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ORIGINAL RESEARCH

Integrating self-determined needs into the relationship among product design, willingness-to-pay a premium, and word-of-mouth: a cross-cultural gender-specific study

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Background: The present study integrates self-determined needs satisfaction into a relationship between product design (eg, aesthetic, functional, and symbolic design) and consumer behavior (eg, willingness-to-pay [WTP] a premium and negative word-of-mouth [WOM]) and to explore whether gender can differentiate the effects of aesthetic, functional, and symbolic product designs on self-determined needs satisfaction.

Methods: To this end, participants from Pakistan and China were recruited, and the hypotheses for this study were tested using structural equation modeling and SPSS-PROCESS.

Results: The effects of three product designs on self-determined needs satisfaction were significantly positive across samples. The results further show that self-determined needs satisfaction had the strongest positive effect on WTP a premium and the strongest negative effect on vindictive WOM for Pakistanis. Self-determined needs frustration had the strongest negative effect on the WTP a premium for Chinese participants and an equivalent magnitude effect on vindictive WOM for Pakistani and Chinese participants. The cross-cultural gender-specific findings revealed that Pakistani men are more aesthetic and hedonic than women in Pakistan. Surprisingly, Chinese women resemble Pakistani men in the sense that they prefer aesthetically pleasing products. Chinese men resemble Pakistani women in terms of little interest in symbolic products, whereas Chinese women and Pakistani men respond similarly regarding their decisions to choose symbolic products.

Conclusion: To the best of the authors' knowledge, the present study is one of the initial attempts to integrate self-determined needs into the relationship between product design and consumer WTP a premium and WOM, and further explore cross-cultural gender-specific differences across Pakistan and China. The findings of the present study may help international marketers in terms of segmenting, targeting, and positioning their markets.

Keywords: product design, self-determined needs satisfaction, self-determined needs frustration, willingness-to-pay a premium, word-of-mouth, Pakistan and China

Introduction

In today's dynamic business environment, both marketing scholars' and brand managers' interests in consumer-based brand equity have flourished.[1,2] The contemporary way to understand and enhance this relational outcome focuses on word-of-mouth (WOM) and the willingness-to-pay (WTP) a premium,[3,4] both of which lay at the core of all consumer–brand relationships. WOM is an informal communication between two or more parties concerning evaluations of products and services.[5,6] WTP a premium is the maximum price at or below which a consumer will buy a product.[3,4]

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Marketing research on consumers' WTP a premium and WOM has demonstrated that consumers' motivations are key to improving the WTP a premium and WOM.[7,8] As such, marketing managers seek effective ways to support consumers' motivations.[9,10] Recently, the relationship among consumer motivations, WTP a premium, and WOM has received considerable attention in marketing research.[4,11,12]Although the exact understanding of what motivates consumers to spread WOM and increase their WTP a premium continue to evolve,[13–15] the majority of empirical studies have described consumers' motivations through extrinsic product attributes (eg, quality, country-of-origin labeling, perceived uniqueness, and prestige benefits) and then examined the effects on consumers' WTP a premium and WOM.[3,13,14,16–21] However, this perspective failed to fully understand consumer behaviors. We argue that, sometimes, consumers' motivations cannot be explained by focusing only on extrinsic characteristics of products. For instance, customers may increasingly be willing to spread a positive WOM and increase their WTP a premium for products that they truly care about (eg, relatedness need satisfaction), consumers may increase their WTP a premium price and spread a positive WOM for products that allow them to express their individuality and make them feel admired (eg, autonomy need satisfaction), or consumers may be increasingly willing to spread a positive WOM and increase their WTP a premium for products that make them feel more competent (eg, competence need satisfaction).

This line of marketing investigation is parallel to the self-determined motivation of self-determination theory (SDT). SDT suggests that consumer behaviors are shaped by the satisfaction of innate self-determined needs for relatedness, competence, and autonomy.[22–25] To the best of our knowledge, the notion of examining the impact of self-determined needs satisfaction and frustration on consumer behaviors has recently drawn the attention of marketing scholars. These available studies demonstrated that when consumers' self-determined needs for autonomy, relatedness, and competence are met, they positively improve consumers' behavioral outcomes, such as the attachment to a celebrity,[24–26] the attachment to a brand,[27] their intentions to take a trip,[28] and brand engagement.[29] However, the literature has yet to uncover the links between consumers' self-determined needs satisfaction/frustration and consumers' WTP a premium and spread WOM.

To fill this gap, the present study integrates self-determined needs in consumers' WTP a premium price and WOM. To this end, we borrow SDT and its construct (eg, self-determined needs satisfaction and frustration).We embedded it into the relationship between product design dimensions (eg, aesthetics, functional, and symbolic) and consumers' WTP a premium and WOM to find and re-link the missing psychological drivers of consumer–brand relationships. Despite a plenitude of research on product design,[30–34] marketing scholars have devoted negligible attention to exploring the effects of product design dimensions on consumers' self-determined needs satisfaction and the subsequent consumers' WTP a premium and WOM. This is the main issue that our research addresses.

Since consumers' preferences for product design are tied to cultural backgrounds,[34,35] it is therefore of utmost importance to establish how different cultural backgrounds influence consumers' evaluations of product designs in today's dynamic business environment. Furthermore, based on the literature review of cross-cultural gender-specific studies, there is no evidence of any existing research that examines whether nationality and gender can differentiate the effects of aesthetic, functional, and symbolic product designs on self-determined needs satisfaction. Therefore, the present study also addresses this knowledge gap by conducting a cross-cultural gender-specific investigation in Pakistan and China.

Theoretical underpinnings and hypotheses

Self-determination theory

Self-determination theory (SDT) is a motivational paradigm that distinguishes motivation into two types (intrinsic and extrinsic motivation) and suggests that human behaviors tend to be both intrinsically and extrinsically motivated.[36] Intrinsic motivation is defined as doing an activity for its own sake, such as experiencing fun, fantasy, amusement, and sensory stimulation.[23] The intrinsically motivated behaviors are conducted because the behaviors themselves have an appeal, interest, and enjoyment, whereas extrinsically motivated behaviors provide satisfaction derived from the achievement of a goal that is external to the behavior itself. SDT further posits that consumer behaviors are shaped by the satisfaction of innate self-determined needs (eg, autonomy, relatedness, and competence) that are considered important for well-being,[36] and that when self-determined needs are affected, there will be distinct functional costs.[37–39] A close relationship exists between self-determined needs satisfaction and consumers' WTP a premium and WOM whereby consumers may increasingly be willing to pay a premium for brands and spread WOM for those that meet or exceed their self-determined needs satisfaction. For instance, the findings by Dholakia[40] show that firms that meet their consumers' self-determined needs are

more likely to enjoy higher purchase intentions and stronger loyalty. In contrast, firms that thwart (eg, by sending coupons) consumers' self-determined needs are likely to experience a drop in revenue and income over the past fiscal. In line with the theoretical framework of SDT, we expect that product/brands that meet consumers' self-determined needs will more likely capture consumers' WTP a premium and WOM and enjoy sustainable profits over time (Figure 1).

