-Sorolla (2018). Both the survey instrument and the data collection plan were stored on Open Science Framework (OSF) before data collection began: [https://osf.io/uzemj/?view\\_only=75c23c60422b4b61a9f24a5ec0f56fce](https://osf.io/uzemj/?view_only=75c23c60422b4b61a9f24a5ec0f56fce). A total of 1,223 participants were recruited from an online panel managed by CloudResearch to participate in a 2 (aesthetics: higher vs. lower)  $\times$  continuous (CVPA) between-subjects study for payment. Eight individuals did not complete the survey and were excluded from further analyses, yielding a final sample of 1,215 participants (56% female, median age = 37, aged 18–77; 5 participants did not report gender, but their otherwise complete responses were retained for the main analysis).

Participants were first asked to complete the CVPA scale (Bloch et al., 2003), an 11-item scale ( $\alpha = .93$ ) that captures the level of importance that visual product aesthetics hold for consumers. Sample items include “I enjoy seeing displays of products that have superior designs” and “A product’s design is a source of pleasure for me” (1 = strongly disagree, 7 = strongly agree; see Web Appendix F for all measures). Next, participants were asked to imagine that they were interested in buying a new smartwatch and were presented with one of two smartwatches that had been found in a pretest to differ in terms of aesthetic appeal (pretest:  $M_{\text{higher aesthetic}} = 5.24$ ,  $SD = 1.42$  vs.  $M_{\text{lower aesthetic}} = 4.30$ ,  $SD = 1.75$ ;  $t(122) = 6.43$ ,  $p < .0001$ ) but not perceived novelty (pretest:  $M_{\text{higher aesthetic}} = 4.65$ ,  $SD = 1.72$  vs.  $M_{\text{lower aesthetic}} = 4.47$ ,  $SD = 1.63$ ;  $t(122) = 1.41$ ,  $p = .1616$ ). See Web Appendix E for images.

Next, participants responded to a series of items designed to capture various facets of acquisition effort. Specifically, participants first indicated how likely they would be to purchase the smartwatch (1 = not at all likely, 7 = very likely) and

how much they would be willing to pay for it (\$0–\$200).<sup>4</sup> Subsequently, participants indicated the extent to which they would be willing to: (1) buy the smartwatch even if it were outside their price range; (2) pay a 10% premium to purchase the smartwatch; (3) drive a long distance to buy the smartwatch; and (4) wait several weeks for the smartwatch to become available again in stores if it were currently unavailable (all anchored at 1 = not willing at all, 7 = very willing). These six items, which captured the investment of both time and money to acquire a product, were combined to form an overall acquisition effort index ( $\alpha = .88$ ). Finally, we collected demographic information.

## Results

We performed a 2 (aesthetics)  $\times$  continuous (CPVA) multiple regression analysis on acquisition effort. Regressing the dependent measure on the aesthetics manipulation, mean-centered levels of CPVA, and their interaction revealed a significant effect of aesthetics at the mean level of CPVA ( $b = .49$ ,  $SE = .07$ ,  $t(1211) = 7.06$ ,  $p < .0001$ ), such that participants were willing to expend more effort to acquire the higher (vs. lower) aesthetic smartwatch, as well as a significant effect of CVPA ( $b = .26$ ,  $SE = .04$ ,  $t(1211) = 6.38$ ,  $p < .0001$ ), such that higher (vs. lower) CVPA individuals were willing to expend more acquisition effort. Importantly, the interaction was also significant ( $b = .18$ ,  $SE = .06$ ,  $t(1211) = 3.17$ ,  $p = .0015$ ). Decomposing the interaction, in the higher aesthetic condition, we found a significant effect of CVPA ( $b = .45$ ,  $SE = .04$ ,  $t(1211) = 10.96$ ,  $p < .0001$ ), such that higher (vs. lower) CVPA individuals were willing to expend more acquisition effort. Importantly, the effect of CVPA was relatively dampened in the lower aesthetic condition, despite remaining significant ( $b = .26$ ,  $SE = .04$ ,  $t(1211) = 6.38$ ,  $p < .0001$ ). Because CPVA was measured on a 1 to 7 scale ( $M = 4.44$ ,  $SD = 1.19$ , median = 4.55), we next conducted a floodlight analysis using the Johnson and Neyman (1936) technique to identify the range of CVPA for which the simple effect of aesthetics was significant (Fig. 2; see also Spiller et al., 2013). This analysis revealed a significant increase in acquisition effort for the higher (vs. lower) aesthetic smartwatch for any value of CVPA above 2.97 (at  $p < .05$ ). Thus, consistent with our predictions, the impact of aesthetics on acquisition effort is especially pronounced among high CVPA individuals, suggesting that this effect is indeed grounded in aesthetics.

<sup>4</sup> Given that willingness to pay was measured on a different scale, we rescaled this item to have the same upper and lower limits as the other items, which were measured on 1–7 scales. The same transformation was performed across all remaining studies.

## Discussion

In study 2, we conceptually replicated the effects of studies 1A–C using a new product category, more controlled stimuli, and a more internally rigorous paradigm. We found that consumers are willing to expend more effort to acquire a beautiful product even after controlling for perceived novelty, suggesting that our effects cannot be explained by the novelty of the aesthetic design alone. Second, we found that the impact of aesthetics on acquisition effort is moderated by CVPA, an individual difference variable that shapes the level of significance that consumers attach to visual product aesthetics; this finding provides further evidence that aesthetic appeal is indeed central to our phenomenon. In summary, it seems unlikely that other alternative explanations could account for the totality of our effects, suggesting that an explanation based on the inherent scarcity of aesthetics is the most parsimonious one.

Having documented the significance of aesthetics to acquisition effort through a theoretically relevant individual difference variable, in our next study, we directly investigate the relationship between aesthetics and scarcity to understand how consumers respond to beautiful products when their perceived scarcity is no longer the default assumption.

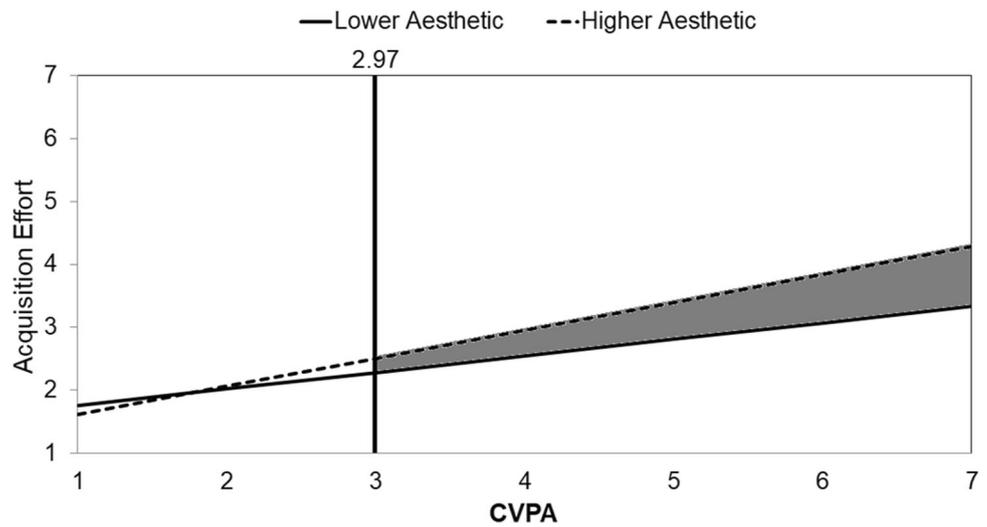
## Study 3

Building on our pilot study, which documented a positive association between aesthetics and scarcity, study 3 sheds additional light on this relationship by examining what happens when this association no longer holds true. In other words, if beauty is in fact inherently scarce, then incidental information about the product's perceived abundance should systematically lower acquisition effort, but only for beautiful products. As such, we manipulate both constructs independently to show that (1) product aesthetics are most effective at mobilizing acquisition effort when such beauty is scarce, and (2) the positive impact of scarcity on acquisition effort only emerges for beautiful products.

