RUNNING HEAD: VISUAL AESTHETICS AND BRAND PREMIUMNESS

How aesthetic features convey the concept of brand premiumness

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Abstract

When do aesthetic properties convey the concept of premiumness? Is symmetry tied to the perception of premiumness due to symmetry's evolutionary association to quality, an association not present with other aesthetic features like curvature? Usually, symmetry and curvature are preferred features. However, preference itself may not suffice to evoke premiumness. With this in mind, we predicted that symmetry (vs. asymmetry) and high (vs. low) product quality would both increase the perception of premiumness of a product while curvature (curved vs. angular) would only do so when it aligned with product quality. We conducted two preliminary exploratory experiments and four pre-registered experiments in which we manipulated product quality, symmetry, and curvature of product packaging and measured preference and premiumness perception. We conducted four additional experiments using a different product category to assess the generalizability of our results. We found that while both symmetry and curvature affect preference, only symmetry affects premiumness perception. Importantly, our results indicate that the extent to which aesthetic features convey brand premiumness can be product-specific. We suggest a theoretical model on when visual aesthetic properties convey premiumness. Overall, our study informs how subtle aesthetic elements play a role in value perception, something which firms can capitalize on.

Key Words: Symmetry, curvature, aesthetics, premiumness, multisensory marketing

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As competition amongst markets grows, marketers must consistently ask themselves how to differentiate their products against their competitors'. This question is highly relevant in the premium or luxury market in particular, a market that increasingly faces competition (D'Arpizio,Levanto, Prete, Del Fabro, & de Montgolfier, 2019; Ko, Costello, & Taylor, 2019; Okonkwo, 2007).

Various researchers have attempted to characterize luxurious products and brands as well as distinguish between the concepts of premium and luxury (Miller & Mills, 2012). While there is some variation between what people define as luxury and premium in research and practice, it has been argued that luxury products are exclusive and expensive while premium products involve quality and price variations of commodity goods (Godin, 2009; Velasco & Spence, 2019). This is consistent with the Oxford Dictionary's definition of premium: "relating to or denoting a commodity of superior quality and therefore a higher price" (see also Lyons & Wien, 2018). Despite the subtle differences, luxury goods and premium goods are very similar: both are multidimensional and can be characterized in terms of price and quality (Wiedmann, Hennigs, & Siebels, 2007). Thus, in the present research, we adopted their overlapping elements, based on Ko and colleagues' (2019) multidimensional depiction of luxury perception (e.g., quality, authenticity, and willingness to pay a higher price), to characterize premiumness perception (see also Almiron et al., 2021, for a similar approach)[1]. It is worth noting, though, that consumers are not always looking for premium goods. Instead, there are also instances in which consumers may be willing to pay for lower-quality and/or lower-price options (Steenkamp et al., 2010). For

[1] There are certain dimensions of luxury perception such as "prestigious image", "ability to inspire a deep connection", and "scarcity", which do not apply to premiumness, neither from an academic (see Quelch, 1987, for an early reference; see also Sjostrom, Corsi, & Lockshin, 2016) nor a practice perspective (e.g., Campaign, 2008; Godin, 2009), and thus, we only kept those attributes that overlapped between the concepts, namely, authenticity, quality, and price.

example, aspects like flavour or convenience may be more valuable to certain consumer groups and/or in certain contexts (e.g., Betancur et al., 2020). In this study, however, we focus on premium brands.

How can premium brands differentiate their products from their competitors? Undoubtedly, when it comes to branding, vision is key (Crilly, Moultrie, & Clarkson, 2004). Different visual features are critical when it comes to conveying different brand attributes, including premiumness (Velasco & Spence, 2019). For example, both bold and expanded fonts as well as the colour black convey refinedness, soberness, excellence, and higher price of the product (Ampuero & Vila, 2006). Similarly, products in tall, slender packages are more likely to be perceived as belonging to a brand of high status (Chen, Pang, Koo, & Patrick, in press). Moreover, typically preferred visual aesthetic features, such as symmetry and curvature have been identified to be related to premiumness (Ampuero & Vila, 2006; Orth & Malkewitz, 2008). As opposed to more high-level attributes of marketing stimuli (e.g., images of objects), aesthetic features such as symmetry and curvature, which are not specific to a single object or meaning, offer subtler means to convey brand attributes.

The careful selection of aesthetic features can aide in communicating a brand's message. For example, in a series of experiments, Bajaj and Bond (2018) showed that brand excitement was significantly related to the level of symmetry of a brand's logo, and brands with logos that were less symmetrical were perceived as more exciting (see also Bettels & Wiedmann, 2019; Luffarelli, Stamatogiannakis, & Yang, 2019). As Bajaj and Bond claim, their observations correspond with what Hagtvedt and Patrick (2008) called the "spillover effect". The spillover effect occurs when associations of sensory elements are assimilated into the evaluation of a product. In other words, low-level visual features could convey attributes across meaning

domains, explaining why aesthetic features in packaging could convey the premiumness of a product.

However, previous research has identified that only certain types of aesthetic features are associated with premiumness perception. Ampuero and Vila (2006) aimed to understand the variations in consumer perception with different changes in product packaging. They manipulated graphic variables such as colour, typography, and shapes in product packaging and tested consumers' association to different positioning strategies. Regarding shapes, they found that non-selective products, characterized as those with average price points, tended to be associated with circles, curves, and wavy outlines. However, high price products appeared to be associated with straight outlines and symmetrical compositions. Their results suggest that particular graphical elements, in this case curvature and symmetry, are associated to different positioning strategies. However, they do not provide possible reasoning behind these associations.

In the present study, we focus on understanding the circumstances under which visual aesthetic properties convey the concept of premiumness. We do so by looking at symmetry and curvature, two instances of aesthetic features which can influence consumer preferences but may differentially affect premiumness given their differing connotations as suggested by Ampuero and Vila's (2006) results. In order to understand the discrepancies between symmetry and curvature and their potential association to premium goods in Ampuero and Vila's (2006) results, it is important to consider the research behind symmetry and curvature and what defines them as aesthetic features. As we will see, symmetry, as opposed to curvature, is tied with quality and thus can potentially signal the concept of premium. An overview of such research is presented below.

Symmetry

Even though the definition of symmetry differs across fields, it is generally believed that an object is symmetrical if "there is at least one symmetry axis that splits the object into identical but mirror-inverted halves" (Treder, 2010, pg. 1512). It is worth noting that this definition describes reflectional (also referred to as bilateral) symmetry, and different types of symmetry such as rotational symmetry and transitional symmetry also exist (Treder, 2010; Turoman, Velasco, Chen, Huang, & Spence, 2018). Given the presence of text in many logos and packaging, achieving this level of symmetry is not always possible or desirable. Therefore, in this case, we will define an object as symmetrical if both its visual and textual elements are equally arranged along a central, vertical axis. In the context of design, this is also known as bilateral symmetrical balance (Jirousek, 1995). Bilateral symmetry is abundant both in nature and artificially: from microscopic crystals, humans faces, and galaxies, to architecture, art, and objects of day to day use such as tables and chairs (Treder, 2010).

Research on symmetry perception has shown that symmetry can be recognized very quickly and detected even at a very young age (Bornstein, Ferdinandsen, & Gross, 1981; Tyler, 2001). Nevertheless, an increased interest in symmetry research comes from the consistent finding that symmetry is preferred over asymmetry in domains ranging from human faces to visual patterns (Shepherd & Bar, 2011). Furthermore, Tinio and Leder (2009) concluded that the effect of symmetry on aesthetic judgement is robust and remains even when varying participant groups, testing contexts, and stimuli (though see Gartus, Völker, & Leder, 2020; Leder et al., 2019). Additional research shows that symmetry is preferred across cultures, genders, and age groups to the extent that some have considered symmetry one of the universal aesthetic variables

(Aleem, Pombo, Correa-Herran, & Grzywacz, 2019; Bode, Helmy, & Bertamini, 2017; Little, Apicella & Marlowe, 2007).

Importantly, however, research on the effect of symmetry in premiumness or luxury branding is not necessarily clear. As mentioned, preference does not necessarily lead to premiumness perception, though symmetry, as it also signals quality, may be a special feature to consider in this context.

Curvature

Due to its prevalence in art and its common association with harmony and pleasantness, curvature has a strong presence in aesthetics research (Gómez-Puerto, Munar, & Nadal, 2016). The Merriam-Webster dictionary defines curvature as "a measure or amount of curving", more specifically, "the rate of change of the angle through which the tangent to a curve turns in moving along the curve" (https://www.merriam-webster.com/dictionary/curvature). Generally speaking, curvature in aesthetics is measured by the level of angularity of a stimulus. This is usually manipulated in the contours of objects or shapes. Researchers have suggested that curved contours are processed more quickly and efficiently than angular contours (Bertamini, Palumbo, & Redies, 2019). Though Corradi and colleagues (2019) found that presentation times have an effect on curvature preference, ample research converges into the idea that curved contours of a stimulus are preferred over those with sharp contours (see Gómez-Puerto et al., 2016, for a review). This preference has been observed across cultures and ages as well as in primates (Bar & Neta, 2006; Gómez-Puerto et al., 2016, 2018; Palumbo, Ruta, & Bertamini, 2015; Quinn, Brown, & Streppa, 1997).

Symmetry and Curvature as Aesthetic Features

Different theories have emerged in attempt to explain preference for symmetry and curvature, one of which is the processing fluency theory (see Palmer et al., 2013, and Gómez-Puerto et al., 2016, for reviews on preference for symmetry and curvature respectively; Reber, Schwarz, & Winkielman, 2004). The processing fluency theory claims that the easier it is for perceiver to process a stimulus, the more hedonic value it has. In other words, stimuli that are more fluent are perceived more positively than those with less fluency (Aleem et al., 2019). In accordance with the processing fluency theory, symmetry's and curvature's aesthetic values originate from their ease of processing. Various theories seek to explain the reason behind the ease of symmetry processing. The mere-exposure effect suggests that constant exposure to symmetry results in increased fluency and therefore in increased liking (Bornstein, 1989; Zajonc, 1968). Consequently, symmetry's high prevalence in nature and elsewhere would explain its aesthetic value. Alternatively, symmetry's ease of processing is commonly credited to evolutionary psychology. A common suggestion is that symmetry is associated with phenotypic and genotypic quality, and the recognition of symmetry is therefore essential for survival (Møller & Thornhill, 1998). Similarly, many of the explanations for why curvature can be easily processed also have evolutionary roots. Sharp contours tend to correspond with harm or threat while curved ones do not, explaining the preference for the latter (Bar & Neta, 2006). Furthermore, researchers have claimed that v-shaped geometric features are associated with angry facial expressions while rounded shapes are associated with happy ones (Aronoff, Woike, & Hyman, 1992; cf. Gómez-Puerto et al., 2016). Even though not necessarily associated with approach and avoidance behaviour, research has shown that curvature is implicitly associated with approach-related words such as "safe" while angularity is associated with avoidance-related

words such as “dangerous” (Palumbo et al., 2015; Velasco, Pathak, Woods, Corredor, & Elliot, 2020; Velasco et al., 2016a).

Based on the aforementioned research, both symmetry and curvature are preferred features and the explanation for their preference has been rooted in evolutionary psychology. However, the crucial difference between symmetry and curvature, and the possible reason why they may differ in their relationship to premiumness, is the attributes they each signal. On one hand, it is evident that curvature signals positive attributes such as safety and emotional valence (Palumbo et al., 2015; Velasco et al., 2016a). On the other hand, symmetry appears to signal quality (Grammer, Fink, Møller, & Thornhill, 2003). For example, theories suggest that in humans, asymmetry could originate from greater numbers of deleterious mutations, resulting in a lower ability to resist pathogens, lower fertility, and loss in fitness components (Manning, Scutt, & Lewis-Jones, 1998; Scheib, Gangestad, & Thornhill, 1999). In animals, evidence suggest symmetry preferences drive food and mate choices (Møller & Thornhill., 1998; Wignall, Heiling, Cheng, & Herberstein, 2006; cf. Bertamini & Makin, 2014). Biological symmetry has been associated with more offspring and fewer serious disease (Waynforth, 1998). Similarly, asymmetry in plants, petals, and leaves has been associated with developmental instability. This would explain bumblebees’ learned preference towards bilaterally symmetrical flowers (Plowright, Evans, Leung, & Collin, 2010).

Understanding what these aesthetic values signal becomes relevant when understanding their potential to signal premiumness. Since premiumness is a multidimensional construct in which quality is differentiated, symmetry (as opposed to curvature) may convey premiumness due to its association to higher quality. Moreover, since premiumness is not necessarily characterized by liking (e.g., one product may be premium yet not liked or liked and not

premium), aesthetic features themselves, theoretically-speaking, are not enough to signal premiumness. Importantly, other aesthetic features can also convey these attributes (e.g., complexity can convey quality; Spence, 2018) and symmetry and curvature can convey different attributes (e.g., asymmetry can convey excitement; Bajaj et al., 2018). Hence, different aesthetic features may also convey brand premiumness, and the association between aesthetic features and different attributes may be used to convey other brand meanings (Sundar, Cao, & Machleit, 2020).