Hypotheses development

The product represents one of the four P's of the marketing mix, and the exterior design of a product is considered as a fundamental characteristic to revitalize products.[35] Product design has emerged as a prominent field of marketing inquiry that communicates aesthetic, functional, and symbolic information.[31] Product design is conceptualized and operationalized as a multidimensional construct comprised of three dimensions, namely, aesthetics, functional, and symbolic designs.[41] The aesthetic design focuses mainly on the physical appearance and beauty of a product.[41–43] The aesthetic design captures customers' attention and enhances brand experiences, which in turn enhances brand preferences and product evaluations.[44]

Innovation researchers consider "aesthetic design" as an important antecedent of an organization's success. For example, Veryzer and Hutchinson[45] investigated the effects of unity and prototypicality on the aesthetic responses of customers and reported aesthetic design as an essential dimension for creating, maintaining, and enhancing superior competitive advantages. This notion was supported by Rindova and Petkova[46] and Chitturi et al[47] whose studies demonstrated that aesthetic design contributes positively to enhancing consumers' perceptions of value and improves WOM and repurchase intentions. Candi[30] explored the benefits of using aesthetic design in new service development and showed that firms designing aesthetic products could enjoy higher turnover, growth, and profits. This finding was further validated by many design scholars who documented that aesthetic design was the most salient factor of sales growth and market share.[23–33] In a recent study, Lee and Johnson[34] explored the effect of aesthetic design on Korean customers' willingness to buy and showed that aesthetic design is more promising for Korean consumers who are technologically innovative. Despite the strategic importance of aesthetic design in improving relationship equity, no study to date has examined whether the aesthetic design satisfies or thwarts customers' self-determined needs for autonomy, competence, and relatedness. We expect that aesthetic design (such as the perceived appearance of a product) may provide sensory

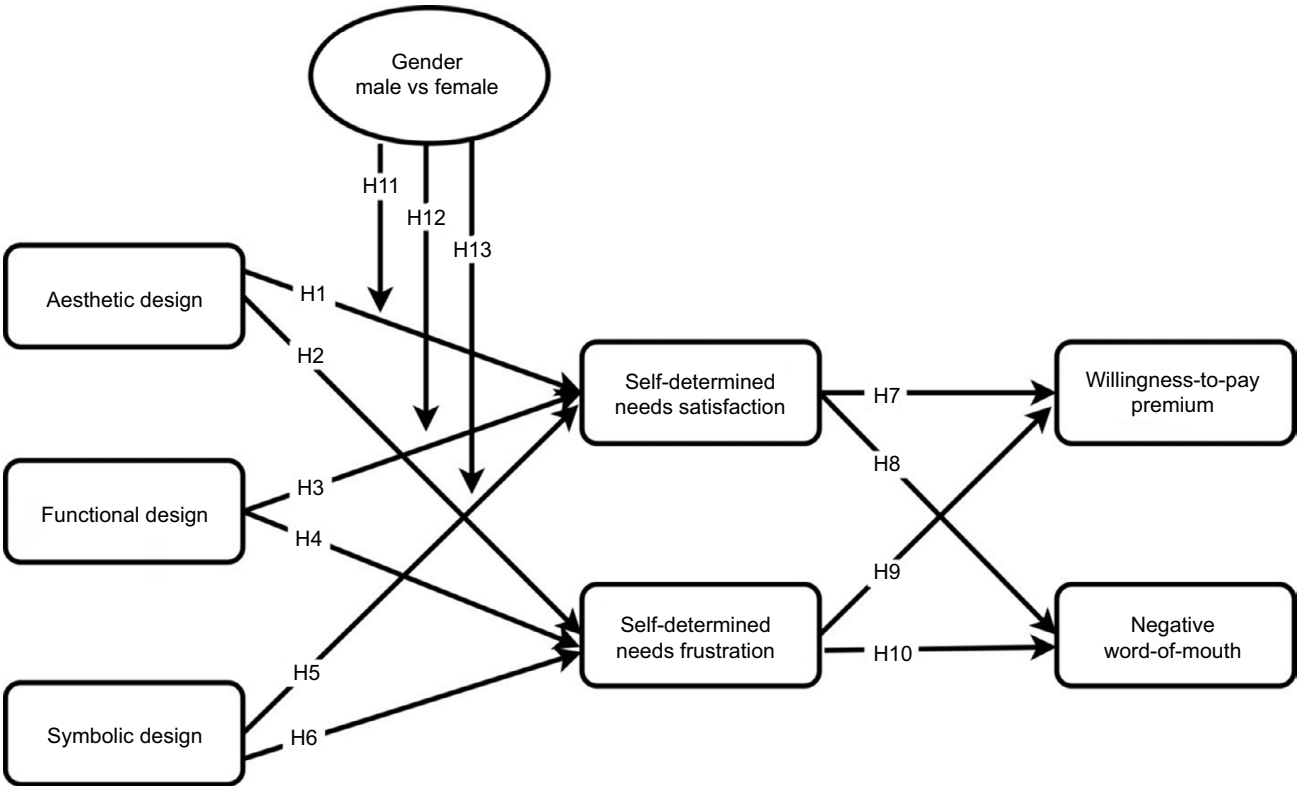

Figure 1 Proposed theoretical framework.
Note: H1–13 are elaborated in "Hypotheses development" and "Moderating role of gender" sections.
Abbreviation: H, hypothesis.

pleasure and a means of self-expression that satisfies one's desire to feel connected to others. Therefore, we hypothesize the following relationship:

Hypothesis 1: Aesthetic design is positively related to consumers' self-determined needs satisfaction.

Prior research has argued that self-determined needs could be satisfied or thwarted,[37–39] and therefore, aesthetic design can be either a strong or weak predictor of self-determined needs. Consequently, we also expect the following relationship:

Hypothesis 2: Aesthetic design is positively/negatively related to consumers' self-determined needs frustration.