## Method

Given the inherent allure of aesthetics (Reimann et al., 2010; Townsend, 2017), we opted for a relatively large sample to detect a statistically significant interaction. Because we expected attenuation of the main effect of aesthetics, we aimed to recruit a final sample of 1,800 participants, consistent with recommendations by (Giner-Sorolla, 2018). Both the survey instrument and the data collection plan were stored on OSF before data collection began: [https://osf.io/df3qa/?view\\_only=867148cb17944ece88f1a2ec2122517c](https://osf.io/df3qa/?view_only=867148cb17944ece88f1a2ec2122517c). A total of 1,817 participants were recruited from CloudResearch to

**Fig. 2** Study 2: Aesthetics × CVPA interaction on acquisition effort. Note. The grey area denotes the Johnson-Neyman region of significance when CVPA is greater than 2.97



participate in a 2 (aesthetics: higher vs. lower) × 2 (quantity: scarce vs. abundant) between-subjects study for payment. Five individuals did not complete the survey, and 112 failed an attention check measure and were excluded from further analysis based on our predetermined data collection plan,<sup>5</sup> yielding a final sample of 1,700 participants (54% female, median age = 39, aged 18-92; 7 participants did not report gender, but their otherwise complete responses were retained for the main analysis).

Participants were asked to imagine they wanted to buy a new coffee maker and were presented with either the higher or lower aesthetic coffee makers from study 1C. Participants in the scarce condition learned that there were only three of these coffee makers available for sale (i.e., there was a limited supply available to customers), whereas those in the abundant condition learned that there were more than 3,000 of these coffee makers available for sale (i.e., there was an abundant supply available to customers; adapted from Kristofferson et al., 2017). Subsequently, participants completed the same acquisition effort index ( $\alpha = .89$ ) from study 2 before responding to quantity manipulation check and attention check measures, described in Web Appendix F, and demographic information.

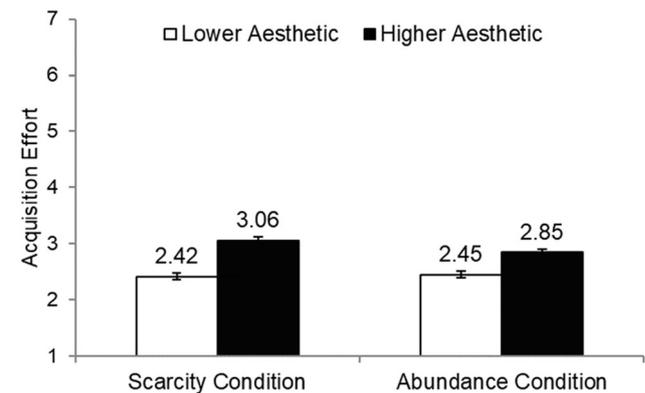
**Results**

A 2 (aesthetics) × 2 (quantity) ANOVA on acquisition effort revealed a significant main effect of aesthetics ( $F(1, 1696) = 72.61, p < .0001, \eta^2 = .041; M_{\text{higher aesthetic}} = 2.95, SD = 1.36$  vs.  $M_{\text{lower aesthetic}} = 2.44, SD = 1.13$ ), which was qualified by a significant aesthetics × quantity interaction ( $F(1, 1696) = 4.24, p = .0397, \eta^2 = .003$ ; see Fig. 3). While participants were willing to expend more effort to acquire the higher (vs. lower)

aesthetic coffee maker in the scarce condition ( $M_{\text{scarce, higher}} = 3.06, SD = 1.38$  vs.  $M_{\text{scarce, lower}} = 2.42, SD = 1.10; F(1, 1696) = 54.50, p < .0001, \eta^2 = .031$ ), this difference became relatively smaller, although still significant, in the abundant condition ( $M_{\text{abundant, higher}} = 2.85, SD = 1.34$  vs.  $M_{\text{abundant, lower}} = 2.45, SD = 1.16; F(1, 1696) = 21.46, p < .0001, \eta^2 = .013$ ). In other words, whereas participants were willing to expend more effort to acquire the higher aesthetic coffee maker in the scarce (vs. abundant) condition ( $F(1, 1,696) = 6.27, p = .0124, \eta^2 = .004$ ), acquisition effort for the lower aesthetic coffee maker did not differ regardless of quantity ( $F < 1$ ).

**Discussion**

Expanding on the premise that beauty is intrinsically scarce, study 3 offers further insights into this relationship by examining what happens when this association is explicitly called into question. Consistent with the idea that the scarcity inherent in aesthetics mobilizes acquisition effort, we found that high aesthetic appeal was most effective at mobilizing acquisition effort when beauty was considered scarce; likewise, the



**Fig. 3** Study 3: Aesthetics × quantity interaction on acquisition effort. Note. The error bars indicate standard errors of the mean

<sup>5</sup> The pattern and significance of the results remain the same when we retained the 112 participants who failed the attention check measure.

positive influence of scarcity on acquisition effort only emerged among beautiful products and not their less aesthetically appealing counterparts. Taken together, these findings not only reaffirm the inextricable associations between aesthetics and scarcity but also provide additional evidence that the motivational prowess of aesthetics can be at least partially attributed to their inherent scarcity.

Having shown that the positive impact of aesthetics on acquisition effort partially hinges on its perceived scarcity, we next examine the underlying process by adopting two different approaches. First, we attempt to provide evidence for statistical mediation via a measurement-of-process design (study 4). Next, we attempt to provide evidence for conceptual mediation by directly manipulating pride (study 5A) and desire (study 5B) via a manipulation-of-process design (Spencer et al., 2005).

## Study 4

The primary goal of study 4 is to examine the dual drivers of anticipated ownership pride and instantaneous desire by directly measuring these proposed mediators.

## Method

Both the survey instrument and the data collection plan were stored on OSF before data collection began: [https://osf.io/cmpdf/?view\\_only=2e9a7418e4c2428891fc4338498ea24a](https://osf.io/cmpdf/?view_only=2e9a7418e4c2428891fc4338498ea24a). A total of 505 participants were recruited from CloudResearch to participate in a 2-cell (aesthetics: higher vs. lower) between-subjects study for payment. Five individuals did not complete the survey and were excluded from further analyses, yielding a final sample of 500 participants (43% female, median age = 33, aged 18-76).