In the present research, we tested the proposition that symmetry (as opposed to curvature) could convey premiumness through its association to quality, and asked the questions, when and how do visual aesthetic features signal brand premiumness? In order to answer the question, we designed a series of experiments where we manipulated product quality and symmetry or curvature of product packaging and measured preference and premiumness perception. By including product quality as a factor in the experiments, we were able to measure whether objective product quality had an effect on premiumness perception at different levels of our aesthetic variables. Based on the aforementioned research, we hypothesized that:

H1: High product quality would be preferred over low product quality

H2: Symmetrical stimuli would be preferred over asymmetrical stimuli

H3: Curved stimuli would be preferred over angular stimuli

To confirm our hypotheses, we would expect main effects of symmetry, curvature, and quality on preference.

In terms of premiumness perception, we predicted that

H4 : High (vs. low) product quality would increase the perception of premiumness of a product

H5: Symmetry (vs. asymmetry) would increase the perception of premiumness of a product

H6: Curvature (curved vs. angular) would only increase premiumness perception when it aligned with high quality

To confirm these hypotheses, we would expect main effects of quality and symmetry on premiumness perception as well as a significant interaction between (curvature) and product quality on premiumness perception. Figure 1 offers a visual representation of our hypotheses. With these experiments, we aimed to bridge the existent research on experimental psychology and empirical aesthetics with knowledge of consumer behaviour and brand perception, and likewise, offer practical ways in which brands could adopt these principles to differentiate their products.

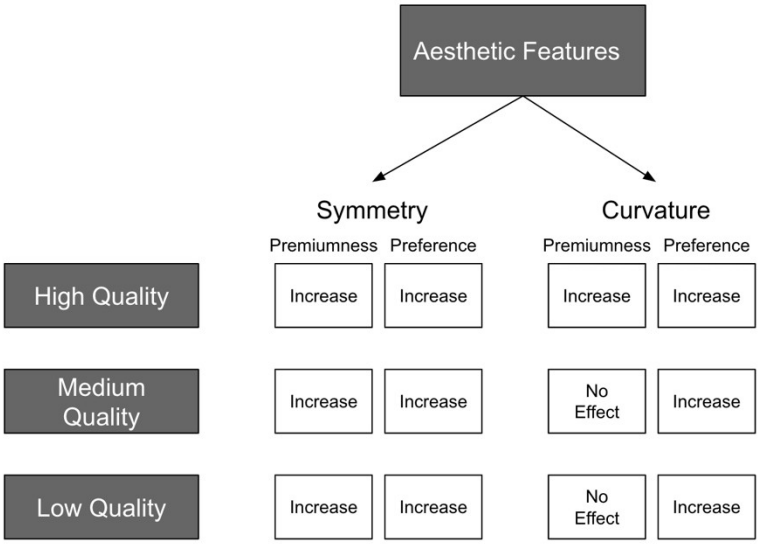

Figure 1. Visual representation of predictions for how different product quality levels and different types of aesthetic features will affect premiumness perception and preference.

Experiments 1A and 1B

We conducted Experiment 1 as a preliminary study to examine our manipulations of symmetry, curvature, and product quality and develop more specific hypotheses about the role that curvature and symmetry play in premiumness perception.

Methods

Participants

112 participants took part in Experiment 1A and 99 in Experiment 1B. Participants received a payment of £2.5 and £1.88 in exchange for participating in each of the experiments, respectively. For Experiment 1A, 76 participants identified themselves as female, and ages ranged from 18 to 74 (M= 36.5, SD = 12.2). For Experiment 1B, 67 participants identified themselves as female, 31 as male, and one preferred not to say. Their ages ranged from 18 to 55 (M = 33.22, SD = 10.29).

Experiments 1A and 1B as well as the subsequent experiments were conducted using the Qualtrics Online Survey platform (https://qualtrics.com/). Participants in all experiments were recruited using the online recruitment platform Prolific Academic (https://prolific.co/). All participants for all experiments were based in the United Kingdom and were native English speakers. Furthermore, participants were not allowed to participate in more than one of our experiments. All experiments reported here were carried out in accordance with the World Medical Association's Declaration of Helsinki.

Apparatus and Materials

Visual stimuli of four distinct orange juice packages created by a professional designer were used. All four of these packages were used in Experiment 1A and three of them were used

in Experiment 1B. We decided to use orange juice stimuli because it is a product of mass consumption that is widely known. Likewise, there is a lot of variability of both naturalness and quality in orange juice products, allowing for its manipulation. Similar products like wine, chocolate, whiskey, and coffee could have lent themselves for similar manipulations. It is worth noting that even though orange juice may not be perceived as a luxurious product, it is a commodity good that can have a high product quality and a high price, and therefore, under Godin's (2009) definition, can classify as a premium good.

For Experiment 1A, each stimulus was developed in three versions: symmetric, asymmetrical to the left, and asymmetrical to the right. Two levels of asymmetry were created in order to have a strong reference for asymmetry. For symmetrical stimuli, the textual and visual elements on the stimuli were arranged along a central, vertical axis, following the definition of symmetry identified previously. For asymmetrical stimuli, the text and visual elements were left- or right-aligned. The designer was asked to try to keep the overall harmony of the designs in both balanced and unbalanced versions. All information regarding the naturalness of the juice was removed using the GIMP image-editing software. Using the same software, the product quality was manipulated at three levels: high, medium, and low, represented by adding the labels "Freshly Squeezed, 100% orange juice", "Partly Natural, 50% orange juice", and "Orange Flavoured, 30% orange juice" respectively. The rationale behind this manipulation is that naturalness of food products has been shown to be associated with perceived quality (Binninger, 2017; Magnier, Schoormans, & Mugge, 2016). The font and size of the text was manipulated to match the previous design of the product as well as assure its legibility. This resulted in 36 distinct stimuli varying in levels of symmetry and product quality. See Figure 2A for an example of a stimulus varying in symmetry across one product quality level.

Figure 2. A. Example of the stimuli in the high-quality condition varying in symmetry level. B. Examples of the stimuli in the high-quality condition varying in curvature level ("Curved" and "Angular" from left to right).

For Experiment 1B, we used the same orange juice stimuli from Experiment 1A. However, instead of manipulating symmetry, we manipulated curvature. To keep symmetry constant, only the "symmetrical" stimuli were used. The typeface of each of the orange juice stimuli was manipulated to either a curved one or an angular one. All fonts were downloaded from DaFont (https://dafont.com/) and the images were edited using the GIMP software. Additionally, the size of the text was manipulated to assure that in each packaging, the text

occupied similar amounts of space. Appendix A displays all the fonts used. The experiment included 18 stimuli with varying levels of curvature and product quality. Figure 2B shows a sample of stimuli varying in curvature across one product quality level. All images in Experiment 1 had dimensions of 720 x 720 pixels and a resolution of 300 dpi. The complete set of the coloured stimuli can be found here: https://osf.io/5u9bz/.

We measured premiumness perception of the product using four attributes: perceived quality, authenticity, premiumness, and willingness to pay a high price (c.f., Ko et al., 2019). After observing the image of a product, participants were asked to rate the following statements on a visual analogue scale of one hundred points ranging from "Strongly Disagree" to "Strongly Agree": "This product is of high quality," "This product is authentic," "This is a premium product," and "I am willing to pay a higher price for this product than for others." The premiumness index associated with each product constituted as the average of the ratings of these items. Likewise, participants were asked to rate statements of familiarity and preference ("I am familiar with this product" and "I like this product").

In Experiment 1A, to measure the perceived symmetry of the products, participants were asked to evaluate the design of the product using two visual analogue scales, each of one hundred points. One ranged from "Completely Symmetrical" to "Completely Asymmetrical" and the other one from "Completely Balanced" to "Completely Unbalanced". In Experiment 1B, to measure the perceived curvature of the products, participants were asked to evaluate the design of the product using a visual analogue scale of one hundred points. The scale ranged from "Completely Curved" to "Completely Angular". In both Experiments 1A and 1B, participants rated the perceived naturalness of the product on another visual analogue scale ranging from "Completely Natural" to "Completely Artificial".

To get a general sense of the participants' interaction with the product category we included questions regarding the consumption habits of the product, in this case orange juice, in the survey. Participants answered questions regarding how many times a month they consume this product and what brand of orange juice they usually drink. Appendix B contains a word cloud of the orange juice brands participants in all experiments indicated. Additionally, demographic questions regarding age, gender, as well as one concerning vision were included. Lastly, an attention check question, which asked participants to select a specific answer, was added to assure participants were paying attention.

Design and Procedure

Experiment 1A followed a 3 x 3 within participants experimental design with two factors: symmetry (symmetrical vs. asymmetrical left vs. asymmetrical right) and product quality (high vs. medium vs. low). Experiment 1B followed a 2 x 3 within participant experimental design with two factors: curvature (curved vs. angular) and product quality (high vs. medium vs. low). After giving informed consent, participants were presented with demographic questions about their gender and age, as well as with a question about their vision. Then each participant saw an image of an orange juice package and was asked to answer questions about the premiumness, preference, aesthetic characteristics, and naturalness of that specific product. In Experiment 1A, participants did this for a total of 36 images with varying levels of symmetry and product quality. In Experiment 1B, participants did this for a total of 18 images varying in levels of curvature and product quality. Both the order of the images and the questions were randomized. Afterwards, participants were asked to answer questions about their orange juice consumption (see above for specific questions). On average, the participants took approximately 27 minutes to complete Experiment 1A and 14.75 minutes to complete Experiment 1B.

Data Analysis

In order to determine the reliability between the various elements in the premiumness scales, we calculated Cronbach's alpha for various of our measures using the "psych" package in R (Revelle, 2018). We determined that a Cronbach's alpha of 0.70 or higher was satisfactory to assume that measures were reliable (Spector, 1992). Furthermore, we performed a repeated measures ANOVA to determine the main effect of each of our independent variables which allowed us to assure that our manipulation worked. The analysis was executed using the 'ez' package (Lawrence, 2016) and the ezANOVA function in R. In the cases when sphericity was violated (Maunchly's Test was significant), p-values were corrected using the Huynh-Feldt correction. We preformed pairwise t-tests whenever the ANOVA results were significant, and we used the Holm-Bonferroni correction to account for multiple comparisons. All data and code for all experiments can be accessed here: https://osf.io/5u9bz/.

Results and Discussion

Experiment 1A: Symmetry

Data from 18 participants were removed from the analyses (leaving a total of n = 94, 62 females, ages 18 to 74, $M = 36.07$, $SD = 12.3$). Five participants reported not normal or corrected-to-normal vision and eight failed to answer the attention check question correctly. Additionally, data from five participants were removed as the time it took them to complete the survey was relatively shorter or longer than other participants (e.g., two standard deviations below or above the mean response time, $M = 1643$ s, $SD = 777.14$ s, $M \pm 2*SD = 88.72$ s to 3197.28 s). This may suggest that participants might not have paid enough attention to the stimuli or were distracted while participating in the experiment.

We conducted reliability tests between the four items in our premiumness scale and computed correlation coefficients between our symmetry measures (perceived symmetry and balance) and quality measures (perceived quality and naturalness). The premiumness scale as well found to be reliable, $\alpha = 0.95$. Symmetry and balance as well as perceived quality and naturalness are strongly correlated, $r = 0.79$ and $r = 0.71$, respectively. Consequently, we averaged all items in our premiumness measure into a new measure called "Premiumness Perception."

Previous literature has distinguished between symmetry and asymmetry on premiumness perception (Ampuero & Vila, 2006) and not in the effects of lateralization. Importantly, given that our hypothesis was directed at symmetry rather than lateralization, we averaged all values corresponding to stimuli that were asymmetrical to the left with those of stimuli that were asymmetrical to the right. Thus, the analyses were conducted using a 2 x 3 repeated measures ANOVA with two levels of symmetry (symmetrical vs. asymmetrical) and three levels of product quality (high vs. medium vs. low).

Table 1 shows the results of our analyses of variance. These results indicate a main effect of product quality on perceived symmetry, balance, perceived quality, and naturalness. Similarly, there was a main effect of product quality on preference and premiumness perception. Except for perceived symmetry and balance, the measure of effect size, generalized eta squared, is large. The results also indicate a main effect of symmetry for both perceived symmetry and balance with relatively large effect sizes. Furthermore, the interaction between symmetry and product quality was significant for perceived quality and naturalness as well as for premiumness perception and preference. However, in all cases, the effect size is relatively modest.