Function-based design refers to the product's ability to perform its primary purpose and satisfy the instrumental or functional needs of consumers.[48,49] Product performance, quality, and durability are examples of a functional design.[34,41] Studies have shown that function-based design plays a role when customers consider buying products.[35,42,50] This standpoint was validated in many recent studies,[47,51] which demonstrated that customers usually buy a product either to satisfy a functional need or to get aesthetic enjoyment. Similarly, research has established the positive effect of functional design on customers' purchase intentions,[41,52] market share, and sales growth.[32–33] Moreover, it is well established within the design literature that a product that meets consumers' functional goals and fulfills prevention goals can enhance customers' confidence;[31,47,53] this makes consumers feel competent enough to perform well (eg, competence satisfaction); it allows them to appreciate, empower, and express their individuality (eg, autonomy satisfaction); and it provides warm feelings of openness and acceptance (eg, relatedness satisfaction). In line with these rationales, it is reasonable to postulate that a function-based design is likely to both improve and undermine customers' self-determined needs. Therefore, we formally propose the following relationships:

Hypothesis 3: Functional design is positively related to consumers' self-determined needs satisfaction.

Hypothesis 4: Functional design is positively/negatively related to consumers' self-determined needs frustration.

Symbolic design focuses on the sign or meaning that the product design communicates to the consumer and others through visual elements.[41,42,54] Some researchers have related the purchases of product to personality traits of the purchasers. For example, Pierre[55] showed that the product or brand image is a symbol of the buyer's personality. Evans[56] investigated whether the choice of an automobile brand reflects the personality of the owner. Woods[57] found that when the ego-involvement with a product is high, the symbolic meaning is important to the consumer. Grubb and Grathwohl[58] linked the consumers' purchase intentions with the symbolic value of a product and showed that the symbolic meaning of a product was a motivator of human behavior in the marketplace. In line with these findings, research has further established that the symbolic design can evoke varied associations[59] and help consumers to express their self-image and specific lifestyle,[42,54] to articulate their personal values and form their own identity,[60,61] and/or to signal an affiliation, enmity, or alliance with other individuals or a social group.[62,63]

In a similar vein, the literature on product symbolism has shown that customers respond emotionally to the symbolic meaning of a product's design[64] since it allows consumers to express their identity and extended self with the help of products.[41,65] Studies have documented that the more that products protect and maintain consumers' extended selves, the more consumers' self-determined needs are satisfied.[66,67] This finding somewhat resembles those of Sweeney et al's[68] study, which suggests that receiving positive WOM messages satisfy consumers' self-determined needs. In line with these findings, we expect that the symbolic dimension of product design is likely to improve and thwart self-determined needs. Consequently, we propose the following relationships:

Hypothesis 5: Symbolic design is positively related to consumers' self-determined needs satisfaction.

Hypothesis 6: Symbolic design is positively/negatively related to consumers' self-determined needs frustration.

Empirically, the links between self-determined needs and outcome variables have been observed in diverse life domains. For example, Reis et al[22] explored the effect of self-determined needs satisfaction in people's ongoing lives and showed that well-being could be improved from the satisfaction of self-determined needs. Martin and Hill[69] examined the relationship between self-determined needs and individual life satisfaction and suggested that greater self-determined needs fulfillment in the form of autonomy and relatedness promotes greater life satisfaction and increases individual well-being. In the workplace context, Baard et al[70] reported the positive relationship between self-determined needs satisfaction and employees' performance evaluations. Sørebø et al[71] studied self-determined needs in the educational context and found that perceived autonomy, perceived competence, and perceived relatedness are the drivers of teachers' motivations to use e-learning technology. Jillapalli and Wilcox[72] explored the idea of brand advocacy in marketing education and suggested that when professors satisfy students'

self-determined needs for competence and relatedness, students form stronger attachments, trust their professors more, are more satisfied with the educational experience and are willing to advocate their professor as a brand.

In a marketing context, studies have reported on the positive association between self-determined needs satisfaction and consumers' behavioral outcomes. For instance, Thomson[24] and Ilicic et al[26] examined the effects of self-determined needs on celebrity attachment and showed that autonomy and relatedness satisfaction were prominent predictors of consumers' attachments to celebrities. Loroz and Braig[25] and Proksch et al[27] explored the antecedents of the brand attachment and found that competence was an important self-determined need in developing a strong attachment. Huang et al[28] studied the self-determined needs in the context of tourism and suggested that satisfaction of autonomy and relatedness needs predict enjoyable experiences and the intentions to take a trip.

Although many studies have identified the positive relationships of self-determined needs satisfaction and consumers' behavioral outcomes, research has yet to investigate whether the satisfaction of self-determined needs influence consumers' WTP a premium and WOM. This stream of research (such as what contributes to WTP a premium and spreading WOM) has received scant attention in the marketing literature.[73,74] Therefore, it is interesting and of utmost importance in the present context to investigate whether satisfaction of self-determined needs contributes to enhancing or undermining customers' WTP a premium and WOM. We expect that the satisfaction of self-determined needs should have a significant positive effect on customers' WTP a premium and a significant negative effect on vindictive WOM. Accordingly, the hypotheses are developed as follows.

Hypothesis 7: Self-determined needs satisfaction is positively related to consumers' WTP a premium.

Hypothesis 8: Self-determined needs satisfaction is negatively related to consumers' vindictive WOM.

Moreover, numerous studies have shown that the frustration of the three self-determined needs is related to people's ill-being[37–39] and depressive symptoms.[48] Thus, we expect that the frustration of self-determined needs should have a significant negative effect on consumers' WTP a premium and a significant positive effect on vindictive WOM. Accordingly, the hypotheses are derived as follows.

Hypothesis 9: Self-determined needs frustration is negatively related to consumers' WTP a premium price.

Hypothesis 10: Self-determined needs frustration is positively related to vindictive WOM.

Moderating role of gender

An earlier study by Bernard[75] reported that females are more emotional and are mainly attracted to impressionist paintings than their male counterparts. This view was later supported in Polzella's[76] study that explored the gender differences in college students' preferences for aesthetic paintings. Furthermore, the extant literature on "gender schema theory" posits that male and female shopping behaviors differ both in degree and in kind. For example, in a land mark study, Zelditch[77] demonstrated that females are raised to fulfill more expressive roles, whereas males are raised to fulfill more instrumental roles. Campbell[78] fully supported this notion and noted that, in general, men usually consider shopping as a needs-driven process and are primarily motivated to see themselves as fulfilling an instrumental need. However, women view shopping as a recreational experience and focus more on aesthetic fulfillment. Dittmar et al's[79] study showed that men tend to prefer buying instrumental, functional, and leisure items, while women prefer buying self-expressive goods related to beauty, appearance, and the emotional aspects of one's self. Dittmar et al's[80] study documented that, compared with men, women mainly shop for aesthetic products. This finding was further supported in Moss's and Colman's[81] study, which revealed that men have a greater tendency to value functionality over aesthetics. Coley and Burgess[82] showed that women are more likely than men to experience positive emotions and impulsively purchase books and magazines that address appearance and beauty-related issues. Given this evidence, it would be reasonable to expect that aesthetic product designs would be more prominent in satisfying the self-determined needs of women compared to men. Thus, we formally propose the following:

Hypothesis 11: The female (vs male) gender more positively moderates the strength of the mediated relationship for aesthetic design and the self-determined needs satisfaction such that the mediated relationship will be stronger for females than for males.