Participants were asked to imagine they wanted to buy a piece of artwork to decorate their living rooms and were presented with one of two photographic prints. Those in the higher aesthetic condition were shown a print that featured snowcapped mountains and a starry night sky, whereas those in the lower aesthetic condition were shown a print that featured snowcapped hills and a cloudy blue sky (see Web Appendix E for images).

Subsequently, participants completed the same acquisition effort index as prior studies ( $\alpha = .95$ )<sup>6</sup> before indicating the extent to which they would experience the following emotions if they were to own this product (1 = not at all, 7 = extremely): proud, satisfied, confident, accomplished, and self-fulfilled; these items were combined to form a pride of ownership index

( $\alpha = .97$ ; adapted from Di Muro & Noseworthy, 2013). Additionally, participants indicated their agreement with the following statements (1 = strongly disagree, 7 = strongly agree; adapted from Wiggin et al., 2019): (1) I wanted to have this product the moment I saw it; (2) I felt an immediate urge to make this product mine; (3) It would be my desire to own this product right away; (4) If it were possible, I would try to get this product right away; and (5) I would like to own this product as soon as possible. These statements were combined to form an instantaneous desire index ( $\alpha = .98$ ). Notably, we counterbalanced the order in which the mediators were assessed; importantly, presentation order did not interact with aesthetics to affect either mediator and thus will not be discussed further. Finally, we collected demographic information.

## Results

We predict that consumers will be willing to expend more effort to acquire the higher aesthetic product, an effect driven by anticipated pride of ownership and instantaneous desire.

**Acquisition effort** A one-way ANOVA revealed that participants were willing to expend greater effort to acquire the higher aesthetic print ( $M_{\text{higher aesthetic}} = 3.78$ ,  $SD = 1.68$  vs.  $M_{\text{lower aesthetic}} = 3.21$ ,  $SD = 1.92$ ;  $F(1, 498) = 12.33$ ,  $p = .0005$ ,  $\eta^2 = .024$ ).

**Differentiating between pride and desire** To ensure that we were justified in treating pride and desire as separate constructs, we first tested whether the indices loaded on separate factors. We conducted a principal-components factor analysis with oblique rotation (promax), given that we expected these two factors to naturally covary but to represent distinct constructs. Indeed, rotated factor pattern results revealed that the pride and desire items did load separately (all coefficients > .66), supporting our assertion that they are independent constructs. Of note, we find entirely consistent patterns with other specifications, including orthogonal varimax rotation. While pride and desire are conceptually distinct constructs, we note that they are highly correlated ( $r = .87$ ,  $p < .0001$ ).

**Anticipated pride of ownership** A one-way ANOVA revealed that participants anticipated experiencing greater pride from owning the higher aesthetic print ( $M_{\text{higher aesthetic}} = 4.39$ ,  $SD = 1.74$  vs.  $M_{\text{lower aesthetic}} = 3.75$ ,  $SD = 1.95$ ;  $F(1, 498) = 15.00$ ,  $p = .0001$ ,  $\eta^2 = .029$ ).

**Instantaneous desire** The same analysis revealed that participants expressed greater instantaneous desire for the higher aesthetic print ( $M_{\text{higher aesthetic}} = 3.88$ ,  $SD = 1.97$  vs.  $M_{\text{lower aesthetic}} = 3.13$ ,  $SD = 2.13$ ;  $F(1, 498) = 16.66$ ,  $p < .0001$ ,  $\eta^2 = .032$ ).

<sup>6</sup> Given the nature of the product, we adjusted the anchors for the willingness-to-pay measure to \$0–\$100 in studies 4, 5A, and 5B, which we subsequently rescaled into a 1-7 scale.

**Mediation** Based on our conceptualization, the greater effort that consumers expend to acquire beautiful products should be driven in tandem by anticipated ownership pride and instantaneous desire. We conducted a mediation analysis by including pride of ownership and instantaneous desire in the model as parallel mediators (model 4, Hayes, 2017). Results, based on 5,000 bootstrapped samples, revealed that aesthetics had significant positive effects on anticipated ownership pride ( $b = .64$ ;  $SE = .17$ ;  $t = 3.87$ ;  $p = .0001$ ) and instantaneous desire ( $b = .75$ ;  $SE = .18$ ;  $t = 4.08$ ;  $p = .0001$ ), and that higher scores on pride ( $b = .23$ ;  $SE = .03$ ;  $t = 7.10$ ;  $p < .0001$ ) and desire ( $b = .64$ ;  $SE = .03$ ;  $t = 22.26$ ;  $p < .0001$ ) each had a significant positive effect on acquisition effort. Further, while the main effect of aesthetics on acquisition effort was significant, as noted above, the direct effect was not ( $b = -.06$ ;  $SE = .06$ ;  $p = .3387$ ). Given the 95% bias corrected confidence interval for the indirect effect excluded 0 for both pride ( $b = .14$ ; 95% CI: [.0621, .2420]) and desire ( $b = .48$ ; 95% CI: [.2440, .7144]), mediation was significant (Hayes, 2017). Anticipated ownership pride and instantaneous desire thus fully mediated the relationship between aesthetics and acquisition effort, providing initial evidence that these factors work in parallel to increase the amount of effort that consumers expend to acquire beautiful products.<sup>7</sup>

## Discussion

Study 4 provides support for the dual drivers of acquisition effort—anticipated ownership pride and instantaneous desire—using a measurement-of-process approach. While both mechanisms represent discreet, positive emotional-motivational states, they are conceptually distinct constructs, as indicated by factor analysis results. Specifically, whereas anticipated ownership pride is future-oriented and interpersonal in nature (Bagozzi & Pieters, 1998; Griskevicius et al., 2010), instantaneous desire occurs in the moment and is intrapersonal in nature (Wiggin et al., 2019). In our last two studies, we directly manipulate each mediator to provide additional evidence of our proposed underlying process.

## Study 5A

The objective of study 5A is to show that anticipated pride of ownership plays a critical role in shaping acquisition effort by directly manipulating the context in which the product is consumed, thereby elucidating the underlying process through moderation (Spencer et al., 2005). Specifically, given that prior work

<sup>7</sup> Although we propose that our mediators work in parallel, for comprehensiveness we also examined serial mediation to see if one was driving the other. We found that serial mediation was significant both when pride was included first ( $b = .40$ ; 95% CI: [.1962, .6003]) and when desire was included first ( $b = .13$ ; 95% CI: [.0557, .2274]), suggesting that they do in fact operate as parallel drivers of our phenomenon.

has shown that pride is most commonly experienced in situations involving public assessments (Griskevicius et al., 2010; Webster et al., 2003), we predict that the positive impact of aesthetics on acquisition effort will be more pronounced when the product is consumed publicly (vs. privately). This approach is similar to work on social-signaling and self-signaling, which leverages similar manipulations (Savary & Goldsmith, 2020). To increase the generalizability of our effects, we followed a within-subjects approach in study 5A, in which consumers were shown products of differing levels of aesthetic appeal and evaluated each one successively. This design enables us to mirror real life more closely, as consumers typically encounter multiple product offerings with differing levels of aesthetic appeal before choosing one to acquire.