Table 1

ANOVA Results for Experiment 1A

	Factor	*F*	*p*	η_G^2
Perceived Symmetry	Symmetry	**83.396**	**<0.001**	**0.22**
	Quality	**47.862**	**<0.001***	**0.04**
	Symmetry:Quality	0.48	0.601*	<0.01
Balance	Symmetry	**65.59**	**<0.001**	**0.12**
	Quality	**61.03**	**<0.001***	**0.07**
	Symmetry:Quality	1.11	0.331	<0.01
Perceived Quality	Symmetry	2.57	0.112	<0.01
	Quality	**198.26**	**<0.001***	**0.46**
	Symmetry:Quality	**8.10**	**0.001***	**<0.01**
Naturalness	Symmetry	0.12	0.727	<0.01
	Quality	**355.96**	**<0.001***	**0.69**
	Symmetry:Quality	**9.59**	**<0.001**	**0.01**
Premiumness Perception	Symmetry	2.00	0.161	<0.01
	Quality	**194.74**	**<0.001***	**0.47**
	Symmetry:Quality	**14.27**	**<0.001***	**<0.01**
Preference	Symmetry	0.65	0.421	<0.01
	Quality	**139.33**	**<0.001***	**0.34**
	Symmetry:Quality	**7.84**	**0.001***	**<0.01**

** Corrected using the Huynh-Feldt correction*

p-values ≤ 0.001 are marked in bold

Appendix C contains both the interaction plots for all variables presented using boxplots (see Weissgerber, Milic, Winham, & Garovic, 2015) as well as a table with the means and standard deviations of every symmetry level and product quality level for each variable.

Experiment 1B: Curvature

Data from 11 participants were removed from the analyses (leaving a total of n = 88, 61 females, 26 males, one preferred not to say, ages 18 to 55, M = 32.94, SD = 10.18). Six participants failed to answer the attention check question correctly. Additionally, data from five participants were removed as the time it took them to complete the survey following the same criteria as above (M = 889.5 s, SD = 406.774 s, $M \pm 2*SD$ = 75.952s to 1703.048 s). The premiumness scale was found to be reliable, $\alpha = 0.96$, and our quality measures (perceived quality and naturalness) were strongly correlated, $r = 0.72$, replicating our previous results. Consequently, we once again averaged all items in our premiumness scale into a "Premiumness Perception."

Table 2 shows the results of our ANOVAs. These results indicate a main effect of product quality on perceived curvature, perceived quality, and naturalness. Similarly, there was a main effect of product quality on preference and premiumness perception. Aside from perceived curvature, the measure of effect size, generalized eta squared, is large. The results also indicate a main effect of curvature for perceived curvature with a modest effect size. Furthermore, the interaction between curvature and product quality was significant for perceived naturalness with a large effect size. Appendix D contains the interaction plots for all variables and a table with the mean standard deviations of every curvature and product quality level for each variable.

Table 2

ANOVA Results for Experiment 1B

	Factor	*F*	*p*	η_G^2
Perceived Curvature	Curvature	**20.777**	**<0.001**	**0.05**
	Quality	**4.494**	**0.012**	**<0.01**
	Curvature:Quality	0.252	0.777	<0.01
Perceived Quality	Curvature	0.861	0.356	<0.01
	Quality	**162.142**	**<0.001***	**0.38**
	Curvature:Quality	0.990	0.374	<0.01
Naturalness	Curvature	0.164	0.686	<0.01
	Quality	**403.243**	**<0.001***	**0.66**
	Curvature:Quality	**3.245**	**0.042**	**<0.01**
Premiumness Perception	Curvature	0.028	0.867	<0.01
	Quality	**156.326**	**<0.001***	**0.37**
	Curvature:Quality	2.191	0.115	<0.01
Preference	Curvature	0.040	0.842	<0.01
	Quality	**132.978**	**<0.001***	**0.30**
	Curvature:Quality	1.659	0.193	<0.01

** Corrected using the Huynh-Feldt correction*
p-values ≤ 0.05 are marked in bold

Discussion

Overall, the results of Experiment 1 suggest that our manipulations for symmetry, curvature, and product quality were effective. Symmetrical stimuli were considered significantly more symmetrical than asymmetrical stimuli across all product quality levels. Likewise, curvature stimuli were considered significantly more curved than angular stimuli across all product quality levels. Similarly, high-quality stimuli were considered to have significantly more perceived quality than medium-quality stimuli, which were considered to have significantly more perceived quality than low-quality stimuli in both experiments. Moreover, we confirmed the reliability of the premiumness scale as well as the reliability between perceived quality and naturalness in both experiments and the reliability of symmetry and balance in Experiment 1A.

Initially, and based on Ko et al.'s (2019) definition of premiumness, we had hypothesized that stimuli with high product quality would be perceived as more premium than stimuli with

low product quality. Similarly, previous research had indicated a preference for symmetry (e.g., Shepherd & Bar., 2011; Tinio & Leder., 2009) as well as its potential ability to convey premiumness (Ampuero & Vila, 2006). Consequently, we had hypothesized that symmetrical stimuli not only would be preferred over asymmetrical stimuli, but also would be perceived as more premium. Based on the results of Experiment 1A regarding premiumness perception and preference, which indicate these tendencies in the high- and low-quality conditions, we maintained these hypotheses. However, we considered that the effects of symmetry at different product quality levels were worth exploring.

Similarly, curvature is an aesthetic feature that is commonly preferred but does not necessarily signal quality (Bar & Neta, 2006; Silvia & Barona, 2009). The results of Experiment 1B indicate a tendency for participants to prefer curved stimuli high qualities as well as perceive these as more premium. Accordingly, we predicted that even though curvature and symmetry may be preferred, preference alone may not be enough to convey premiumness. We predicted that symmetry (vs. asymmetry) and (high vs. low) product quality would both increase the perception of premiumness of a product while curvature (curved vs. angular) would only do so when it aligned with product quality. After determining the effectiveness of the stimuli and further developing our hypotheses, we conducted Experiments 2 and 3, each with parts A and B, for a total of four experiments. The goal of Experiment 2 was to expand our understanding of the role of symmetry on both premiumness perception and preference. In contrast, Experiment 3 aimed to examine the role of curvature. Both Experiments 2 and 3 were registered using the format provided by AsPredicted.org. The registration can be found here: https://aspredicted.org/kj3da.pdf. Experiments 4 and 5 were designed to replicate and extend our findings.

Experiments 2A and 2B: Symmetry in Orange Juice Packaging

Methods

Participants

151 new participants took part in Experiment 2A and 151 in Experiment 2B. Participants received a payment of £0.80 in exchange for participating in each of the experiments. For Experiment 2A, 107 participants identified themselves as female, 42 as male, and two preferred not to say. Their ages ranged from 18 to 74 (M = 33.35, SD = 9.98). For Experiment 2B, 113 participants identified themselves as female, 37 as male, and one preferred not to say. Their ages ranged from 14 to 82 (M = 35.71, SD = 13.57). Sample size for this and all remaining experiments were estimated a prior using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007, see preregistration documents here: https://aspredicted.org/kj3da.pdf.

Design and Procedure

Experiment 2 used three of the four orange juice packaging stimuli used in Experiment 1A, resulting in a total of 27 stimuli with varying levels of symmetry and product quality. Both parts of Experiment 2 consisted of a two-alternative forced-choice task. After giving consent and answering demographic questions equivalent to those of Experiment 1, participants were shown an image of an orange juice package and were asked to select one of two choices as quickly as possible. For Experiment 2A, these were “Premium” or “Not Premium”, while for Experiment 2B, the options were “Like” or “Dislike”. The order of the images was randomized. Each participant repeated this process a total of 27 times. See Figure 3 for an example of one trial of Experiment 2A. After completing the two-alternative forced-choice task, participants were asked to answer the same questions on consumption habits as in Experiment 1. On average, it took participants 4.45 minutes to complete Experiment 2A and 4.37 minutes to complete Experiment 2B.

Figure 3. Sample trial of Experiment 2A using a stimulus in the symmetrical, high product quality condition.

Data Analysis

For both Experiment 2A and 2B, the data across asymmetry levels (asymmetrical left and asymmetrical right) was averaged resulting in a 2 x 3 factorial design resembling that of Experiment 1. Afterwards, the "nparLD" package in R (Noguchi, Gel, Brunner, & Konietschke, 2012) was used to conduct a robust ANOVA and calculate an ANOVA-type statistic. Given that the data was not continuous but rather a frequency, the traditional ANOVA was not well suited for the analyses. We conducted traditional parametric ANOVAs with our data and the results are consistent with those of the robust ANOVA. However, the robust ANOVA is a more appropriate test in this case, therefore, we report such test. Even though power estimations may work differently for robust ANOVAs, our sample sizes were estimated using the traditional ANOVA and used as a proxy here. In contrast to the traditional ANOVA, the robust ANOVA provides a more accurate estimates when the assumptions of classic parametric tests, such as normality, are violated (see Erceg-Hurn & Mirosevich, 2008). Additionally, this rank-based method is robust to

outliers. The ANOVA-type statistic, as implemented in "nparLD", provides relative treatment effect (RTE) measures as well. The RTE is a number between 0 and 1, and as Marmolejo-Ramos, Elosúa, Yamada, Hamm, and Noguchi (2013) define it, it represents the probability that a randomly chosen observation in the subset of the data tends to be larger than a randomly chosen observation in the whole data. RTE plots can therefore be thought of as analogous to interaction plots of means from parametric ANOVAs. After calculating the ANOVA-type statistics, pairwise t-tests were conducted, and p-values were corrected for multiple comparisons using the Holm-Bonferroni correction.

Results and Discussion

Experiment 2A: Premiumness

For Experiment 2A, data from 14 participants were removed from the analysis (leaving a total of n = 137, 97 females, 38 males, and two preferred not to say, ages 18 to 74, M = 33.62, SD = 10.22). Five participants reported not normal or corrected-to-normal vision and seven failed to answer the attention check question correctly. Additionally, data from two participants were removed as the time it took them to complete the survey was relatively longer than other participants (e.g., two SD above the mean response time M = 267.3 s, SD = 300 s, $M \pm 2*SD$ = 0 to 867.3 s).

For Experiment 2A, the results of the robust ANOVA indicate that while there was no main effect of symmetry on premiumness perception, $F_{ATS}(1, \infty) = 1.18$, $p = 0.277$, there was a main effect of product quality, $F_{ATS}(1.33, \infty) = 119.20$, $p < 0.001$. Furthermore, the interaction between symmetry and product quality was also significant, $F_{ATS}(1.99, \infty) = 3.80$, $p = 0.022$. The pairwise comparisons indicated that there was a significant difference in premiumness perception between high-quality and medium-quality stimuli, $p < 0.001$, as well as a significant difference

between medium- quality and low- quality stimuli, $p = 0.003$. High-quality stimuli were considered to be more premium than medium-quality stimuli, which were considered to be more premium than low-quality stimuli. Moreover, the pairwise comparisons indicated that even though the difference in premiumness perception between symmetrical and asymmetrical ratings was not significant for high and medium-quality, $p = 0.85$ in both cases, this difference was significant for low-quality, and symmetrical stimuli were considered more premium than asymmetrical ones, $p = 0.03$. Panel A of Figure 4 summarizes these results and offers a sense of the relative treatment effects (RTE).