Research on gender psychology has further shown that men are task-oriented and focus more on the effectiveness of a product than their female counterparts.[83] This standpoint supported by many studies that concluded that males view shopping as a needs-driven process and focus more on the functionality of the product or service.[78,84] Similarly, Moss and Colman[81] revealed that compared with women, men have a greater tendency to value functionality over aesthetics. Moutinho et al[85] noted that men are more price conscious and relate price with quality. This view was supported by many social scientists who reported that men make fewer compromises on the price and quality

of a product or service that they buy.[86–89] In line with evidence mentioned earlier, it is reasonable to postulate that gender moderates the effect of functional design on self-determined needs satisfaction of men compared to women. Therefore, we formally propose the following:

Hypothesis 12: The male (vs female) gender more positively moderates the strength of the mediated relationship between the functional design and self-determined needs satisfaction such that the mediated relationship will be stronger for men than for women.

Moreover, the gender differences literature shows that compared with men, women focus more on maintaining a harmonious relationship with firms[86,90] and are more willing to pay a premium for symbolic products that enhance their self.[82,91] Similarly, Dittmar et al[79] noted that compared to men, women tend to value symbolic possessions and are more emotional and image-guided. Dittmar et al[80] and Underhill[92] further reported that compared with men, women prefer buying self-expressive and symbolic products that address the emotional aspects of self. This notion was fully supported in Coley's and Burgess's[82] study, which reported that women more frequently made purchases in product categories where stylish appearance and social identity were of concern, while men more frequently made purchases in product categories where personal identity was of concern. In line with the findings of these studies, we expect that the symbolic design of a product would be more prominent to improve the self-determined needs satisfaction of women than their male counterparts. As such, we expect the following relationship:

Hypothesis 13: The female (vs male) gender more positively moderates the strength of the mediated relationship of symbolic design and self-determined needs satisfaction such that the mediated relationship will be stronger for women than for men.

Research methodology

Ethical statement

This research was reviewed and approved by the Ethics Review Committee for Pakistan and University of Science and Technology Beijing. All participants were told that they could withdraw from the study at any time and that there was no obligation to participate. All participants provided written informed consent as per the Declaration of Helsinki.

Participants and procedure

Three-hundred fifty-six subjects from metropolitan areas within Pakistan participated in the study (39.6% female, mean 29.83 years of age, SD=4.77 years). Similarly, five-hundred fifty questionnaires were returned from China, and one-hundred six questionnaires containing incomplete data were discarded from the analysis, thus resulting in 444 valid questionnaires (49.1% female, mean 28.30 years of age, SD=4.80 years). Table S1 presents the details of the demographic characteristics of the sample. We collected data from young-adults (e.g., shoppers of cell phone, shoe, and/or clothing brands) and from students who were studying at major business schools in Pakistan and China. All the participants in both countries received small gifts in exchange for the participation.

Measure

The key constructs utilized were adapted from previous studies, and we made some necessary adjustments before conducting the main survey. First, the original validated scales items were worded accordingly to fit the context of the study. Second, the fine-tuned questionnaire was translated into the Chinese language by two post-graduate Chinese students and the back translations were done separately by two other Chinese students studying at the Renmin University of China. To check the accuracy of the translation, we recruited an English-Chinese language teacher to compare the original and back-translated version of the items to ensure their reliability. Finally, we conducted two pilot studies in China (n=22) and Pakistan (n=35) with a convenience sample of Chinese and Pakistani students. Participants were asked to complete the questionnaire that was comprised of a series of statements denoted as "XYZ" (1="strongly disagree" and 5="strongly agree").

We adapted the product design measure from previous research.[41] Nine items were used to measure three dimensions, namely, aesthetic, functional, and symbolic designs. The consumers' self-determined needs satisfaction and frustration scale was adapted from Chen et al's[39] study. The scale consists of 12 self-determined needs satisfaction and 12 self-determined needs frustration items. Consumer WTP a premium was measured by three items that were adapted from Casidy and Wymer;[4] the items were originally published in a work by Netemeyer et al.[3] Consumers' vindictive WOM was measured by three items adapted from Gelbrich[93] and Ho et al,[74] which were originally published in a work by Grégoire and Fisher.[94] Finally, respondents' answers were elicited on a 5-point scale ranging from 1="completely disagree" to 5="completely agree". The internal consistency of each scale was greater than the recommended threshold value 0.70[95] across the Pakistani and Chinese samples (Table S2).

Results

Exploratory factor analysis

Before conducting structural equation modeling (SEM), the items of key variables were subjected to an exploratory factor analysis (EFA) using the principal component analysis with the Varimax rotation to identify the factor structure of the variables for Pakistanis and Chinese separately. The EFA for the entire set of variables yielded 11 factor solutions that explained 80.62% and 82.23% of the total variance for Pakistanis and Chinese, respectively. All items were loaded on the factor that they were supposed to load on, and there was no significant cross-loading for multi-sample data (Pakistan and China). Finally, the Kaiser-Meyer-Olkin (KMO) for both samples were above the recommended threshold value of 0.6 (Pakistan=0.816 and China=0.810), and the Bartlett's test of sphericity was highly significant for both samples (χ^2 [356]=11,171.819, $p<0.05$; χ^2 [444]=14,286.641, $p<0.05$). Thus, the results of these tests show the suitability of the data sample for factor analysis[96] (see Tables S3–S6 for the detailed results).