## Method

A total of 256 participants were recruited from CloudResearch to participate in a 2 (aesthetics: higher vs. lower, within-subjects)  $\times$  2 (consumption context: public vs. private, between-subjects) mixed-design study for payment. One individual did not complete the survey and was excluded from further analyses, yielding a final sample of 255 participants (43% female, median age = 33, aged 20–73; one participant did not report age or gender, but this individual's otherwise complete responses were retained for the main analysis).

Study 5A used the same guided visualization scenario as study 4, in which participants imagined they were buying a piece of artwork to decorate their home. In the public condition, they were told that their choice would be displayed in the living room and that they often have friends or visitors who come to stay with them; thus, their choice would be viewed and evaluated by others. In the private condition, the artwork would be for their private bedroom; thus, their choice would not be viewed or evaluated by others (procedure adapted from Wang et al., 2012). To bolster the manipulation, participants were asked to take a moment to think about this situation and to write several sentences describing their thoughts. Next, participants were presented with two different photographic prints, each shown on a separate screen in randomized, counterbalanced order. The higher and lower aesthetic stimuli were the same as those used in study 4.

For each photographic print, participants were asked to indicate how likely they would be to buy this print (1 = not at all likely, 7 = very likely) and how much they would be willing to pay for it (\$0–\$100 sliding scale); these measures were combined to form an acquisition effort index ( $r = .69$  for the higher aesthetic print and  $r = .81$  for the lower aesthetic print).<sup>8</sup> After reporting acquisition effort for the first

<sup>8</sup> Given the within-subjects nature of the design, we only asked a subset of the overall acquisition effort index to prevent fatigue; we decided to use these two items since they most closely resemble traditional approaches toward assessing acquisition effort.

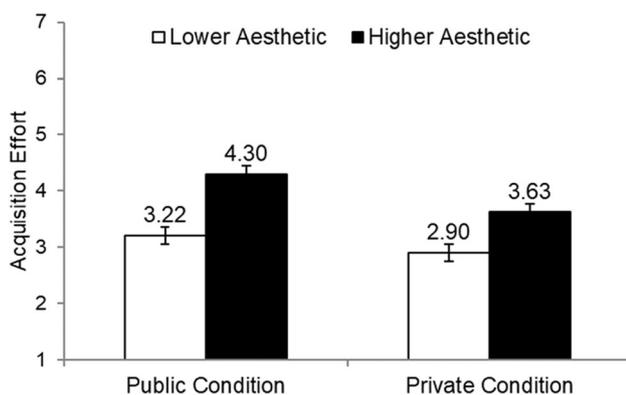
photographic print, they indicated their responses for the other photographic print in counterbalanced order. Importantly, presentation order did not interact with any of the variables to affect acquisition effort and thus will not be discussed further. Finally, we collected a consumption context manipulation check, described in [Web Appendix F](#), and demographic information.

## Results

A 2 (aesthetics, within-subjects)  $\times$  2 (consumption context, between-subjects) mixed ANOVA revealed a significant main effects of aesthetics ( $F(1, 253) = 90.29, p < .0001; M_{\text{higher aesthetic}} = 3.96, SD = 1.72$  vs.  $M_{\text{lower aesthetic}} = 3.06, SD = 1.73$ ) and consumption context ( $F(1, 253) = 6.54, p = .0111; M_{\text{public}} = 3.76, SD = 1.54$  vs.  $M_{\text{private}} = 3.27, SD = 1.52$ ), which were qualified by a marginal aesthetics  $\times$  context interaction ( $F(1, 253) = 3.48, p = .0634$ ; see Fig. 4). While participants were willing to expend more effort to acquire the higher (vs. lower) aesthetic print in the private condition ( $M_{\text{private, higher}} = 3.63, SD = 1.69$  vs.  $M_{\text{private, lower}} = 2.90, SD = 1.64; t(253) = -5.41, p < .0001$ ), this difference was even more pronounced in the public condition ( $M_{\text{public, higher}} = 4.30, SD = 1.68$  vs.  $M_{\text{public, lower}} = 3.22, SD = 1.81; t(253) = -8.02, p < .0001$ ). In other words, whereas participants were willing to expend more effort to acquire the higher aesthetic print in the public (vs. private) condition ( $t(253) = -3.12, p = .0020$ ), this difference was attenuated for the lower aesthetic print ( $t(253) = -1.46, p = .1443$ ).

## Discussion

In study 5A, we isolate the positive impact of anticipated ownership pride on acquisition effort by taking a moderation approach. Since pride is an inherently social emotion that is experienced most strongly in situations involving public assessments (Griskevicius et al., 2010; Webster et al., 2003),



**Fig. 4** Study 5A: Aesthetics  $\times$  consumption context interaction on acquisition effort. Note. The error bars indicate standard errors of the mean

study 5A provides corroborating support for our predictions by showing that the influence of aesthetics on acquisition effort is especially pronounced in public, thereby lending additional evidence that anticipated ownership pride is critical in shaping the pursuit of beautiful products. Importantly, we note that even in situations wherein pride plays a less prominent role, people still expend more effort to acquire a beautiful product, suggesting another mechanism may be driving consumer responses under such conditions. Accordingly, in our final study, we investigate our other proposed underlying driver, instantaneous desire, in a manner comparable to that of study 5A.

## Study 5B

Study 5B mirrors study 5A by using a moderation approach to examine the other underlying driver: instantaneous desire. Work on contamination (Argo et al., 2006) finds that the desire for a given product decreases when people learn that it has been handled by other individuals, even in the absence of any physical damage. Drawing on this literature, we predict that the positive impact of aesthetics on acquisition effort will be weakened if the product was contaminated but subsequently restored to its original pristine condition. In other words, we directly examine the role played by instantaneous desire by systematically decreasing the product's desirability without affecting its aesthetic appeal. Additionally, while study 5A followed a within-subjects approach for increased realism, we return to a between-subjects approach in study 5B for a more conservative test of our predictions.

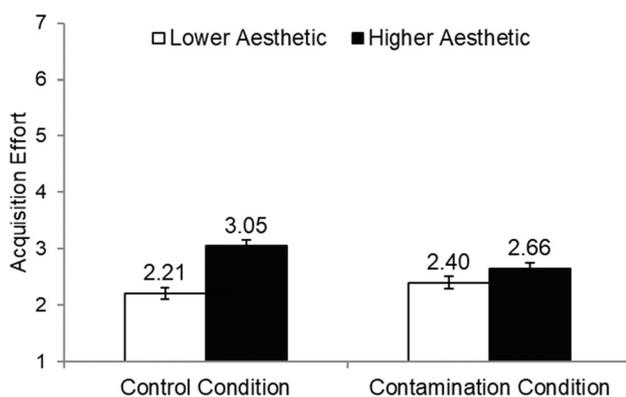
## Method

Given the ability of aesthetics to spontaneously induce desire (Reimann et al., 2010), even in the presence of negative information (Townsend, 2017), we opted for a relatively large sample to detect a statistically significant interaction. Because we expected attenuation of the main effect of aesthetics, we aimed to recruit a final sample of 1,216 participants, consistent with recommendations by Giner-Sorolla (2018). Both the survey instrument and the data collection plan were stored on OSF before data collection began: [https://osf.io/c2vza/?view\\_only=f44bd298ae3a42f384b33677a05d8a34](https://osf.io/c2vza/?view_only=f44bd298ae3a42f384b33677a05d8a34). A total of 1,227 participants were recruited from CloudResearch to participate in a 2 (aesthetics: higher vs. lower)  $\times$  2 (contamination: yes vs. no) between-subjects study for payment. Three individuals did not complete the survey and were excluded from further analyses, yielding a final sample of 1,224 participants (54% female, median age = 37, aged 18-88; 5 participants did not report gender and 3 did not report age, but their otherwise complete responses were retained for the main analysis).