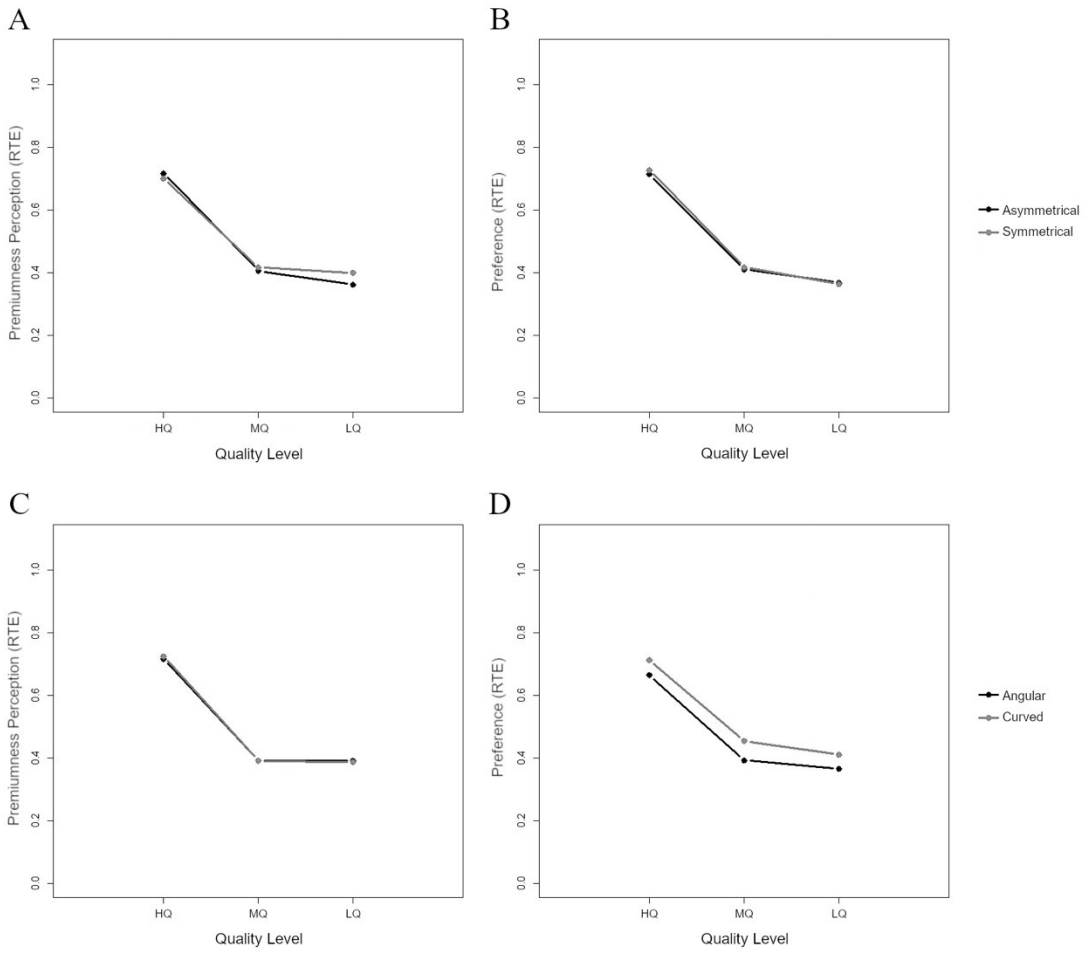

Figure 4. Results of Experiments 2 and 3. Panels A and B correspond to Experiments 2A and 2B respectively. Panels C and D correspond to Experiments 3A and 3B respectively. The x-axis

corresponds to product quality level (HQ = high quality, MQ = medium quality, LQ = low quality). The y-axis measures the relative treatment effect (RTE).

Experiment 2B: Preference

For Experiment 2B, data from 19 participants were removed from the analysis (leaving a total of n = 132, 102 females, 29 males, one preferred not to say, ages 18 to 82, M = 35.44, SD = 13.53). Two participants were younger than 18 and 13 failed to answer the attention check question correctly. Additionally, data from four participants were removed based on the time it took them to complete the survey following the same criteria as above (M = 262.6 s, SD = 157.46 s, $M + 2*SD$ = 577.52 s). Everyone that participated in Experiment 2B reported normal or corrected-to-normal vision.

For Experiment 2B, the results indicate a main effect of product quality on preference, $F_{ATS}(1.6, \infty) = 150.70$, $p < 0.001$. However, we did not find evidence of an effect of symmetry, $F_{ATS}(1, \infty) = 0.712$, $p = 0.399$, and the interaction was not significant, $F_{ATS}(1.99, \infty) = 0.99$, $p = 0.373$. The pairwise comparison indicated that high product quality was preferred significantly more than medium-quality, $p < 0.001$, which was preferred significantly more than lower product quality, $p < 0.001$. Part B of Figure 4 summarizes these results and offers a sense of the relative treatment effects (RTEs).

Discussion

Consistent with our predictions, high-quality stimuli were perceived as significantly more premium than medium-quality stimuli, which were perceived as significantly more premium than low-quality stimuli (H4). Nevertheless, while we had hypothesized that symmetrical stimuli would be perceived as more premium than asymmetrical stimuli (H5), our results only indicate that this difference is significant in the low-quality condition, perhaps due to a ceiling effect imposed by quality. We had hypothesized that high-quality stimuli would be preferred over low-

quality stimuli and symmetrical stimuli would be preferred over asymmetrical stimuli (H1 and H2). In alignment with our hypotheses, high-quality stimuli were preferred significantly more than medium-quality stimuli, which were preferred significantly more than low-quality stimuli. However, contrary to our hypothesis, the results do not indicate a preference for symmetrical stimuli across product quality conditions. We discuss these results in greater detail in the General Discussion section.

Experiments 3A and 3B: Curvature in Orange Juice Packaging

Methods

Participants

202 new participants took part in Experiment 3A and 201 in Experiment 3B. Participants received a payment of £0.80 in exchange for participating in Experiment 3A and £0.50 in exchange of participating in Experiment 3B. For Experiment 3A, 154 participants identified themselves as female and ages ranged from 18 to 77 (M = 35.86, SD = 13.04). For Experiment 3B, 141 participants identified themselves as female, 58 as male, and two preferred not to say. Their ages ranged from 18 to 75 (M = 35.49, SD = 13.56).

Design, Procedure, and Data Analysis

Experiment 3 used the same stimuli used in Experiment 1B. While the stimuli are different, Experiments 3A and 3B follow a similar design and procedure as Experiment 2A and 2B respectively (though the stimuli are different). Given that the curvature manipulation only included two levels (as opposed to three in the symmetry manipulation), Experiment 3 followed a 2 x 3 factorial design. Furthermore, Experiment 3A included an additional part to assure that our curvature manipulation was effective. In this part, we asked participants to rate the design of each of the 18 stimuli using a visual analogue scale like those used in Experiment 1 that ranged

from “Completely Curved” to “Completely Angular”. On average, it took participants 5.53 minutes to complete Experiment 3A and 3.35 minutes to complete Experiment 3B.

The part of Experiment 3A intended to verify the curvature manipulation was analysed using a repeated measures ANOVA resembling those used in Experiment 1. The remaining data analyses for Experiment 3 were carried in the same way as those of Experiment 2.

Results and Discussion

Experiment 3A: Premiumness

For Experiment 3A, data from 22 participants were removed from the analysis (leaving a total n = 180, 140 females, ages 18 to 77, M =35.19, SD = 12.6). Seven participants reported not normal or corrected-to-normal vision and 12 failed to answer the attention check question correctly. Additionally, data from three participants were removed as the time it took them to complete the survey was relatively shorter or longer than the other participants (e.g., two standard deviations below or above the mean response time, M = 331.5 s, SD = 162.65 s, $M \pm 2*SD$ = 6.2 s to 656.8 s).

The results of Experiment 3A suggest that our curvature manipulation was effective. The ANOVA indicated a main effect of curvature level on perceived curvature, $F(1, 179) = 26.502$, $p < 0.001$, $\eta_G^2 = 0.03$. Curved stimuli were rated as significantly more curved than angular stimuli across all product quality levels. Furthermore, we did not find evidence of an effect of product quality on curvature perception, $F(2, 358) = 0.33$, $p = 0.719$, and the interaction between curvature level and product quality was not significant, $F(2, 358) = 0.091$, $p = 0.909$.

The results of the robust ANOVA indicate a main effect of product quality on premiumness perception, $F_{ATS}(1.24, \infty) = 164.58$, $p < 0.001$. However, we did not find evidence of an effect of curvature on premiumness perception, $F_{ATS}(1, \infty) = 0.02$, $p = 0.879$, and the

interaction was not significant, $F_{ATS}(1.93, \infty) = 0.24$, $p = 0.776$. The pairwise comparisons indicated that stimuli with higher product quality were considered significantly more premium than stimuli with medium and low product quality, $p < 0.001$ in both cases. However, there was no difference in premiumness perception between medium and low-quality stimuli, $p = 0.78$. Panel C of Figure 4 summarizes these results and offers a sense of the RTEs.

Experiment 3B: Preference

For Experiment 3B, data from 19 participants were removed from the analysis (leaving a total of n = 182, 128 females, 52 males, two preferred not to say, ages 18 to 75, $M = 35.5$, $SD = 13.53$). Four participants reported not normal or corrected-to-normal vision and 14 failed to answer the attention check question correctly. Additionally, data from one participant was removed based on the time it took them to complete the survey following the same criteria as above ($M = 201.5$ s, $SD = 214.255$ s, $M + 2*SD = 629.96$ s).

For Experiment 3B, while the interaction between curvature and product quality was not significant, $F_{ATS}(1.93, \infty) = 0.57$, $p = 0.561$, there was a main effect of product quality, $F_{ATS}(1.36, \infty) = 130.81$, $p < 0.001$, as well as a main effect of curvature on preference, $F_{ATS}(1, \infty) = 15.70$, $p < 0.001$. The pairwise comparisons indicated that stimuli with high product quality were preferred significantly more than stimuli with medium product quality, $p < 0.001$, which were preferred significantly more than stimuli with low product quality, $p < 0.001$. Furthermore, across all product quality conditions, curved stimuli were preferred significantly more than angular stimuli, $p \leq 0.02$. Panel D of Figure 4 summarizes these results and offers a sense of the RTEs.

Discussion

Initially, we had hypothesized that high-quality stimuli would be perceived as more premium than low-quality stimuli (H4). Experiment 3A showed that there was a significant difference between high product quality and medium and low product quality, but not a significant difference between medium and low product quality. Additionally, we had hypothesized that curved stimuli would be perceived as more premium than angular stimuli, but only in the high product quality condition (H6). Contrary to our predictions, there was no difference in premiumness perception between curved and angular stimuli in any of the product quality conditions. The fact that there is no significant difference in premiumness perception between curved and angular stimuli in the high product quality condition is consistent with the possibility of a ceiling effect imposed by product quality proposed in Experiment 2. We hypothesized that high-quality stimuli would be preferred over low-quality stimuli and curved stimuli would be preferred over angular stimuli (H1 and H3). Consistent with our predictions, the results of Experiment 3B suggest that high-quality stimuli were preferred significantly more than medium-quality stimuli, which were preferred significantly more than low-quality stimuli. Similarly, curved stimuli were preferred significantly more than angular stimuli in all quality conditions.

In order to understand the generalizability of our results, we conducted Experiments 4 and 5 in which we carried out the same experiments using a different consumer good, fruit jam.

Experiments 4A and 4B: Symmetry in Jam Packaging

Methods

Participants

151 new participants took part in Experiment 4A and 158 in Experiment 4B. Participants received a payment of £0.53 in exchange for participating in each of the experiments. For Experiment 4A, 90 identified themselves as female, 60 as male, and one preferred not to say. Their ages ranged from 18 to 71 (M = 32.5, SD = 11.99). For Experiment 4B, 103 identified as female, 54 identified as male, and one preferred not to say. Their ages ranged from 18 to 70 (M = 34.12, SD = 12.29).

Apparatus and Materials

The visual stimuli used in Experiments 4A and 4B resemble those used in Experiment 1A and Experiment 2. Using the GIMP image-editing software, we created three different strawberry jam packages that varied in symmetry and product quality levels. The symmetry manipulations were done in the same way as those in Experiment 1A and Experiment 2. The product quality was manipulated at three levels similar to those used in the orange juice stimuli: “All Natural, 100% Real Fruit”, “Partly Natural, 50% Real Fruit”, and “Fruit Flavoured, 30% Real Fruit”. In total, both experiments contained 27 stimuli. Figure 5A contains an example of a strawberry jam packaging varying in symmetry across one product quality level and the complete set of the coloured stimuli can be found here: https://osf.io/5u9bz/.

A

B

Figure 5. A. Example of stimuli in the high-quality condition varying in symmetry level. B. Examples of the stimuli in the high-quality condition varying in curvature level ("Curved" and "Angular" from left to right).

We chose strawberry jam because, similar to orange juice, strawberry jam is a product of mass consumption that is widely known and has a certain level of variability in terms of both naturalness and product quality. Strawberry is one of the most popular jam flavour in the United Kingdom ("Strawberry Jam Forever", 2013), and this is confirmed by the word cloud of the types of jam participants indicated to consume in Experiments 4 and 5 (see Appendix B). While strawberry jam may not be perceived as a luxurious product, it is a commodity good that can

have a high product quality and a high price, and therefore, under Godin's (2009) definition, can classify as a premium good.

Design, Procedure, and Data Analysis

The design, procedure, and data analyses were conducted in the same ways as those for Experiment 2. On average, it took participants 3.98 minutes to complete Experiment 4A and 4.46 minutes to complete Experiment 4B.

Results and Discussion

Experiment 4A: Premiumness

For Experiment 4A, data from 12 participants were removed from the analysis (leaving a total of n = 139, 85 females, 53 males, 1 preferred not to say, ages 18 to 71, $M = 32.5$, $SD = 12.08$). Two participants reported not normal or corrected-to-normal vision and four failed to answer the attention check question correctly. Data from six participants were removed as the time it took them to complete the survey was relatively shorter or longer than the other participants (e.g., two standard deviations below or above the mean response time, $M = 239.12$ s, $SD = 111.97$ s, $M \pm 2*SD = 15.19$ to 463.05 s).