Correlation analysis

Table 1 shows the means, standard deviations, and correlations between the measured variables. For the Pakistani sample, each of the three product design dimensions (aesthetics, functional, and symbolism) were positively correlated with consumers' WTP a premium (r=0.257, $p<0.05$; r=0.112, $p<0.05$; r=0.143, $p<0.05$) and negatively correlated with the negative/vindictive WOM (r=–0.210, $p<0.05$; r=–0.177, $p<0.05$; r=–0.276, $p<0.05$). Similarly, for the Chinese sample, the aesthetic design was positively correlated with consumers' WTP a premium (r=0.262, $p<0.05$) and negatively corrected with negative/vindictive WOM (r=–0.149, $p<0.05$), whereas functional and symbolic designs were insignificantly correlated with the consumers' WTP a premium (r=0.086, p=not significant [ns]; r=–0.023. p=ns) and negative/vindictive WOM (r=–0.020, p=ns; r=–0.044, p=ns). Moreover, as expected, the correlations between consumers' WTP a premium and self-determined needs satisfaction and the correlations between negative/vindictive WOM and self-determined needs satisfaction were significant in the expected direction for both Pakistanis (r=0.270, $p<0.05$; r=–0.217, $p<0.05$) and Chinese (r=0.363, $p<0.05$; r=–0.414, $p<0.05$). Likewise, the correlations between consumers' WTP a premium and self-determined needs frustration and the correlations between negative/vindictive WOM and self-determined needs frustration were significant in the expected direction for both Pakistanis (r=–0.245, $p<0.05$; r=0.166, $p<0.05$) and Chinese (r=–0.160, $p<0.05$; r=0.197, $p<0.05$).

Structural equation modeling

To test our hypotheses, we ran a SEM with maximum-likelihood method. The proposed model of seven constructs with the 39 observed items yielded excellent model fit to the data drawn from China and Pakistan. For China, the model fits the data well (χ^2 [11]=21.510; comparative fit index

Table 1 Means, standard deviations, and correlations between measured variables

Pakistani sample									
	Variable	**M**	**Std.**	**FD**	**SD**	**SDNS**	**SDNF**	**WTPP**	**NWOM**
1.	AD	3.741	0.811	–0.002	0.118*	0.535**	–0.058	0.257**	–0.210**
2.	FD	3.837	0.961		0.088	0.337**	–0.004	0.112*	–0.177**
3.	SD	3.768	0.945			0.404**	–0.161**	0.143**	–0.276**
4.	SDNS	3.830	0.424				–0.094	0.363**	–0.414**
5.	SDNF	3.520	0.750					–0.160**	0.197**
6.	WTP	3.603	0.847						–0.282**
7.	NMOM	1.971	0.790						
Chinese sample									
		M	**Std.**	**FD**	**SD**	**SDNS**	**SDNF**	**WTPP**	**NWOM**
1.	AD	3.450	1.169	–0.017	–0.052	0.319**	–0.211**	0.262**	–0.149**
2.	FD	3.555	1.268		–0.108*	0.173**	0.047	0.086	–0.020
3.	SD	3.486	1.228			0.101*	0.118*	–0.023	–0.044
4.	SDNS	3.552	0.718				–0.026	0.270**	–0.217**
5.	SDNF	2.672	0.770					–0.245**	0.166**
6.	WTPP	3.547	1.152						–0.137**
7.	NMOM	2.270	1.111						

Notes: **$p<0.01$, *$p<0.05$.

Abbreviations: AD, aesthetic design; FD, functional design; SD, symbolic design; SDNS, self-determined need satisfaction; SDNF, self-determined need frustration; Std., standard deviation; WTPP, willingness-to-pay a premium; NWOM, negative word-of-mouth.

[CFI]=0.95; goodness-of-fit index [GFI]=0.99; Tucker-Lewis index [TLI]=0.90; standardized root mean square residual [SRMR]=0.05; root mean square error of approximation [RMSEA]=0.04; PCLOSE=0.53; Akaike information criterion [AIC]=55.51), and for Pakistan, the model also fits data well (χ^2 [11]=22.53; CFI=0.97; GFI=0.98; TLI=0.94; SRMR=0.03; RMSEA=0.05; PCLOSE=0.37; AIC=56.53).

The results of the full SEM are presented in Table 2 for both samples (i.e., Pakistan and China). It shows that an aesthetic design has a significant positive impact on consumers' self-determined needs satisfaction across samples drawn from Pakistan (β=0.512; p<0.05) and China (β=0.328; p<0.05), thus supporting H1 and suggesting that Pakistani and Chinese consumers prefer an aesthetic design to support their self-determined needs. Similarly, the coefficient estimates for the impact of an aesthetic design on self-determined needs frustration (H2) is not significant for Pakistanis (β=–0.039; p=ns), whereas for Chinese, an aesthetic design has a significant negative impact on consumers' self-determined needs frustration (β=–0.204; p<0.05). Thus, H2 is supported for Chinese and not accepted for Pakistanis. The contention of H3 is that a functional design significantly satisfies consumers' self-determined needs for Pakistanis (β=0.318; p<0.05) and Chinese (β=0.192; p<0.05). The results supported our view and suggested that a functional design is also an important criterion to satisfy consumers' self-determined needs. Likewise, H4, which argues that functional design is significantly related to consumer self-determined needs frustration, is not supported across the Pakistani (β=0.010; p=ns) and Chinese samples (β=0.056; p=ns).

In a similar vein, the significant positive relationship between symbolic design and consumers' self-determined needs satisfaction supports H5 for Pakistanis (β=0.327, p<0.05) and Chinese (β=0.138, p<0.05). Meanwhile, the relationship between symbolic design and consumers' self-determined needs frustration was significantly negative for Pakistanis (β=–0.158; p<0.05) and significantly positive for Chinese (β=0.114, p<0.05). This suggests that the symbolic design of a product itself is not prominent enough to thwart the self-determined needs of Pakistani consumers, whereas the symbolic design is viewed equally important to thwart the self-determined needs of consumers in China. Thus, this suggests that symbolic design is an important criterion across China. Moreover, H7 and H8 demonstrate that self-determined needs satisfaction positively influences consumers' WTP a premium and negatively influences vindictive WOM. The results supported our view across the samples drawn from Pakistan (β=0.343, p<0.05; β=–0.391, p<0.05) and China (β=0.265, p<0.05; β=–0.214, p<0.05). These findings advance previous studies that reported brand attitude, electronic WOM, and customized product design as the predictors of consumers' WTP a premium price.[97,98] Finally, we refer to H9 and H10, which hypothesize that self-determined needs frustration is negatively related to consumer WTP a premium and positively related to vindictive WOM. These results were supported across Pakistan (β=–0.128, p<0.05; β=0.160, p<0.05) and China (β=–0.238, p<0.05; β=0.160, p<0.05). In summary, out of 10 links, we found support for 8 and 9 hypotheses for Pakistan and China, respectively (Tables S7 and S8).