Like the two previous studies, participants were asked to imagine they wanted to buy a piece of artwork to decorate their living room. Participants in the contamination condition were shown a photographic print and presented with additional information about the artwork's history. Specifically, they learned that an employee had previously splashed paint onto the product while painting a damaged wall but had subsequently cleaned the product and restored it to its original condition. Participants were further shown side-by-side images of the artwork before and after it was cleaned to highlight its current, pristine condition (see Web Appendix E for images). As such, consistent with the contamination literature (e.g., Argo et al., 2006), participants learned that the product had previously been handled by someone else even though it did not sustain any permanent damage. Participants in the no-contamination condition were simply shown the photographic print without any contamination information. Finally, all participants completed the same acquisition effort index ( $\alpha = .89$ ) as in prior studies before responding to a contamination manipulation check, described in Web Appendix F, and demographic information.

## Results

A 2 (aesthetics)  $\times$  2 (contamination) ANOVA on acquisition effort revealed a significant main effect of aesthetics ( $F(1, 1220) = 66.21, p < .0001, \eta^2 = .049$ ;  $M_{\text{higher aesthetic}} = 2.85, SD = 1.34$  vs.  $M_{\text{lower aesthetic}} = 2.30, SD = 1.10$ ), which was qualified by a significant aesthetics  $\times$  contamination interaction ( $F(1, 1220) = 18.08, p < .0001, \eta^2 = .015$ ; see Fig. 5). While participants were willing to expend more effort to acquire the higher (vs. lower) aesthetic print in the control condition ( $M_{\text{control, higher}} = 3.05, SD = 1.43$  vs.  $M_{\text{control, lower}} = 2.21, SD = 1.16$ ;  $F(1, 1220) = 74.41, p < .0001, \eta^2 = .058$ ), this difference became relatively smaller in the contamination condition ( $M_{\text{contamination, higher}} = 2.66, SD = 1.22$  vs.  $M_{\text{contamination, lower}} = 2.40, SD = 1.02$ ;  $F(1, 1220) = 6.54, p = .0106, \eta^2 = .005$ ). In other words, whereas participants were



**Fig. 5** Study 5B: Aesthetics  $\times$  contamination interaction on acquisition effort. Note. The error bars indicate standard errors of the mean

willing to expend more effort to acquire the higher aesthetic print in the control (vs. contamination) condition ( $F(1, 1220) = 16.14, p < .0001, \eta^2 = .013$ ), this difference was reversed for the lower aesthetic print ( $F(1, 1220) = 3.97, p = .0464, \eta^2 = .003$ ). This reversal may have occurred because mistakes can sometimes produce positive consumer responses due to greater perceived uniqueness (Reich et al., 2018). Nonetheless, importantly, our interaction was, as theorized, mostly driven by reduced acquisition effort for the contaminated higher aesthetic print.

## Discussion

Study 5B complements study 5A by examining the other critical factor of our conceptualization, showing that the effort to acquire beautiful products was relatively dampened when the product had been contaminated and thus induced less desire, even though the aesthetic qualities of the product remained unchanged. Taken together, studies 5A and 5B demonstrate, through manipulation-of-process designs, that the ownership pride and instantaneous desire stemming from aesthetics are both critical in mobilizing acquisition effort, thereby complementing the measurement-of-process approach taken in study 4.

## General discussion

The present research heeds calls from marketing and consumer researchers to engage in a deeper investigation of behavioral and psychological responses to scarcity (Griskevicius et al., 2013; Kristofferson et al., 2017). Our investigation focuses on aesthetic appeal, a specific product attribute that is intrinsically scarce, which enables us to integrate the scarcity and aesthetics literatures to develop a much-needed comprehensive theory of aesthetics in consumption (Kumar & Garg, 2010; Patrick et al., 2019; Patrick & Peracchio, 2010). Across a series of studies, using a multimethod investigation that incorporates archival, field, and lab data, we provide convergent evidence that product aesthetics elicit anticipated ownership pride and instantaneous desire, which together compel consumers to expend a significant amount of effort to acquire the beautiful item. With these findings, we advance a novel conceptualization that not only emphasizes the lengths to which consumers are willing to go to pursue beautiful products but also elucidates the mechanisms driving this exertion. Given general awareness that companies invest considerable effort into the design and production of beautiful products (Wu et al., 2017) but have finite resources that are zero-sum in nature (Chernev, 2007; Chernev & Carpenter, 2001), we contend that the effort required to make beautiful products thus imbues them with an authentic form of scarcity.

## Theoretical contributions

**On the relationship between aesthetics and scarcity** The present work bridges research on aesthetics and scarcity by being the first to empirically identify a positive relationship between the two. While the scarcity literature has predominantly investigated consumer reactions to scarce resources that are both precise and quantifiable (e.g., money and assets; Cannon et al., 2018; Goldsmith et al., 2021; Hamilton et al., 2019), our work diverges from prior research by focusing on beauty, a resource that is neither specific or quantifiable, and demonstrating that it can naturally elicit perceptions of scarcity. As such, we identify a novel antecedent to scarcity perceptions, one that exists independent of actual resource levels. In fact, we show that part of the allure of beauty stems from its perceived scarcity, as the positive impact of beauty on acquisition effort is reduced when it is thought to be in abundant supply.

**On the link between aesthetics and acquisition effort** The current research deepens our understanding of the link between aesthetics and effort by showing that consumers are willing to invest more effort—whether through time, money, physical energy, or other forms of consumer engagement—to acquire beautiful products. In doing so, our work not only presents a more refined perspective on the overarching approach–avoidance framework first proposed by Bloch (1995), but also explicates a specific form of approach behavior that is particularly relevant in a consumption context. Relatedly, we demonstrate that the relationship between aesthetics and effort is not limited to the production process (Wu et al., 2017) but can be observed among consumers themselves in their pursuit of beauty.

**On uncovering the mediating roles of anticipated ownership pride and instantaneous desire** While it is well established that product design is a critical determinant of commercial success (Bloch, 1995), the exact mechanisms through which aesthetics influence consumer behavior have remained largely unexplored, particularly at the acquisition stage. The present research identifies two distinct affective processes that drive the relationship between product aesthetics and acquisition effort: the anticipated pride of owning something beautiful and the instantaneous desire for beauty that aesthetic appeal evokes. By systematically illuminating these two underlying mechanisms and their respective levers, the current work provides a comprehensive framework that formally integrates previously disparate theoretical notions in the literature that have alluded to these dual drivers. More broadly, we consider the framework that we propose to be a key contribution in and of itself, as it yields important insights into the underlying drivers of, and the factors that can shape the exertion of effort in, the pursuit of beautiful products.