The results of the robust ANOVA indicate a main effect of product quality on premiumness perception, $F_{ATS}(1.51, \infty) = 230.06$, $p < 0.001$. However, we did not find evidence of an effect of symmetry on premiumness perception, $F_{ATS}(1, \infty) = 2.53$, $p = 0.111$, and the interaction was not significant, $F_{ATS}(1.95, \infty) = 0.50$, $p = 0.605$. The pairwise comparisons indicated that stimuli with high product quality were perceived as premium significantly more than stimuli with medium product quality, $p < 0.001$, which were perceived as premium significantly more than stimuli with low product quality, $p < 0.001$. Panel A of Figure 6 summarizes these results and offers a sense of the RTEs.

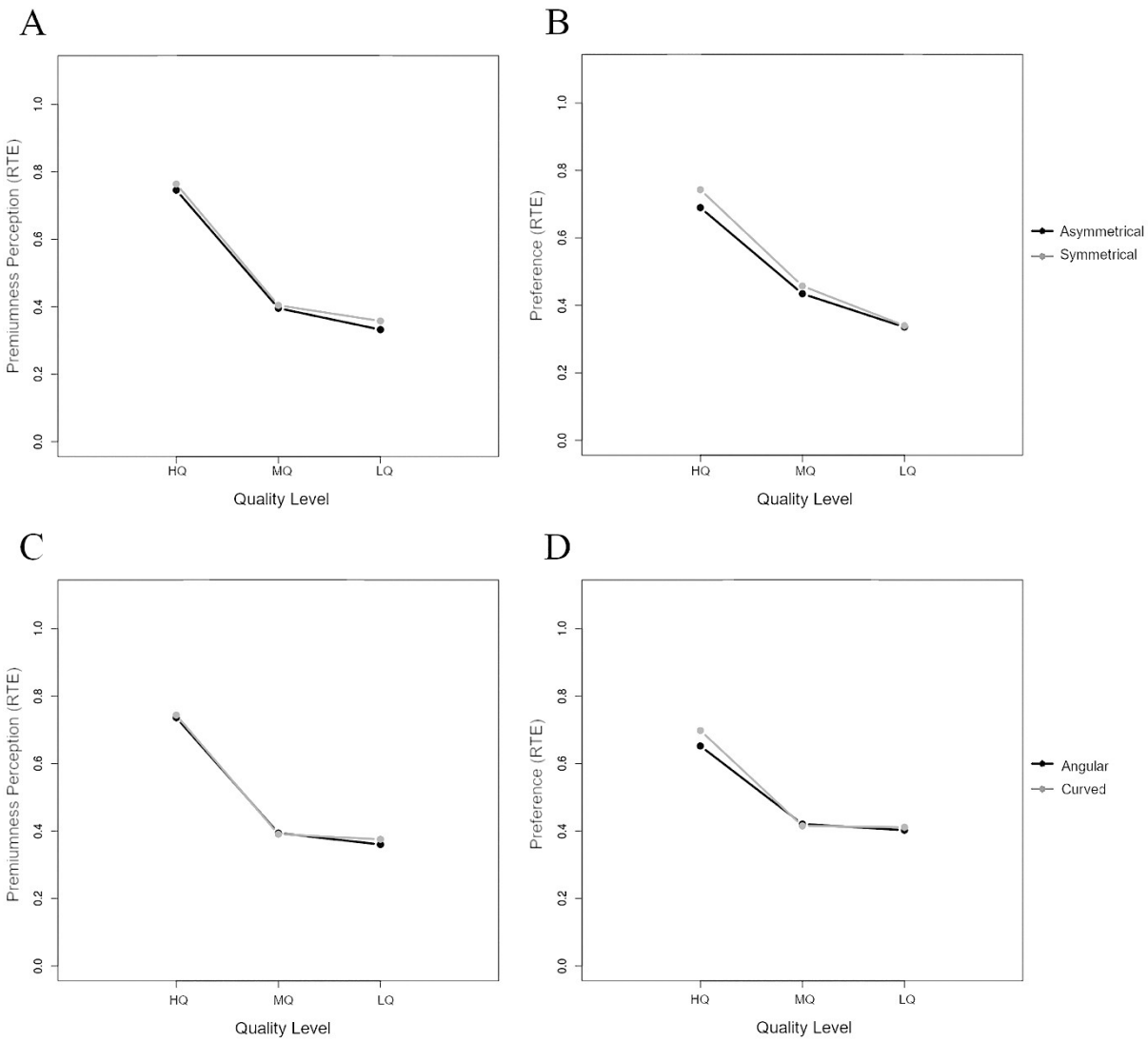

Figure 6. Results of Experiments 4 and 5. Panels A and B correspond to Experiments 4A and 4B respectively. Panels C and D correspond to Experiments 5A and 5B respectively. The x-axis corresponds to product quality level (HQ = high quality, MQ = medium quality, LQ = low quality). The y-axis measures the relative treatment effect (RTE).

Experiment 4B: Preference

For Experiment 4B, data from eight participants were removed from the analysis (leaving a total of n = 150, 97 females, 52 males, 1 preferred not to say, ages 18 to 70, M = 33.77, SD = 12.04). Four participants reported not normal or corrected-to-normal vision. Data from four

participants were removed based on the time it took them to complete the survey following the same criteria as above (M = 267.86 s, SD = 206.39 s, $M \pm 2*SD$ = 0 to 680.64 s).

The results of the robust ANOVA indicate a main effect of symmetry on preference, $F_{ATS}(1, \infty) = 7.97$, $p = 0.005$, and a main effect of product quality on preference, $F_{ATS}(1.86, \infty) = 169.38$, $p < 0.001$. The interaction between symmetry and product quality was also significant, $F_{ATS}(1.97, \infty) = 4.87$, $p = 0.008$. The pairwise comparisons indicated that symmetrical stimuli were preferred more than asymmetrical stimuli, $p < 0.001$. Similarly, the high-quality jam was preferred significantly more than medium-quality, $p < 0.001$, which was preferred significantly more than low-quality, $p < 0.001$. Lastly, even though the difference in preference was not significant between symmetrical and asymmetrical stimuli at low qualities, $p = 0.253$, symmetrical stimuli were preferred significantly more than asymmetrical stimuli at high qualities, $p < 0.001$, and medium qualities, $p = 0.050$. Panel B of Figure 6 summarizes these results and offers a sense of the RTEs.

Discussion

The main effects of product quality on premiumness and preference observed in Experiment 4 are consistent with our hypotheses and also with the results of our first experiments involving orange juice stimuli. In Experiment 4A, we observed a main effect of symmetry on both premiumness perception and preference, both which are in accordance with our original hypotheses. We did not replicate the interaction of symmetry and product quality on premiumness perception and observed an interaction of symmetry and product quality on preference, one that we did not observe in Experiment 2B. Table 3 offers the comparison of the results of Experiments 2 and 4. We attribute the discrepancies in our results to important

differences between the value contexts of orange juice and jam products, something we discuss further in our General Discussion.

Table 3

Comparing Results of Experiments 2 and 4

Independent Variables	Variable	Observed Statistical Effects	Orange Juice	Jam
Symmetry & Quality	Premiumness	Main Effect of Symmetry	No	No
		Main Effect of Quality	Yes	Yes
		Interaction	Yes	No
	Preference	Main Effect of Symmetry	No	Yes
		Main Effect of Quality	Yes	Yes
		Interaction	No	Yes

Experiments 5A and 5B: Curvature in Jam Packaging

Methods

Participants

150 participants took part in Experiment 5A and 147 in Experiment 5B. Participants received a payment of £0.53 and £0.42 in exchange for participating in each of the experiments, respectively. For Experiment 5A, 101 identified themselves as female, 48 as male, and one preferred not to say. Their ages ranged from 18 to 65 (M = 33.81, SD = 12.43). For Experiment 5B, 100 identified as female, 46 identified as male, and one preferred not to say. Their ages ranged from 18 to 69 (M = 33.19, SD = 12.61).

Apparatus and Materials

The stimuli used in Experiments 5A and 5B resemble those used in Experiment 1B and Experiment 3. The experiment included 18 stimuli varying in levels of curvature and product quality. To manipulate curvature, we manipulated the typeface of the strawberry jam stimuli to a

curved or angular one using the same fonts used with the orange juice stimuli (see Appendix A). The product quality manipulation was the same as that used in Experiment 4. See Figure 5B for an example of stimuli varying in curvature across one product quality level. The complete set of coloured stimuli can be found here: https://osf.io/5u9bz/.

Design, Procedure, and Data Analysis

With the exception of the manipulation check included in Experiment 3A, the design, procedure, and data analyses of Experiments 5A and 5B were conducted in the same ways as those for Experiment 3A and 3B respectively. On average, it took participants 3.26 minutes to complete Experiment 5A and 3.22 minutes to complete Experiment 5B.

Results and Discussion

Experiment 5A: Premiumness

For Experiment 5A, data from eight participants were removed from the analysis (leaving a total of n = 142, 96 females, 45 males, 1 preferred not to say, ages 18 to 65, $M = 34.08$, $SD = 12.53$). Six participants reported not normal or corrected-to-normal vision. Data from two participants were removed as the time it took them to complete the survey was relatively shorter or longer than the other participants (e.g., two standard deviations below or above the mean response time, $M = 195.37$ s, $SD = 96.83$ s, $M \pm 2*SD = 1.72$ to 389.02 s).

The results of the robust ANOVA indicate a main effect of product quality on premiumness perception, $F_{ATS}(1.44, \infty) = 170.63$, $p < 0.001$. However, we did not find evidence of an effect of curvature, $F_{ATS}(1, \infty) = 0.52$, $p = 0.473$, and the interaction was not significant, $F_{ATS}(1.93, \infty) = 0.45$, $p = 0.633$. The pairwise comparisons indicated that high-quality stimuli

were perceived as significantly more premium than medium-quality stimuli, $p < 0.001$, and medium-quality stimuli were perceived as significantly more premium than low-quality stimuli, $p = 0.025$. Panel C of Figure 6 summarizes these results and offers a sense of the RTEs.

Experiment 5B: Preference

For Experiment 5B, data from 14 participants were removed from the analysis (leaving a total of n = 133, 90 females, 42 males, 1 preferred not to say, ages 18 to 69, $M = 33.01$, $SD = 12.75$). Seven participants reported not normal or corrected-to-normal vision, and one participant failed to answer the attention check question correctly. Data from six participants were removed based on the time it took them to complete the survey following the same criteria as above ($M = 193.40$ s, $SD = 81.96$ s, $M \pm 2*SD = 29.49$ to 357.32 s).

The results of the robust ANOVA indicated that even though we did not find evidence of an effect of curvature on preference, $F_{ATS}(1, \infty) = 2.20$, $p = 0.138$, there was a main effect of product quality on preference, $F_{ATS}(1.54, \infty) = 94.82$, $p < 0.001$. Additionally, the interaction between curvature and product quality was significant, $F_{ATS}(1.91, \infty) = 4.93$, $p = 0.008$. The pairwise comparisons indicated that even though there was no significant difference in preference between low-quality and medium-quality stimuli, $p = 0.330$, high-quality stimuli were preferred more than both medium and low-quality stimuli, $p < 0.001$ in both cases. Lastly, the pairwise comparisons indicated that even though the difference in preference was not significant between curved and angular stimuli at medium and low qualities, $p = 1$ in both cases (p-value exceeds one after the Holm-Bonferroni correction), curved stimuli were preferred significantly more than angular stimuli at high qualities, $p < 0.007$. Panel D of Figure 6 summarizes these results and offers a sense of the RTEs.

Discussion

Experiment 5A completely replicated Experiment 3A. In accordance with our hypotheses, we did not observe a main effect of curvature on premiumness perception (H6) and we observed a main effect of product quality on premiumness perception (H4). Contrary to our hypotheses (H6) but in accordance to Experiment 3A, we did not observe a significant interaction between curvature and product quality on premiumness perception. Contrary to our hypotheses and to the results of Experiment 3B, we did not observe a main effect of curvature on preference (H3). Similarly, we observed an interaction of curvature and product quality on preference, one which we did not observe in Experiment 3B. Nevertheless, in accordance to our hypotheses and the results of Experiment 3B, we observed a main effect of product quality on preference (H1). Table 4 compares the results of Experiments 3 and 5.