Tests of moderation: gender differences

Hypotheses 11–13 related to the moderation of gender were tested using the procedure suggested by Barron and Kenny[99] and the methods explained by Preacher et al.[100] Tables 3 and 4 show the results for the moderation of the mediation effect and the conditional effect. The H11 posits that gender would moderate the effect of an aesthetic design on self-determined

Table 2 Structural equation model results

H	Paths	Standardized β (Pakistan)	Decision	Standardized β (China)	Decision
H1	AD→SDNS	0.512	Supported	0.328	Supported
H2	AD→SDNF	–0.039	Not supported	–0.204	Supported
H3	FD→SDNS	0.318	Supported	0.192	Supported
H4	FD→SDNF	0.010	Not supported	0.056	Not supported
H5	SD→SDNS	0.327	Supported	0.138	Supported
H6	SD→SDNF	–0.158	Supported	0.114	Supported
H7	SDNS→WTPP	0.343	Supported	0.265	Supported
H8	SDNS→NWOM	–0.391	Supported	–0.214	Supported
H9	SDNF→WTPP	–0.128	Supported	–0.238	Supported
H10	SDNF→NWOM	0.160	Supported	0.160	Supported

Abbreviations: H, hypothesis; AD, aesthetic design; FD, functional design; SD, symbolic design; SDNS, self-determined needs satisfaction; SDNF, self-determined needs frustration; WTPP, willingness-to-pay premium; NWOM, negative word-of-mouth.

Table 3 Moderated mediation results (Pakistan)

(a) Moderation of gender						
Regression results for self-determined needs satisfaction as dependent variable						
Predictor	**β**	***t***	***p***	***F***	R^2	
Aesthetic product design	0.53	11.71	0.000	73.38	0.29	
Gender	0.09	1.96	0.051			
Aesthetic product design	0.20	1.40	0.135	51.91	0.31	
Gender	–0.45	–2.11	0.036			
Gender × aesthetic product design	0.67	2.57	0.010			
Gender	**Conditional effect**	**SE**	***z***	***p***	**LLCI**	**ULCI**
Female	0.23	0.029	7.94	0.000	0.173	0.287
Male	0.35	0.053	6.64	0.000	0.249	0.459
(b) Moderation of gender						
Regression results for self-determined needs satisfaction as dependent variable						
Predictor	**β**	***t***	***p***	***F***	R^2	
Functional product design	0.33	6.72	0.000	26.43	0.13	
Gender	0.13	2.61	0.000			
Functional product design	0.26	1.73	0.085	17.67	0.131	
Gender	0.03	0.13	0.897			
Gender × functional product design	0.13	0.52	0.604			
Gender	**Conditional effect**	**SE**	***z***	***p***	**LLCI**	**ULCI**
Female	0.14	0.040	3.44	0.001	0.059	0.217
Male	0.16	0.057	2.85	0.005	0.050	0.272
(c) Moderation of gender						
Regression results for self-determined needs satisfaction as dependent variable						
Predictor	**β**	***t***	***p***	***F***	R^2	
Symbolic product design	0.41	8.52	0.000	40.41	0.18	
Gender	0.15	3.17	0.002			
Symbolic product design	0.08	0.55	0.585	28.28	0.20	
Gender	–0.31	–1.57	0.116			
Gender × symbolic product design	0.57	2.43	0.016			
Gender	**Conditional effect**	**SE**	***z***	***p***	**LLCI**	**ULCI**
Female	0.14	0.034	4.17	0.000	0.075	0.209
Male	0.25	0.051	4.90	0.000	0.149	0.348

Abbreviations: LLCI, lower limit confidence interval; ULCI, upper limit confidence interval; SE, standard error.

needs satisfaction. Consistent with our expectation, the results show a significant positive effect of the aesthetic design × gender interaction term (β=0.67, $p<0.05$) on self-determined needs satisfaction with R^2 increasing from 0.29 to 0.31. To further understand the moderating effect, we used Preacher et al's[100] statistical significance test and plotted the interaction effect.[101] The results of the plot test show that, although an aesthetic design is positively associated with consumers' self-determined needs satisfaction, an aesthetic design is likely to be more effective in improving self-determined needs satisfaction for men than for women (Figure S1). We further conducted a simple slope test that confirmed that an aesthetic design has a stronger effect on self-determined needs satisfaction for men (β=0.35, $p<0.05$, CI=0.249 to 0.459) than for women (β=0.23, $p<0.05$, CI=0.173 to 0.287). Similarly, for the Chinese sample, the results show a significant negative effect of the aesthetic product design × gender interaction term (β=–0.46, $p<0.05$) on self-determined needs satisfaction with R^2 increasing from 0.10 to 0.11. The results of the plot and slope test (Figure S2) further indicate that an aesthetic design has a stronger effect on self-determined needs satisfaction for women (β=0.27, $p<0.05$, CI=0.177 to 0.356) than for men (β=0.14, $p<0.05$, CI=0.061 to 0.220). This finding corroborates the ideas of many studies that suggest that women have an aesthetic preference for exceptionality and are attracted more by exclusivity and uniqueness as attributes of products.[89,90] Thus, H11 was supported across the sample drawn from Pakistan and China.

Table 4 Moderated mediation results (China)

(a) Moderation of gender						
Regression results for self-determined needs satisfaction as dependent variable						
Predictor	**β**	***t***	***p***	***F***	R^2	
Aesthetic product design	0.32	7.11	0.000	25.34	0.103	
Gender	–0.04	–0.77	0.438			
Aesthetic product design	0.64	4.35	0.000	18.77	0.113	
Gender	0.27	1.90	0.058			
Gender × aesthetic product design	0.46	2.27	0.024			
Gender	**Conditional effect**	**SE**	***z***	***p***	**LLCI**	**ULCI**
Female	0.27	0.046	5.827	0.000	0.177	0.356
Male	0.14	0.040	3.483	0.001	0.061	0.220
(b) Moderation of gender						
Regression results for self-determined needs satisfaction as dependent variable						
Predictor	**β**	***t***	***p***	***F***	R^2	
Functional product design	0.17	3.68	0.000	6.82	0.03	
Gender	0.00	0.09	0.931			
Functional product design	0.20	1.32	0.189	4.55	0.03	
Gender	0.03	0.20	0.842			
Gender × functional product design	0.04	0.18	0.856			
Gender	**Conditional effect**	**SE**	***z***	***p***	**LLCI**	**ULCI**
Female	0.10	0.042	2.437	0.015	0.020	0.187
Male	0.09	0.042	2.223	0.027	0.011	0.177
(c) Moderation of gender						
Regression results for self-determined needs satisfaction as dependent variable						
Predictor	**β**	***t***	***p***	***F***	R^2	
Symbolic product design	0.10	2.14	0.033	2.34	0.011	
Gender	–0.00	–0.41	0.679			
Symbolic product design	0.44	3.02	0.003	3.59	0.024	
Gender	0.31	2.18	0.030			
Gender × symbolic product design	0.50	2.45	0.015			
Gender	**Conditional effect**	**SE**	***z***	***p***	**LLCI**	**ULCI**
Female	0.12	0.039	3.13	0.002	0.045	0.198
Male	0.01	0.042	0.330	0.742	0.068	0.096

Abbreviations: LLCI, lower limit confidence interval; ULCI, upper limit confidence interval; SE, standard error.