## Limitations and avenues for future research

**The scarcity of aesthetics, approach motivations, and implicit theories** Herein, we have shown that the scarcity inherent in aesthetics can induce an approach response toward beautiful products and mobilize acquisition effort; thus, an interesting avenue for further research would be to investigate theoretically relevant moderators of such approach motivations. For example, Jain et al. (2009) found that people's approach tendencies hinge on their implicit theories about the world around them. Incremental theorists, who believe that the world is malleable and can be changed through one's hard work (Chiu et al., 1997), are more likely to exhibit approach responses, whereas entity theorists, who believe that the world is immutable and cannot be changed through one's efforts, are less likely to do so. As such, future work could investigate whether incremental (vs. entity) theorists are more likely to experience approach motivations in response to beautiful products and thus be willing to exert greater acquisition effort. Indeed, prior work has shown that incremental theorists are more likely to appreciate the effort invested in the creation of beautiful products (Wu et al., 2017), so it would be interesting to examine whether this proclivity could extend to the exertion of acquisition effort as well.

**Is beauty truly scarce, or does it lie in the eye of the beholder and is thus potentially abundant?** A central tenet of the present research is that beauty is inherently scarce. However, prior research has questioned whether and to what extent beauty is subjective—that is, whether it lies in the eye of the beholder (Kumar & Garg, 2010). Can any object be perceived as beautiful—and, by extension, scarce—depending on the viewer? While beauty may be subject to individual, social, and cultural variation, we contend that there are certain universal aesthetic principles upon which the majority of viewers agree, which include, among others, unity and prototypicality (Veryzer Jr & Hutchinson, 1998), certain color combinations (Deng et al., 2010), and interstitial space (Gupta & Hagtvædt, 2021; Sevilla & Townsend, 2016). Because finding an ideal combination of these aesthetic elements is a difficult balancing act for product designers, true beauty is hard to achieve and, thus, not common. Future research should systematically disentangle the extent to which the scarcity inherent in beauty is grounded in objective versus subjective properties.

**On the role of authenticity** According to the aesthetics literature, authenticity refers to the correct identification of the origins, authorship, or provenance of an object (Dutton, 2003)—concerns that are particularly relevant for the perception of artistic creations like one-of-a-kind paintings (Dutton, 2003). Indeed, a post-test for study 1B's stimuli (see Web Appendix C) revealed that the higher aesthetic concern for unique artworks like the ones used in study 1B, we find that our focal

effects hold even for mass-produced everyday products (e.g., coffee makers, smartwatches) for which authenticity concerns are arguably less central, suggesting that authenticity alone cannot account for the totality of our effects. Nonetheless, given the link between beauty and authenticity (Samper et al., 2018), the role of authenticity represents an understudied limitation of the present work, so future research should further address the role of authenticity in shaping consumer preferences for beauty.

**On downstream consequences** A few additional questions about downstream consequences arose out of this work, which future research could tackle. For example, does possessing aesthetic products lead to actual feelings of pride, or is anticipated ownership pride the result of an affective forecasting error? Based on our theorizing and empirical results, we believe that the anticipation of pride—even if it is just an anticipation of a feeling—is associated with actual feelings of pride. For example, research has argued that the anticipation of affect activates associated feelings (Knutson & Greer, 2008). Further, does possessing aesthetic goods alleviate feelings of not having enough? Future work could investigate this interesting connection by drawing on work exploring socioeconomic status and interest in materials possessions (Chaplin & John, 2007). Findings in food decision making would support the notion that the desire evoked by perceptions of scarcity can be satiated through the acquisition of a desirable product (Reimann et al., 2016; Reimann & Lane, 2017).

**On product-based scarcity versus resource scarcity** While the current research primarily focused on the intersection of aesthetics and product-based scarcity, other forms of scarcity, including a general feeling of not having enough (Cannon et al., 2018), warrant further investigation. According to life history theory, childhood socioeconomic status can moderate consumer responses to present-day scarcity threats (Griskevicius et al., 2011; Griskevicius et al., 2013); thus, future work could explore how socioeconomic status, among other sources of resource scarcity, might interact with aesthetics to shape acquisition effort.

**On supply-induced scarcity versus demand-induced scarcity** Relatedly, it would be interesting to examine whether the relationship between aesthetics and scarcity could change based on whether the scarcity was induced by low supply (i.e., few units were made) or high demand (i.e., everyone desires the product). Indeed, previous research has shown that a scarce product is evaluated more positively when its scarcity is due to high demand rather than low supply (Worchel et al., 1975), so an intriguing avenue for further research would be to investigate whether the scarcity inherent in aesthetics would be more effective at mobilizing acquisition effort when it is caused by demand- (vs. supply-related) factors.

**The investment of time versus money** The current research underscores the fact that consumers willingly engage in various types of effortful activities (e.g., expending time and money) to acquire beautiful products. However, a burgeoning body of work has revealed the discrepant impact that the investment of time versus money can have on consumer decision making (e.g., Mogilner & Aaker, 2009). For example, the “time vs. money effect” reveals that the investment of time increases the focus on product experience, which in turn increases product evaluations; conversely, the investment of money increases the focus on product possession, which in turn increases evaluations of prized possessions (Mogilner & Aaker, 2009). While we remained agnostic to the distinctions between time and money in the present work and found that consumers are willing to exert both time and money in pursuit of beautiful products, future research could explore whether the expenditure of time could subsequently lead to different evaluations of one’s aesthetically appealing possessions compared to the expenditure of money.

**The dark side of aesthetics** Beauty is often viewed in a highly positive light, to the extent that researchers have recently argued that it can be leveraged to strengthen communities and enhance well-being (Bublitz et al., 2019; Warren & Reimann, 2019). However, despite this generally positive view of aesthetic appeal, there could be potential downsides to this universally lauded attribute. Indeed, Wu et al. (2017) found that higher aesthetics can sometimes lower product usage and decrease consumption enjoyment, while Townsend (2017) demonstrated that beautiful donation solicitations can discourage donations due to perceptions of organizational wastefulness. Future research could explore other ways in which aesthetics negatively impact consumer well-being. For example, the continual pursuit of beautiful products may lead to overspending and the gradual accumulation of consumer debt, especially if this behavior remains unchecked. Similarly, the steady accumulation of aesthetically appealing possessions may eventually lead to excessive collections and hoarding behaviors, which in turn could trap consumers in a negative spiral of materialism and reduced wellbeing (Coles et al., 2003).

Relatedly, prior work has found that scarcity can sometimes produce maladaptive outcomes like anger and aggression (Biraglia et al., 2021; Kristofferson et al., 2017). Based on these findings, another interesting area for further investigation would be to examine whether the inability to obtain beautiful products (e.g., due to stockouts or limited editions) could generate avoidance emotions like annoyance, thus in turn reducing acquisition motivation. In short, future work could provide important insights into this underexplored aspect of aesthetics by identifying situations wherein the pursuit of beauty generates unintended negative consequences.