Table 4

Comparing Results of Experiments 3 and 5

Independent Variables	Variable	Observed Statistical Effects	Orange Juice	Jam
Curvature & Quality	Premiumness	Main Effect of Curvature	No	No
		Main Effect of Quality	Yes	Yes
		Interaction	No	No
	Preference	Main Effect of Curvature	Yes	No
		Main Effect of Quality	Yes	Yes
		Interaction	No	Yes

Combined Analyses: Bringing All Experiments Together

Given the discrepancies between the results of Experiments 2 and 3 Experiments 4 and 5, we decided to combine our data based on the aesthetic feature manipulated and the independent variable it measured (e.g., we combined Experiments 2A with 4A as they both manipulated symmetry and measured premiumness) and run additional analyses. For the combined data, we

ran a 2 x 2 x 3 mixed robust ANOVA with product type as a between-participant variable (juice vs. jam) and symmetry or curvature (symmetrical vs. asymmetrical or curved vs. angular) and product quality (high vs. medium vs. low) as within-participant variables. Once again, we conducted the non-parametric ANOVA using the "nparLD" package in R (Noguchi et al., 2012). Post-hoc analyses were conducted using two-way non-parametric ANOVAs in the same package and Pairwise Wilcoxon Rank Sum Tests in the stats package, which is part of R. We also ran a traditional ANOVA using the "rstatix" package in R (Kassambara, 2020) which is reported in Appendix E.

Table 5 shows the results of the combined analyses. The results suggest a main effect of product quality in all our conditions. Similarly, and in accordance with our hypotheses, we observed a main effect of symmetry on premiumness perception and preference and a main effect of curvature only on preference. We also observed an interaction of product and product quality for premiumness perception, but not preference, in both symmetry and curvature manipulations. Furthermore, we observed an interaction between product quality and symmetry for preference and premiumness in the symmetry manipulation. Lastly, we observed an interaction between product type and symmetry in preference and a three-way interaction between product, product quality, and curvature in preference. With the exception of the interaction effect of symmetry and product quality on premiumness and preference, which were only marginally significant in the traditional ANOVA ($p = 0.086$ and $p = 0.115$ respectively), our results of the traditional ANOVA were consistent with those of the robust ANOVA.

Table 5

Robust ANOVA Results for Combined Experiments

Aesthetic Feature	Variable	Factor	*ATS*	*p*
Symmetry	Premiumness	Product	0.077	0.781

		Quality	**340.957**	**<0.001**
		Symmetry	**3.900**	**0.048**
		Product:Quality	**10.961**	**<0.001**
		Product:Symmetry	0.710	0.400
		Quality:Symmetry	**3.225**	**0.040**
		Product:Quality:Symmetry	0.744	0.474
	Preference	Product	0.544	0.461
		Quality	**315.713**	**<0.001**
		Symmetry	**8.665**	**0.003**
		Product:Quality	1.880	0.159
		Product:Symmetry	**4.217**	**0.040**
		Quality:Symmetry	**5.588**	**0.004**
		Product:Quality:Symmetry	1.560	0.210
Curvature	Premiumness	Product	**14.106**	**<0.001**
		Quality	**334.497**	**<0.001**
		Curvature	0.467	0.495
		Product:Quality	**4.842**	**0.018**
		Product:Curvature	0.265	0.607
		Quality:Curvature	0.347	0.701
		Product:Quality:Curvature	0.422	0.650
	Preference	Product	**4.486**	**0.034**
		Quality	**220.285**	**<0.001**
		Curvature	**15.359**	**<0.001**
		Product:Quality	0.297	0.673
		Product:Curvature	3.741	0.053
		Quality:Curvature	1.895	0.150
		Product:Quality:Curvature	**3.941**	**0.019**

p-values ≤ 0.05 are marked in bold

We were interested in looking more closely at the interactions between product type and product quality in premiumness perception for both aesthetic variables as well as those between symmetry and product quality in our symmetry experiments. Our post-hoc analyses indicated that when manipulating symmetry, the effect of product on premiumness was significant at high qualities, $p < 0.001$, and low qualities, $p = 0.018$, but not at medium qualities, $p = 0.2$. However,

when manipulating curvature, the effect of product on premiumness was significant at low qualities, $p < 0.001$, and medium qualities, $p = 0.008$, but not at high qualities, $p = 0.11$. Additionally, our post-hoc analyses indicated that when manipulating symmetry, the effect of symmetry on premiumness was significant at low product quality, $p = 0.009$, but not at high quality, $p = 0.91$, or medium quality, $p = 0.65$. Alternatively, the effect of symmetry on preference was significant at high product quality, $p = 0.001$, but not at medium product quality, $p = 0.14$, but not at low product quality, $p = 0.53$.

Overall, by taking the big picture perspective, we observe robust evidence in support of the effect of symmetry on premiumness perception (H5). However, we do not find support in our data to indicate that curvature, regardless of whether it aligns or not with product quality, influences premiumness (H6). Moreover, we find that product quality is, as expected, a key cue for product premiumness (H4).

General Discussion

This study aimed to understand the circumstances under which different aesthetic features such as symmetry and curvature convey the concept of brand premiumness. We hypothesized that even though symmetry (vs. asymmetry) and curvature (vs. angularity) are typically preferred, preference itself was not enough to convey brand premiumness, instead, the alignment of preference with product quality was necessary. To test our hypotheses, we conducted preliminary experiments (Experiments 1A and 1B) and four subsequent experiments (Experiments 2A, 2B, 3A, and 3B) which we later aimed to replicate (Experiments 4A, 4B, 5A and 5B) using a different product category. The results of Experiment 1A and 1B indicated a main effect of product quality on premiumness perception and preference. Experiment 1A indicated an interaction of product quality and symmetry, one that was not present between

product quality and curvature in Experiment 1B. These results suggested further exploration of the effects of these aesthetic features at different product quality levels. The results of Experiments 2A and 2B indicated a main effect of product quality on premiumness perception and preference, and an interaction of symmetry and product quality on premiumness perception. When conducting the same experiments using fruit jam as stimuli, the results also suggested a main effect on product quality. However, even though we found an effect of symmetry on premiumness perception, the interaction of symmetry and product quality was not replicated in Experiment 4A. Nevertheless, we found an effect of symmetry on preference in Experiment 4B. The results of Experiments 3A and 3B indicate a main effect of product quality on premiumness perception and preference as well as a main effect of curvature on preference. While the results of Experiments 5B did not find a main effect of curvature on preference, Experiment 5A confirmed the main effect of product quality on premiumness and preference.

The analyses conducted with the combined data suggest several important findings. First, we observed that a main effect of product quality is present for both preference and premiumness across both aesthetic features (H1 and H4), reiterating the importance of quality as a key attribute in premiumness communication and product preference (e.g., Ko et al., 2019). Second, we observed a main effect of symmetry on premiumness, one that we did not observe with curvature. This is in accordance with our original hypotheses (H5) and suggests the possibility that symmetry is a unique aesthetic property when it comes to conveying the extent to which a brand is perceived as premium. Third, our combined results suggest main effects of both symmetry and curvature on preference (H2 and H3). This is in agreement with both our original hypothesis and previous literature that suggests that symmetry and curvature are preferred aesthetic features (e.g., Bar & Neta, 2006; Gómez-Puerto et al., 2016; Shepherd & Bar, 2011;

Tinio & Leder, 2009). Fourth, our combined results suggest an interaction between product type and product quality for premiumness perception (but not preference) for both symmetry and curvature. This suggests that the observed effects could be dependent on the semantic and value contexts of each product, and possibly explain the discrepancies we observed between products in the individual results associated with each experiment. Lastly, we observed an interaction of symmetry and product quality for premiumness and preference which evidenced that quality establishes different contexts for premiumness and preference. Symmetry seems to differentiate premium products at low quality, but when quality is low, preference is low regardless. As quality increases, symmetry does help to differentiate products for preference.

In every single one of our experiments, and regardless of the manipulated aesthetic feature, we observed a main effect of product quality on both preference and premiumness. Even though this findings are expected and confirm our hypotheses (H1 and H4), our results not only highlight the strength of the connection between quality and naturalness previously observed (Binninger, 2017; Magnier et al., 2016) but also suggest the importance of including specific information regarding product quality on product packaging in order to strengthen the premium appeal of a product. When simple statements such as “100% Orange Juice” or “100% Real Fruit” are included as salient elements of product packaging, consumers will be more likely to perceive the product as premium as well as prefer it.

We originally predicted that symmetry and curvature would have an effect on preference (H2 and H3). We observed these effects in our combined results and these are consistent with ample previous literature (e.g., Bar & Neta, 2006; Gómez-Puerto et al., 2016; Shepherd & Bar, 2011; Tinio & Leder, 2009). However, in the individual experiments, we did not always observe a significant effect of these aesthetic features on preference. We observed an effect of symmetry

on preference in jam packaging but not in orange juice packaging. Contrarily, we only observed an effect on curvature on preference on orange juice packaging but not jam. On one hand, even though not always significant, we did observe a tendency for participants to prefer symmetrical and curved stimuli over asymmetrical and angular stimuli (explaining our combined results). This proposes that what differs between products is the degree to which these aesthetic features influence preference. On the other hand, different factors that we did not account for in our experiment may have influenced participants' preferences. Firstly, it could be that participants like different products differently to begin with. Therefore, given the variability of the affective context, aesthetic features could have relative contributions to preference. Secondly, presentation time was not controlled between experiments, and there could have been systematic differences in the presentation times for participants that took part in the jam experiments compared to those that took part in the orange juice experiments. Previous research has shown that the duration of exposure can influence preference judgements (Hamid, 1973; cf. Bornstein, 1989). For example, Khaw, Nichols, and Freedberg (2019) found that depending on the categorizability of cubist paintings, aesthetic judgments towards these changed with presentation time, and Corradi and colleagues (2019) found a stronger preference for curved objects at short presentation times. Similarly, Leder (2001) found that in longer presentation times of van Gogh paintings, the familiarity-liking effect was no longer found, and Vaughn and Eagleman (2017) found that people rated others as significantly more attractive during shorter exposure times. (though see Harrison & Zajonc, 1970). A third factor that could have contributed to these differences in preferences could be the different roles that cross-modal correspondences of aesthetic features play in different products. For example, previous research has shown that curved typefaces are associated with sweetness (Velasco, Hyndman, & Spence, 2018) and it could be the case that

orange juice packaging with curved typefaces are preferred due to this association. Lastly, different factors like expertise and familiarity have been shown to influence aesthetic preferences (e.g., Leder et al., 2019).

Our original hypothesis was that symmetry and high product quality would both increase the perception of premiumness of a product (H4 and H5) while curvature would only do so when it aligned with product quality (H6) (see: https://aspredicted.org/kj3da.pdf). Overall, our results suggest that the alignment of preference and quality does not necessarily convey the concept of brand premiumness across all product quality levels. Initially, we had predicted that in high-quality conditions, symmetry (curvature) would make a difference, and symmetrical (curved) stimuli would be perceived as more premium than asymmetrical (angular) stimuli. We did not find evidence to support this in any of our experiments. However, with the orange juice stimuli, we found that at low product quality, symmetry could help differentiate products in terms of premiumness. This, in turns suggests, that possibly, for certain products, symmetry may boost quality perception, when the product is characterized by lower quality. Furthermore, in our combined analyses we found a main effect of symmetry in premiumness perception, one that was not present with curvature.

The absence of a main effect of curvature on premiumness perception is consistent with the idea that curvature signals valence rather than quality (Palumbo et al., 2015; Velasco et al., 2016a). However, further research should explore the role that curvature plays in conveying different brand attributes, such as safety (Ghoshal, Boatwright, & Malika, 2015; Thömmes & Hübner, 2018). One could interpret our findings on how symmetry conveys brand premiumness in two ways. Firstly, it could be that when product quality is high, there is little room for aesthetic features, which are usually more subtle than semantic ones (e.g., an image or product

claims), to make a difference in premiumness perception. This would explain why in the high-quality conditions of Experiment 2A, 3A, 4A, and 5A there was no specific difference in premiumness perception between symmetrical and asymmetrical stimuli or curved and angular stimuli. The idea that at high quality there is no room for subtle visual cues to make a difference in the premiumness perception of a product should be explored within and across categories in the premiumness continuum evaluating products, especially given the discrepancy in our results between two similar products. Similarly, it would be interesting to measure the effects of symmetry and curvature in products that rely on aesthetic properties more heavily such as fashion items (e.g., Lee, Hur, & Watkins, 2018). Secondly, it could be that symmetry is a distinct aesthetic property and its tacit association to quality is what allows it to convey the concept of brand premiumness. This explanation is consistent with previous research that suggests that symmetry signals quality (Manning et al., 1998; Scheib et al., 1999). At the practical level, these results would suggest that when product quality is not at its top, aesthetic features like symmetry, which signal quality, may help differentiate products. Indeed, our combined results suggest that, overall, there is a tendency for symmetry to communicate the extent to which a product is premium.