The H12 predicted that the gender would moderate the effect of a functional design on self-determined needs satisfaction. The results show an insignificant effect of the functional product design × gender interaction term on self-determined needs satisfaction across Pakistan (β=0.13, p=ns) and China (β=0.04, p=ns) with a trivial increase in R^2 from 0.130 to 0.131 for Pakistanis and 0.03 to 0.03 for Chinese. Furthermore, the plot and slope test (Figures S3 and S4) revealed that these paths were of equal magnitude for men (β=0.16, p<0.05, CI=0.050 to 0.272; β=0.09, p<0.05, CI=0.011 to 0.177) and women (β=0.14, p<0.05, CI=0.059 to 0.217; β=0.10, p<0.05, CI=0.020 to 0.187) across Pakistan and China. Thus, H12 was not supported for both Pakistan and China.

Finally, H13 proposed that the gender would moderate the effect of a symbolic product design on self-determined needs satisfaction. As expected, the results show the significant effect of the symbolic design × gender interaction term on self-determined needs satisfaction across Pakistan (β=0.57, p<0.05) and China (β=0.50, p<0.05) with R^2 increasing from 0.18 to 0.20 for Pakistanis and from 0.011 to 0.024 for Chinese. We further conducted a plot and slope test to explore the conditional effect of a symbolic design on the self-determined needs satisfaction. The results show that although a symbolic design is significantly associated with consumer self-determined needs satisfaction, a symbolic design is likely to be effective to satisfy the self-determined needs for males (β=0.25, p<0.05, CI=0.0149 to 0.348) rather

than for females (β=0.14, $p<0.05$, CI=0.075 to 0.209) in Pakistan (Figure S5). Likewise, for Chinese, the results of a plot and slope test (Figure S6) indicated that a symbolic design has a stronger effect on self-determined needs satisfaction only for females (β=0.12, $p<0.05$, CI=0.045 to 0.198) and not for males (β=0.01, p=ns, CI=0.068 to 0.096). Together, these findings fully support hypothesis H13 for Pakistanis and partially support H13 for Chinese.

General discussion

Our study contributes to the existing body of marketing knowledge in three ways. First, this study is an initial attempt to explore whether aesthetic, functional, and symbolic product designs satisfy or thwart consumers' self-determined needs. Second, it explores whether the satisfaction and frustration of self-determined needs would enhance or undermine consumers' WTP a premium and vindictive WOM. Third, this study contributes to exploring cross-cultural gender-specific differences and investigates how aesthetic, functional, and symbolic designs are related to men's and women's self-determined needs satisfaction across Pakistan and China. As expected, the results indicated that aesthetic, functional, and symbolic designs positively satisfy consumers' self-determined needs. This finding was further confirmed across a sample drawn from China, which suggests that each product design dimension significantly improves the self-determined needs of consumers.

The results further showed that the aesthetic design emerged as a stronger predictor of self-determined needs satisfaction and was followed by symbolic and functional designs. Similarly, for the Chinese, an aesthetic design also contributed uniquely to the satisfaction of self-determined needs, followed by functional and symbolic designs. The comparisons for Pakistanis vs Chinese showed that an aesthetic design contributed more to enhancing the self-determined needs for Pakistanis (β=0.512) than that for Chinese (β=0.328). This effect indicates that an aesthetic design is an important criterion in Pakistan. Thus, self-determined needs satisfaction can be shaped more by designing aesthetic products in Pakistan than in China.

Additionally, note that the effects of aesthetic and functional designs on self-determined needs frustration were insignificant, whereas the symbolic design had a significant negative effect on the self-determined needs frustration across Pakistan. Likewise, for Chinese, a functional design had a trivial influence on self-determined needs frustration, whereas an aesthetic design negatively affected self-determined needs and a symbolic design positively affected self-determined needs. These effects show that although aesthetic and functional designs contributed significantly to enhancing self-determined needs, these designs appeared less effective in affecting the self-determined needs in Pakistan. As noted earlier, a symbolic design positively affects consumers' self-determined needs across China. This effect shows that a symbolic design is an important factor and marketers should pay special attention to handle it carefully.

The cross-country comparison further revealed some additional evidence worth mentioning. As expected, the satisfaction of self-determined needs positively predicts consumers' WTP a premium and negatively predicts vindictive WOM. Likewise, the frustration of self-determined needs negatively predicts consumers' WTP a premium and positively predicts vindictive WOM across the sample drawn from Pakistan. These findings offered additional support across a diverse sample of Chinese consumers. In addition, the further comparisons for Pakistanis vs Chinese showed that the magnitudes of the impacts of self-determined needs satisfaction yielded the strongest positive contribution to consumers' WTP a premium (β=0.343) and the strongest negative contribution to vindictive WOM (β=–0.391) for Pakistanis rather than for Chinese, thus suggesting that brand fulfilling self-determined needs will strengthen attachment, increase the WTP a premium, and spread positive WOM. Similarly, consumer self-determined needs frustration yielded the strongest negative effect on the WTP a premium for Chinese than for Pakistanis. Finally, the effects of self-determined needs frustration on vindictive WOM were of equal magnitude across Pakistan and China.

Furthermore, the cross-cultural gender-specific results indicate that the effects of product design dimensions can be differentiated by gender. As such, the results show that an aesthetic design had a stronger effect on the self-determined needs satisfaction for men than for women in Pakistan. These findings show that Pakistani men are more aesthetic and hedonic than Pakistani women. The finding is somewhat consistent with those of Siddiqui and Anjum[102] and Shabbir and Safwan,[103] which reported that men in Pakistan are more brand conscious and more likely to buy branded products than women. Similarly, for Chinese, an aesthetic design had the strongest effect on self-determined needs satisfaction for women than for men. That is, Chinese women appeared to be more aesthetic and prefer stylish and beautiful products/brands. These findings portray an aesthetic design which is an important criterion in Pakistan for men rather than for women, whereas an aesthetic design is an important criterion for women in China than for their male counterparts.