**Conclusion** Our research examines how the scarcity inherent in aesthetics mobilizes acquisition effort while revealing the psychological mechanisms that account for this phenomenon. We find that consumers willingly expend more effort to acquire beautiful products because of the pride they expect to experience from owning such possessions, as well as the instantaneous desire for beauty that motivates their acquisition. In closing, our work may help explain why consumers are willing to go to such great lengths to acquire beautiful products, even if doing so involves expending significant effort. The scarcity of beauty is indeed motivating.

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## Declarations

**Conflicts of interest** The authors declare that they have no conflict of interest.

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**WEB APPENDICES**

The scarcity of beauty: Why product aesthetics mobilize consumer acquisition effort

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**Web appendix A:  
Relationship between aesthetic appeal and perceived scarcity**

<b>Correlation coefficients between aesthetic appeal and scarcity</b>	
<b>Coffee Maker</b>	$r = .43, p < .001$
<b>Smartwatch</b>	$r = .34, p < .001$
<b>Photographic Print</b>	$r = .26, p < .001$

**Web appendix B:  
Aesthetic appeal pretests for stimuli\***

	<b>N</b>	<b>Higher Aesthetic</b>	<b>Lower Aesthetic</b>	<b>Comparison</b>	<b><i>r</i></b>
<b>Coffee Maker (Studies 1C, 3)</b>	100	6.18 (1.03)	4.55 (1.49)	$t(98) = -6.37;$ $p < .0001$	$r = .94$
<b>Smartwatch (Study 2)</b>	123	5.24 (1.42)	4.30 (1.75)	$t(122) = 6.43;$ $p < .0001$	Single-item
<b>Photographic Print (Studies 4, 5A, 5B)</b>	100	5.76 (1.27)	4.98 (1.12)	$t(98) = -3.26;$ $p = .0015$	$r = .86$

Note. Standard deviations are in parentheses.

\*For the coffee maker and photographic print stimuli, participants were asked to rate the product, in two separate between-subjects pretests, based on how aesthetically pleasing and good looking it was (1 = not at all, 7 = extremely; adapted from Townsend, 2017), which formed our aesthetic appeal index. For the smartwatch stimuli, participants were asked to rate the smartwatches, in a within-subjects pretest, based on how aesthetically appealing they found the product (1 = not at all appealing, 7 = very appealing) and how novel the smartwatch's design was (1 = not at all novel, 7 = very novel).

## Web appendix C: Study 1B stimuli post-test and details on machine-learning classifier

### I. Study 1B stimuli post-test

To further establish the robustness of the Neural Image Assessment ratings, we conducted a between-subjects post-test where we randomly assigned 301 CloudResearch participants to evaluate the aesthetic appeal of either the five most appealing or five least appealing paintings according to Neural Image Assessment. Specifically, participants rated each of the five paintings based on how aesthetically pleasing and good looking it was (1 = not at all, 7 = extremely; adapted from Townsend, 2017), which formed our aesthetic appeal index ( $\alpha = .94$ ). Subsequently, participants rated each painting based on how authentic it was (1 = not at all, 7 = extremely). Results confirmed that the five most appealing paintings were more aesthetically appealing than the five least appealing paintings ( $M_{\text{top } 5} = 4.75$ ,  $SD = 1.21$  vs.  $M_{\text{bottom } 5} = 4.20$ ,  $SD = 1.36$ ;  $t(299) = 3.74$ ,  $p = .0002$ ), further attesting to the reliability of the machine learning ratings. Further, the five most appealing paintings were considered more authentic than the five least appealing paintings ( $M_{\text{top } 5} = 5.30$ ,  $SD = 1.13$  vs.  $M_{\text{bottom } 5} = 4.97$ ,  $SD = 1.30$ ;  $t(299) = 2.35$ ,  $p = .0194$ ).

### II. Details on machine-learning classifier

We conducted a regression analysis on the price data with aesthetic ratings (i.e., Neural Image Assessment ratings) as the predictor variable and painting size, sale date, and sale time as control variables. Consistent with our predictions, results revealed a significant effect of aesthetic appeal, such that consumers invested more financial effort to acquire paintings with higher aesthetic appeal, controlling for painting size, sale date, and sale time ( $b = 12.46$ ,  $SE = 3.02$ ,  $t(2048) = 4.13$ ,  $p < .0001$ ). Results also revealed significant effects of painting size and sale date on sale price, such that larger ( $b = .12$ ,  $SE = .01$ ,  $t(2048) = 9.40$ ,  $p < .0001$ ) and more recent paintings ( $b = .37$ ,  $SE = .05$ ,  $t(2048) = 7.81$ ,  $p < .0001$ ) sold for larger amounts of money. There was no significant effect of sale time ( $b = .00$ ,  $SE = .00$ ,  $t(2048) = .83$ ,  $p = .4045$ ).

## **Web appendix D: Study 1C Facebook ad specifications**

### Create A/B Test:

- Variable: Creative

### Audience Details:

- Zone: USA
- Age: 18-65+
- People who match interests: Coffeemaker or coffee
- Detail targeting: Off

### Placements:

- Automatic placement

### Optimization & Delivery:

- Optimization for ad delivery: Link clicks
- Cost-control: None
- When researcher gets charged: Impression
- Delivery type: Standard

### Campaign Details:

- Buying type: Auction
- Objective: Traffic
- Lifetime budget: \$264, \$132 per ad
- Estimated test power: 87%
- Split: Even split
- Duration: 2 days
- Bid: Lowest cost

### Creative Features:

- Single image
- Call for action: Learn More

Note. Each ad generated several user comments (twelve in total) that we a-priori decided to delete shortly after they appeared with the help of Research Assistants.

## Web appendix E: Study stimuli

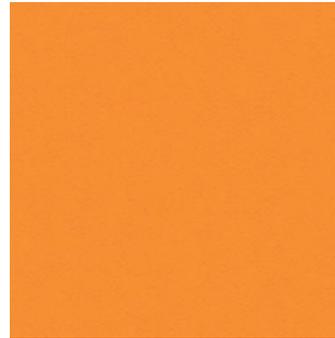
### Study 1A:

Stimuli were self-selected by participants and are available upon request. Sample images:

Aesthetic Condition



Control Condition



### Study 1B:

Downloaded product images from eBay are available upon request.

### Study 1C:

#### Higher Aesthetic Condition

 **Coffee Gear**  
Sponsored ·  ...

The coffee maker you've been waiting for.



COFFEEGEAR.ORG  
**The Ultimate Coffee Experience** LEARN MORE

 Like  Comment  Share

#### Lower Aesthetic Condition

 **Coffee Gear**  
Sponsored ·  ...

The coffee maker you've been waiting for.