The discrepancies in results between orange juice and jam could be explained by the differences in value contexts between the products represented by our stimuli. To assess the value contexts of these products, we looked at their price variability on the Tesco website (https://www.tesco.com/), one of the grocery stores with the largest share in the UK (Wunsch, 2020). When looking at the price of orange juice per 100ml and the price of strawberry jam per 100g of the available products, we found that the price of strawberry jam has greater variability (M = £0.50, SD = £0.25) than orange juice (M = £0.16 , SD = £0.09). What is more, for our

curvature stimuli, our combined results suggest main effects of product on both preference and premiumness, providing further support for the idea that the value context of the products is relatively different.

Our combined results suggest a significant interaction between symmetry and product quality on premiumness perception, one that is not significant for curvature. This suggests that, for diverse products, at three quality levels, different types of aesthetic features influence premiumness perception differently. Moreover, our combined results provide strong support for the idea that, overall, symmetry has the ability to convey brand premiumness in ways that curvature cannot. Even though this study is focused on the role of symmetry and curvature on premiumness perception, other aesthetic features behave similarly, and the results could be generalizable. Figure 7 displays a model of the circumstances under which aesthetic features convey the concept of brand premiumness. In the high-quality condition, what conveys the concept of brand premiumness is the quality of the product itself (e.g., conveyed via semantic information such as claims), and there is little room for aesthetic features, regardless of whether they signal quality or not, to differentiate products in terms of premiumness. As the product quality (or in effect the naturalness) of the product becomes lower, complementing product packaging with aesthetic features which signal quality, such as symmetry, can increase premiumness perception and help differentiate some products. The extent to which aesthetic features that signal quality influence premiumness perception is dependent on the product's value context. In other words, the point at which quality becomes a boundary condition for aesthetic features to convey brand premiumness is product dependent.

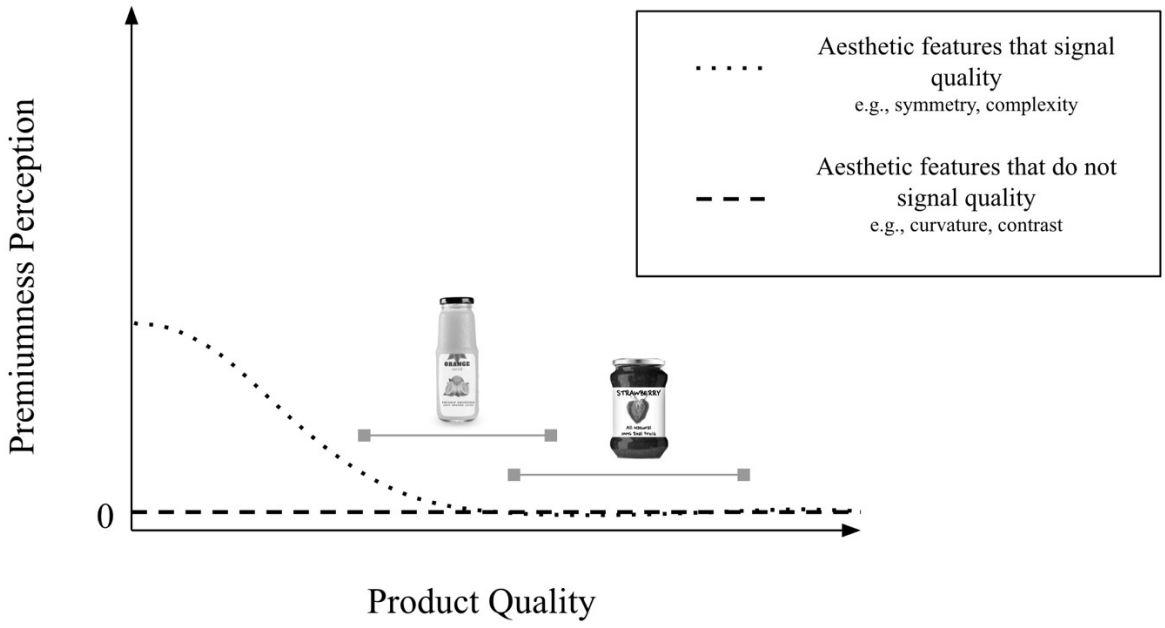

Figure 7. Model of the effect of aesthetic features on premiumness perception of products as product quality increases. The dotted and dashed lines represent the different types of aesthetic features. Different consumer goods lie along different subsections of the quality spectrum,

conveying the variability of quality as a boundary condition. In our case, orange juice lies somewhere near the intercept, where low quality orange juice is to the left of the intercept while high quality orange juice is to the right. Jam falls completely to the right of the intercept.

Furthermore, our model gives insight into the broader question of how low-level features of an object (e.g., size, colour) interact with semantic cues in driving brand impressions. In packaging, for example, semantic cues (e.g., images and text) can vary along feature dimensions such as curvature and symmetry. The results of our experiment appear to indicate that high levels of quality meaning override the effect of symmetry, whereas at low levels of quality, for some products, meaning seems to give room for symmetry to differentiate products in terms of premiumness. These findings are consistent with previous research that has found that semantic meaning overrides effects of symmetry on approach/avoidance motivation (Velasco et al., 2016a) and that low-level features and semantic information interact when conveying taste information (Velasco, Woods, Petit, Cheok, & Spence, 2016b). Broadly speaking, the model presented in Figure 7 helps to answer our initial research question and provides greater insight into how low-level features and semantic cues are diagnostic of product and brand information.

Previous research has shown that aside from symmetry, other aesthetic features can convey quality, such as complexity, which can signal quality across sensory modalities. The complexity of wine has been associated with higher quality of the wine, and restaurants with complex menus are perceived to be of higher quality (Spence, 2018). Similarly, the complexity of music is correlated with the perceived quality (North & Hargreaves, 1998). According to our model, categorizing other aesthetic features, such as contrast, size, and pitch into those which signal quality and those which do not, would offer an understanding on how these aesthetic features in the visual domain, but also across sensory modalities, could convey the concept of brand premiumness.

Limitations and Future Research

One of the limitations of this study is that the manipulations of product quality and symmetry were conceptually different. The quality of the product was manipulated while the aesthetics of the products' packaging were manipulated. This key distinction could have influenced our results and therefore, exploring what occurs when the aesthetics of the product itself (or the quality of the packaging) are manipulated could provide further insight into how aesthetic features which signal quality can convey the concept of brand premiumness. Additionally, the symmetry of packaging resembles what is typical, and previous research has shown that typicality is strongly associated to preference (e.g., Martindale, Moore, & West, 1988; Mayer & Landwehr, 2018). Moreover, previous research suggests that perceived typicality may relate to symmetry and curvature differently. Research in face perception has shown that facial symmetry is related to facial attractiveness via perceived typicality (Zheng et al., 2021). Alternatively, there is evidence to suggests that individuals report higher purchase likelihood, one of the dimensions of premiumness, for designs with curved contours regardless of design typicality (Blijlevens et al., 2012). If further research indicates that typicality modulates the relationship between curvature and preference as well as between symmetry and premiumness, then perceived typicality (as opposed to quality) may offer an alternative explanation to our results. Likewise, the off-centre design of our asymmetrical design could be displeasing or appear disorganized to some participants. In their study on food plating aesthetics, Zellner and colleagues (2011) manipulated the neatness of food presentation and measured food liking. They found a positive relationship between neatness and liking, which they suggest may be modulated by perceived quality. Understanding the relationship between neatness and quality may provide further insight into relationship between aesthetic features that do or do not signal quality and

premiumness perception. Moreover, further research may explore other possible underlying mediators or key processes of the relationships between aesthetic features and premiumness, which beyond typicality and neatness, could include measures of processing fluency (Reber et al., 2004) or construal level (Trope & Liberman, 2010).

As stated earlier, multisensory marketing is concerned with putting the human senses at the centre of the marketing experience. However, multisensory marketing is also concerned with understanding the ways in which different senses interact to enhance product experiences (Velasco & Spence, 2019). That said, this study is only focused on the ways in which visual cues can convey the concept of brand premiumness. Previous research has shown that sensory cues across other sensory modalities can convey the concept of brand premiumness as well. For example, the sound of certain car engines has been shown to convey premiumness, and firm and heavy packaging tend to be associated with excellence and authenticity (Fenko, Heiltjes, & Berg-Weitzel, 2016; Lageat, Czellar, & Laurent, 2003; cf. Velasco & Spence, 2019). Therefore, it is worth exploring if similar results are observed when manipulating aesthetic features in other sensory modalities as well as when these are combined.

To further explore the accuracy of our model, it is important to replicate the results of this study both directly (and independently) and conceptually. Given that this study only uses products in the food and drink category, results should also be replicated with different products across product categories, for example, with products with an inherent aesthetic component (e.g., clothing). Similarly, future research could test our model conceptually by manipulating other aesthetic features which signal quality. By manipulating features like the complexity of products' packaging, one can explore the possibility that aesthetic features other than symmetry can help differentiate products in the low conditions by conveying the concept of brand premiumness.

Implications

According to our model, the role that aesthetic features play in conveying the concept of brand premiumness may only happen in the low-quality condition. However, it is worth noting the distinction between a bad product and a product of low quality. In the case of our experiments, low product quality means low naturalness, and a product of low naturalness does not necessarily have to be a bad product. Marketers may want to differentiate products of low naturalness through different characteristics like flavour, for example. The product that is delivered to the consumer must be a good product that matches the brand's premiumness promise. It is not a matter of differentiating a bad product but rather having an excellent product and creating a premium experience that matches it well. Therefore, in the increasingly competitive context of premium products, carefully considering subtle aesthetic elements to product packaging can help these products stand out.

Conclusions

Here, to the best of our knowledge, we presented the first study designed to assess when and how aesthetics may convey the concept of brand premiumness as well as the first study to identify symmetry as a unique aesthetic feature when it comes to conveying the concept of premiumness. From a theoretical point of view, we link research on empirical aesthetics with research on consumer behaviour and brand perception. From a practical perspective we provide insights as to how brands may differentiate in terms of premiumness in an increasingly competitive marketplace.

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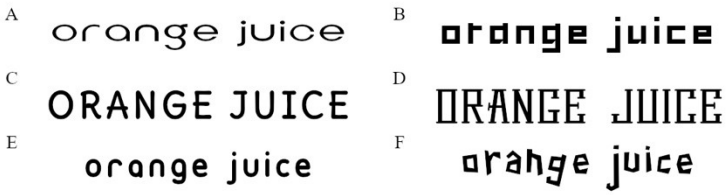
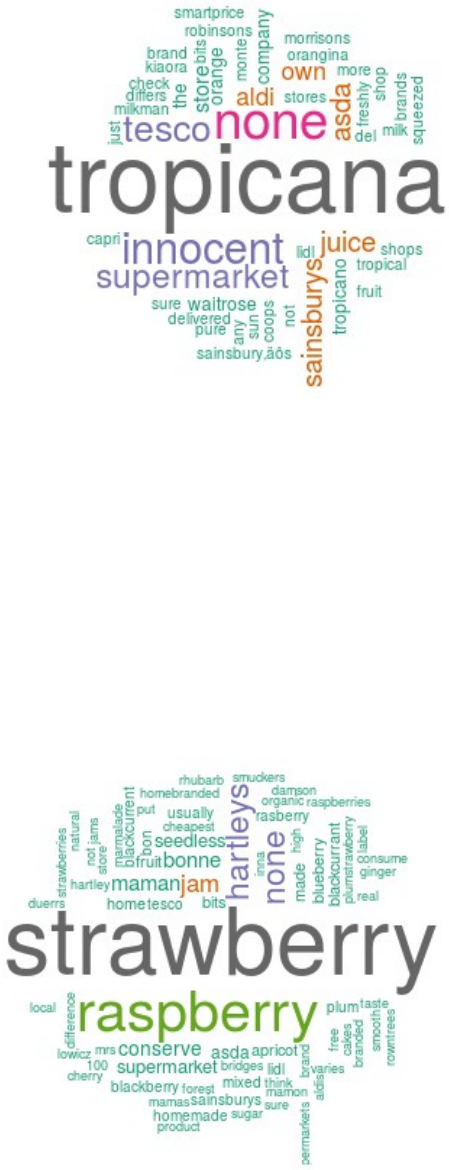
Appendix A