Surprisingly, this finding corroborates the results of Horak's[104] study, which suggested that Korean men respond more significantly than German men and women regarding their decision-making. The moderation analysis does not detect any gender differences for the effect of a functional design on the self-determined needs satisfaction for both Pakistanis and Chinese. The finding seems to be consistent with Shabbir and Safwam's[103] study, which reported insignificant differences between men and women in Pakistan regarding their preferences for the quality and functionality of a product. Finally, the results demonstrate that a symbolic design was enhanced among males in Pakistan rather than females. Likewise, for Chinese, the symbolic design effect was enhanced among Chinese women only, thus suggesting that Chinese women are highly symbolic and prefer products/brands that compliment or give clues to their personalities.

In summary, our results show that Pakistani men are more aesthetic and hedonic than women in Pakistan, and Chinese women resemble Pakistani men and prefer more aesthetically pleasing products. Similarly, Chinese men resemble Pakistani women in terms of little interest in symbolic products, whereas Chinese women and Pakistani men respond similarly regarding their decisions to choose symbolic products. These results are in line with cost signaling, inter-sexual competition theory, and other empirical studies which suggest that men tend to purchase luxury products associated with ads featuring attractive female models rather than attractive men.[105,106]

Theoretical and practical implications

As discussed earlier, the findings of our study have some important contributions to SDT,[23] gender schema theory,[107] and Hofstede's[108] culture typology. First, SDT proposes that human motivation is shaped by the satisfaction of innate self-determined needs for autonomy, relatedness, and competence,[109] and when these needs are satisfied, they have significant effects on positive outcomes in different life domains, such as well-being,[22] life satisfaction,[69] employees' performance,[79]and employees' creativity.[110] We contribute to extending SDT from the field of health, education, and management to consumer behaviors and marketing by exploring the effect of self-determined needs satisfaction and frustration on consumers' WTP a premium and WOM. Second, we contribute to gender schema theory and provide a fresh perspective by exploring the cross-cultural gender-specific differences across Pakistan and China and differentiating the effects of product design dimensions on self-determined needs satisfaction of men and women in Pakistan and China. Third, we contribute to add a new dimension to Hofstede's[108] cultural typology by studying uncertainty avoidance and individualism-collectivism framework. The extant literature suggests that countries that have high uncertainty avoidance (vs low uncertainty avoidance) tend to focus more on the basic functionality of a product, such as the price, quality, and innovation.[111] Our results did not support this assumption and suggest that Pakistani consumers are highly aesthetic and symbolic and prefer highly visual and symbolically design products over purely functional possessions. Thus, countries with high uncertainty avoidances do not necessarily fail to choose aesthetic and symbolic products.

Similarly, our study has some important contributions for practitioners. First, we provide evidence that although aesthetic, functional, and symbolic designs positively improved the self-determined needs of consumers across samples, the aesthetic design appeared more promising to satisfy self-determined needs of Pakistanis and Chinese. Thus, practitioners targeting Pakistani and Chinese customers should pay special attention to improve the perceived appearance and beauty of a product since it creates an initial impression and provides a means of self-expression, the experience of intimacy, and a sense of connectedness with the product/brand.

Second, our results revealed that the satisfaction of self-determined needs is positively associated with consumers' WTP a premium and negatively associated with vindictive WOM. Furthermore, the frustration of self-determined needs positively predicts vindictive WOM and negatively predicts consumers' WTP a premium. These findings were stable across Pakistan and China. Therefore, brand managers targeting Pakistani and Chinese markets should take the time to analyze this body of knowledge to focus on the satisfaction of customers self-determined needs by designing products/brands that make consumers feel competent to perform well; provide warm feelings of openness and acceptance; and appreciate, empower, and allow them to express their individuality.

Third, the results also revealed that aesthetic and symbolic designs had the strongest effects on self-determined needs satisfaction for men rather than for women in Pakistan, which are the opposite in China where aesthetic and symbolic designs had the strongest effects on the self-determined needs satisfaction for women rather than for men. Thus, firms in both countries seeking to implement gender-specific marketing strategies may benefit from our study. In particular, Chinese brand managers currently serving or wish to serve the female customers base (also Pakistani brand managers wish to serve male) should focus on the perceived appearance

and beauty of a product and design a product/brand that compliments or gives clues to their personalities.

Finally, our results show insignificant gender differences in the functional design and self-determined needs satisfaction for both Pakistanis and Chinese. For men and women in both countries, the quality and basic functionality of the product is an important criterion. Therefore, marketers should maintain the quality of the product to prevent customer dissatisfaction and vindictive WOM.

Limitations and future directions

The results of the present study have to be seen in the light of its limitations. First, we conducted a cross-cultural investigation between Pakistan (South Asian country) and China (East Asian country) and compared the effects of aesthetic, functional, and symbolic product designs on the satisfaction of self-determined needs and the subsequent consumers' WTP a premium and WOM. Hence, the results of our study may be suitable for South and East Asian countries (because both countries are high on collectivism), whereas brand managers and policy makers of other countries (eg, Europeans, Africans, and Americans) should carefully utilize our results. We invite future research to extend our model and test the hypotheses to generalize and validate the findings in the European (eg, France, Italy, Germany, Spain, etc.) and American (eg, USA, Mexico, Colombia, Canada, Cuba, etc.) contexts since these countries represent individualistic cultures.[108]

Second, the majority of our sample was comprised of young-adult consumers who were studying in various school/colleges and universities across Pakistan and China. Because our samples overstate the number of young people, they do not adequately represent the culture. Therefore, additional research is needed to revalidate our model and hypotheses by including senior citizens in the population.

Third, we explored the gender differences and investigated how aesthetics, functional, and symbolic designs are related to men's and women's self-determined needs satisfaction across Pakistan and China and did not examine how gender moderates the relationship between self-determined needs satisfaction and consumers' WTP a premium and WOM. The gender psychology literature suggests that women are more willing to pay higher prices than men to maintain a good relationship.[112] Thus, academic research may benefit from considering the moderating role of gender to investigate how men's and women's self-determined needs satisfaction vary regarding customers' WTP a premium and spread WOM.

Finally, future research may also benefit from exploring the role of age (eg, young and senior citizen) in the existing model to investigate the effects of aesthetics, functional, and symbolic designs on the satisfaction of young and senior citizens' self-determined needs, and how self-determined needs satisfaction further predicts their WTP a premium and spread WOM.

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Disclosure

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