COFFEEGEAR.ORG  
**The Ultimate Coffee Experience** LEARN MORE

 Like  Comment  Share

### Study 2:

#### Higher Aesthetic Condition



#### Lower Aesthetic Condition



**Study 3:**

Higher Aesthetic Condition

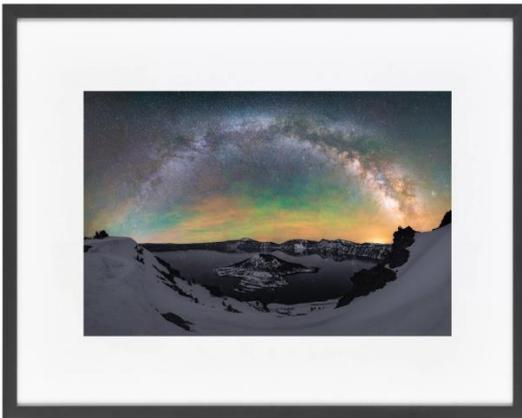


Lower Aesthetic Condition



**Studies 4 and 5A:**

Higher Aesthetic Condition



Lower Aesthetic Condition



**Study 5B:**

Higher Aesthetic, Control Condition



Lower Aesthetic, Control Condition



Higher Aesthetic, Contamination Condition



**Before**



**After**

Lower Aesthetic, Contamination Condition



**Before**



**After**

## Web appendix F: Study measures and manipulation checks

### Centrality of visual product aesthetics (Study 2)

(1 = strongly disagree, 7 = strongly agree; adapted from Bloch, Brunel, & Arnold, 2003)

1. Owning products that have superior designs makes me feel good about myself.
2. I enjoy seeing displays of products that have superior designs.
3. A product's design is a source of pleasure for me.
4. Beautiful product designs make our world a better place to live.
5. Being able to see subtle differences in product designs is one skill that I have developed over time.
6. I see things in a product's design that other people tend to pass over.
7. I have the ability to imagine how a product will fit in with designs of other things I already own.
8. I have a pretty good idea of what makes one product look better than its competitors.
9. Sometimes the way a product looks seems to reach out and grab me.
10. If a product's design really "speaks" to me, I feel that I must buy it.
11. When I see a product that has a really great design, I feel a strong urge to buy it.

### Quantity manipulation check (Study 3)

(1 = very scarce, 7 = very abundant; adapted from Kristofferson et al., 2017)

How would you describe the store's coffee maker quantity?

A 2 (aesthetics)  $\times$  2 (quantity) ANOVA on the quantity manipulation check revealed a significant main effect of aesthetics ( $F(1, 1,696) = 14.65, p = .0001, \eta^2 = .009; M_{\text{higher aesthetic}} = 4.03, SD = 2.45$  vs.  $M_{\text{lower aesthetic}} = 4.29, SD = 2.31$ ), and importantly, a significant main effect of scarcity ( $F(1, 1,696) = 3,324.28, p < .0001, \eta^2 = .662; M_{\text{scarce}} = 2.23, SD = 1.50$  vs.  $M_{\text{abundant}} = 6.10, SD = 1.28$ ). The two-way interaction was not significant ( $p = .3070$ ). Overall, these results verify the effectiveness of our quantity manipulation.

### Quantity attention check (Study 3)

(1 = Only 3, 2 = More than 3,000, 3 = I am not sure)

How many units of the coffee maker were available to customers?

A total of 112 participants failed the attention check measure (73 in the scarcity condition, 33 in the abundant condition, 6 who did not complete the attention check measure) and were excluded from further analyses based on our predetermined data collection plan, yielding a final sample of 1,700 participants. Of note, the pattern and significance of the results remain the same when we retained the 112 participants who failed this attention check measure.

### Aesthetics manipulation check (Study 3)

(1 = Not at All, 7 = Extremely; adapted from Townsend, 2017)

Please rate the coffee maker you encountered along the following dimensions:

Aesthetically pleasing

Good looking

A 2 (aesthetics)  $\times$  2 (scarcity) ANOVA on the aesthetics manipulation check revealed a significant main effect of aesthetics ( $F(1, 1,696) = 399.66, p < .0001, \eta^2 = .191$ ;  $M_{\text{higher aesthetic}} = 5.74, SD = 1.34$  vs.  $M_{\text{lower aesthetic}} = 4.40, SD = 1.43$ ), which was qualified by a marginal two-way interaction ( $F(1, 1,696) = 3.03, p = .0819, \eta^2 = .002$ ). While the higher (vs. lower) aesthetic coffee maker was rated as more aesthetically appealing in the scarce condition ( $M_{\text{scarce, higher}} = 5.84, SD = 1.25$  vs.  $M_{\text{scarce, lower}} = 4.38, SD = 1.39$ ;  $F(1, 1,696) = 229.95, p < .0001, \eta^2 = .119$ ), this difference became relatively smaller, although still significant, in the abundant condition ( $M_{\text{abundant, higher}} = 5.65, SD = 1.41$  vs.  $M_{\text{abundant, lower}} = 4.42, SD = 1.47$ ;  $F(1, 1,696) = 171.16, p < .0001, \eta^2 = .092$ ).

### Consumption context manipulation check (Study 5A)

(1 = definitely for public consumption, 7 = definitely for private consumption)

Please think back to the scenario. To what extent were the photographic prints meant for public or private consumption?

A one-way ANOVA on the context manipulation check revealed a significant main effect of consumption context ( $F(1, 253) = 176.43, p < .0001, \eta^2 = .411$ ;  $M_{\text{public}} = 3.21, SD = 1.98$  vs.  $M_{\text{private}} = 6.16, SD = 1.53$ ), such that participants in the public (vs. private) condition were more likely to think that the photographic print was meant for public consumption, thereby verifying the effectiveness of our consumption context manipulation.

### Contamination manipulation check (Study 5B)

(1 = strongly disagree, 7 = strongly agree)

The photographic print accidentally had paint splashed on it.

A 2 (aesthetics)  $\times$  2 (contamination) ANOVA on the contamination manipulation check revealed significant main effects of aesthetics ( $F(1, 1,218) = 14.94, p = .0001, \eta^2 = .012$ ;  $M_{\text{higher aesthetic}} = 4.25, SD = 2.74$  vs.  $M_{\text{lower aesthetic}} = 4.05, SD = 2.83$ ) and contamination ( $F(1, 1,218) = 9870.83, p < .0001, \eta^2 = .890$ ;  $M_{\text{contamination}} = 6.78, SD = .73$  vs.  $M_{\text{control}} = 1.52, SD = 1.10$ ), which were qualified by an aesthetics  $\times$  contamination interaction ( $F(1, 1,218) = 7.67, p = .0057, \eta^2 = .006$ ). Simple effects analysis revealed that participants were more likely to think that the higher aesthetic print was contaminated in the contamination (vs. control) condition ( $M_{\text{contamination, higher}} = 6.81, SD = .65$  vs.  $M_{\text{control, higher}} = 1.70, SD = 1.23$ ;  $F(1, 1,220) = 4648.92, p < .0001, \eta^2 = .792$ ), an effect that was even more pronounced for the lower aesthetic print ( $M_{\text{contamination, lower}} = 6.75, SD = .80$  vs.  $M_{\text{control, lower}} = 1.35, SD = .91$ ;  $F(1, 1,220) = 5231.48, p < .0001, \eta^2 = .811$ ). Overall, these results verify the effectiveness of our contamination manipulation.