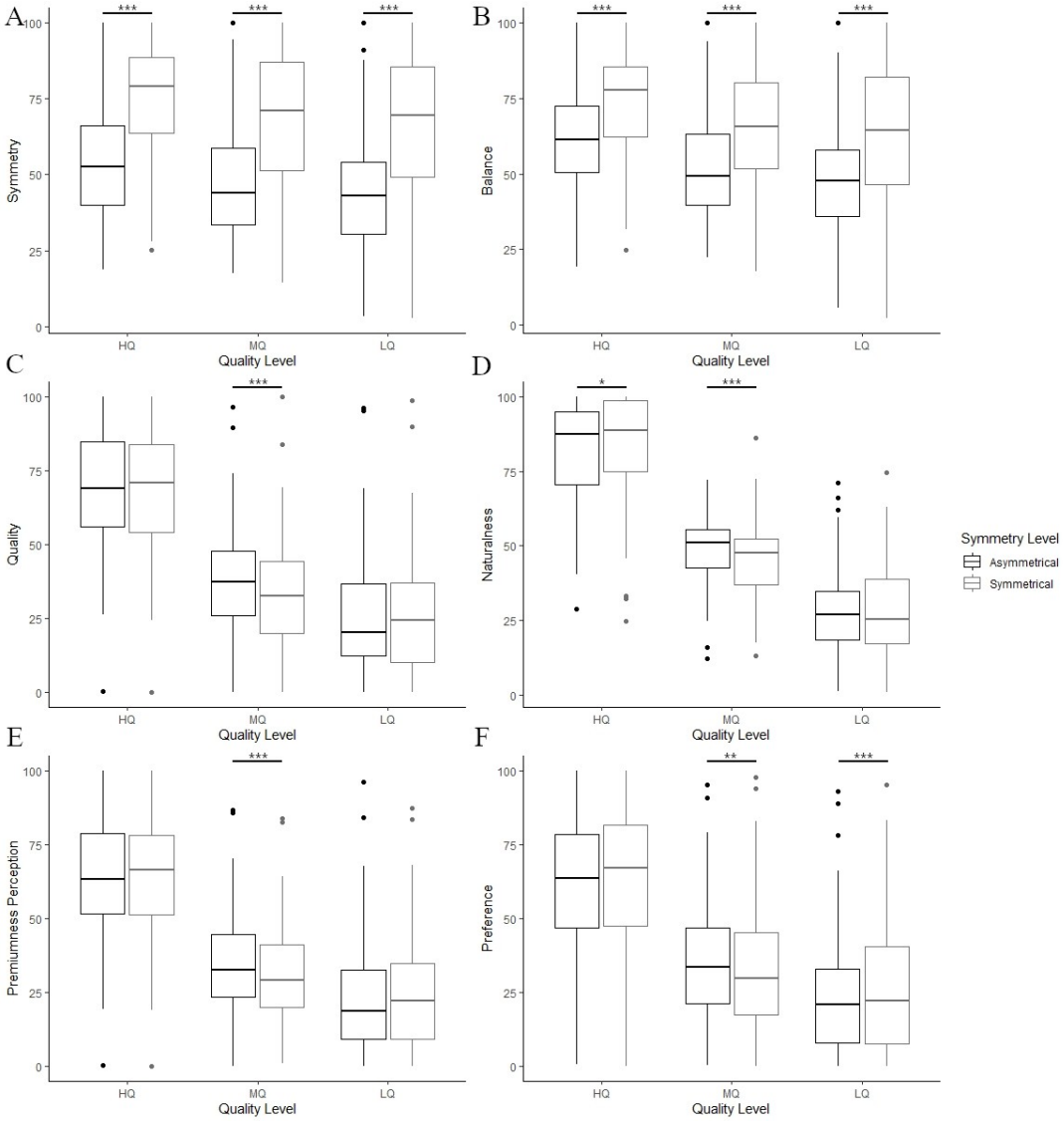
Appendix A. Fonts used on curvature stimuli. A) Topeka. B) Sadana Square. C) Delius. D) Springmarch. E) Ubuntu-Title. F) Paper Cuts 2.

Appendix B



Appendix B. Word clouds of commonly consumed orange juice brands and fruit jam types reported by participants.

Appendix C

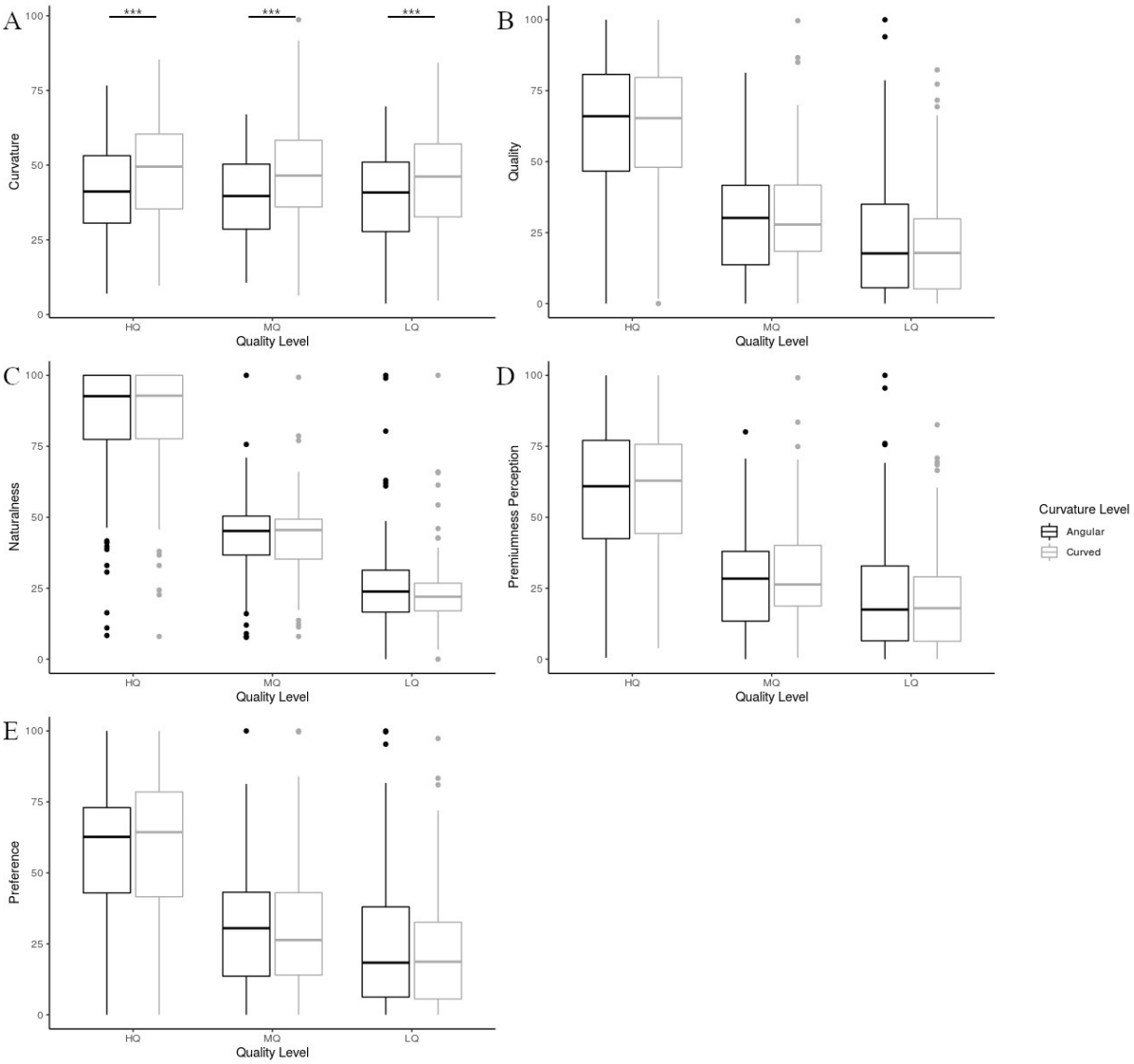


Boxplots displaying data for each variable measured in Experiment 1A. Product quality level is represented in the x-axis (HQ = high quality, MQ = medium quality, LQ = low quality). The rating for each variable is represented in the y-axis, and the colour represents symmetry level. Panels A and B show the boxplots of the ratings of perceived symmetry and balance, respectively, for all quality and symmetry levels. Panel C and D show the boxplots of perceived quality and naturalness, respectively, for all quality and symmetry levels. Panel E shows the boxplots of premiumness perception, a measure made by averaging four different measures (quality, willingness to pay a higher price, premiumness, and authenticity), for all quality and symmetry levels. Panel F shows the boxplots of the preference ratings for all quality and symmetry levels. The asterisks at the top of the boxplots indicate significance: *** for $p \leq 0.001$, ** for $p \leq 0.01$, * for $p \leq 0.05$.

Descriptive Statistics for Experiment 1A

		Product Quality Level					
		High Quality		Medium Quality		Low Quality	
Variable	Symmetry Level	*M*	*SD*	*M*	*SD*	*M*	*SD*
Symmetry	Asymmetrical	54.53	18.54	48.14	18.88	44.63	19.59
	Symmetrical	75.64	17.87	68.44	20.85	66.38	23.84
Balance	Asymmetrical	61.20	16.62	52.02	17.10	48.05	18.30
	Symmetrical	74.20	17.19	65.46	19.21	63.06	23.39
Quality	Asymmetrical	67.76	19.86	37.17	17.95	25.48	19.93
	Symmetrical	68.10	21.56	33.24	18.62	26.28	19.86
Naturalness	Asymmetrical	81.37	17.41	48.45	11.24	28.38	14.42
	Symmetrical	83.51	18.35	45.26	12.82	28.81	15.34
Premiumness Perception	Asymmetrical	63.58	19.00	34.38	16.28	23.39	18.99
	Symmetrical	64.58	20.35	30.51	17.07	24.17	18.62
Preference	Asymmetrical	60.69	23.47	34.66	19.97	24.09	20.44
	Symmetrical	62.79	25.83	31.94	21.51	26.03	21.85

Appendix D



Boxplots displaying data for each variable measured in Experiment 1B. Product quality level is represented in the x-axis (HQ = high quality, MQ = medium quality, LQ = low quality). The rating for each variable is represented in the y-axis, and the colour represents curvature level. Panels A, B, and C show the boxplots of the ratings of perceived curvature, quality, and naturalness respectively, for all quality and symmetry levels. Panel D shows the boxplots of premiumness perception, a measure made by averaging four different measures (quality, willingness to pay a higher price, premiumness, and authenticity), for all quality and symmetry levels. Panel E shows the boxplots of the preference ratings for all quality and symmetry levels. The asterisks at the top of the boxplots indicate significance: *** for $p \leq 0.001$.

Descriptive Statistics for Experiment 1B

		Product Quality Level				
		High Quality		Medium Quality		Low Q
Variable	Curvature Level	*M*	*SD*	*M*	*SD*	*M*
Curvature	Angular	41.70	15.08	39.51	13.85	38.98
	Curved	48.58	17.23	47.27	17.07	45.59
Quality	Angular	62.81	23.89	30.16	19.55	23.66
	Curved	62.06	24.60	30.82	21.19	21.83
Naturalness	Angular	83.33	22.42	43.47	15.23	26.58
	Curved	85.24	20.28	43.28	14.07	24.07
Premiumness Perception	Angular	58.46	23.72	28.28	18.01	22.69
	Curved	59.05	23.73	29.34	19.70	20.76
Preference	Angular	58.28	24.21	30.34	21.96	25.03
	Curved	59.72	25.55	31.10	22.61	23.30

Appendix E

ANOVA Results for Combined Experiments

Aesthetic Feature	Variable	Factor	*F*	*p*	η_G^2
Symmetry	Premiumness	Product	0.797	0.373	<0.01
		Quality	**342.005**	**<0.001**	**0.381**
		Symmetry	**6.327**	**0.012**	**<0.01**
		Product:Quality	**11.797**	**<0.001**	**0.021**
		Product:Symmetry	0.99	0.321	<0.01
		Quality:Symmetry	2.512	0.086	<0.01
		Product:Quality:Symmetry	1.119	0.325	<0.01
	Preference	Product	0.845	0.359	<0.01
		Quality	**324.022**	**<0.001**	**0.326**
		Symmetry	**10.204**	**0.002**	**<0.01**
		Product:Quality	1.892	0.157	<0.01
		Product:Symmetry	**4.588**	**0.033**	**<0.01**
		Quality:Symmetry	2.172	0.115	<0.01
		Product:Quality:Symmetry	1.029	0.358	<0.01
Curvature	Premiumness	Product	**7.76**	**0.006**	**0.007**
		Quality	**346.176**	**<0.001**	**0.384**
		Curvature	0.285	0.594	<0.01
		Product:Quality	**5.973**	**0.01**	**0.011**
		Product:Curvature	0.634	0.426	<0.01
		Quality:Curvature	0.415	0.653	<0.01
		Product:Quality:Curvature	0.262	0.762	<0.01
	Preference	Product	**4.423**	**0.036**	**0.006**
		Quality	**217.769**	**<0.001**	**0.212**
		Curvature	**14.465**	**<0.001**	**0.005**
		Product:Quality	0.294	0.673	<0.01
		Product:Curvature	3.568	0.06	<0.01
		Quality:Curvature	2.005	0.135	<0.01
		Product:Quality:Curvature	**3.802**	**0.023**	**<0.01**

p-values ≤ 0.001 are marked in bold