



Research article

Unveiling the enigma of blind box impulse buying curiosity: The moderating role of price consciousness

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ARTICLE INFO

Keywords:

Addiction
S-O-R model
Blind box
Price consciousness
Perceptual psychology
Curiosity
Impulsive buying behavior
Young consumer

ABSTRACT

This study explores the causes of curiosity-driven impulse buying in blind boxes using the Stimulus-Organism-Response (S-O-R) model and adaptation level theory. It examines how store environment and product factors contribute to customer curiosity, incorporating price consciousness into the overall framework. Insights from an online survey of 306 Chinese respondents indicate that environmental factors and specific product characteristics positively influence consumer curiosity, while price consciousness has a negative moderate effect. The findings also show that customer curiosity stimulates impulse buying behavior and mediates the relationship between store atmosphere, surprise, and perceived novelty. This study identifies both objective and subjective factors behind blind box impulse buying and offers relevant suggestions for governments and consumers on managing impulse buying.

1. Introduction

Blind boxes are a type of pop toy that originated in Japan and achieved significant success in the USA. They are now popular among Chinese consumers [1]. The concept of blind boxes involves opaque containers holding a variety of stylish toys that customers eagerly seek as soon as they are released [2,3]. Its cute appearance and casualness attract consumers, catering to young people's curiosity, expectations, and 'gambling' psychology to a certain extent. Moreover, the popularity of blind boxes surged sharply in the mid-90s and early '00s. Data from the Ali Research Institute show that between 2016 and 2020, young consumers' consumption increased by 73% [4]. The blind box market was valued at 7.4 billion yuan (USD 1.14 billion) in 2019, 10.1 billion yuan (USD 1.40 billion) in 2020, and could reach 150 billion yuan (USD 20.71 billion) by 2025 [3,5,6].

As China's emerging blind box economy expands rapidly, it has led to over-marketing. Scholars have found that consumers' excessive purchasing of blind boxes reflects certain psychological issues. For instance, the frequency of purchasing blind boxes may be related to the risk of suicide [2]. Furthermore, the impulsive behavior of primary school pupils in purchasing blind stationery boxes creates challenges for parents [7].

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<https://doi.org/10.1016/j.heliyon.2024.e40564>

Received 19 June 2024; Received in revised form 22 October 2024; Accepted 19 November 2024

Available online 2 December 2024

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Similarly, according to China Media Group, a blind box was advertised at 800 yuan, but the actual cost was only about 30 yuan. Some consumers spend over 10,000 yuan on blind boxes in hopes of obtaining a limited-edition toy [8]. Meanwhile, the regulatory agency in Shanghai, China, has established related policies, stating that the country needs additional oversight and guidance, which could put economic pressure on blind box sales [2].

Given the enormous potential of the blind box market and its current challenges, it is critical to closely examine the factors influencing consumers' impulsive buying behaviors related to blind boxes. Currently, research on blind box consumption is still in its early stages. Many scholars have extensively discussed the blind box economy, but most research has focused on examining phenomena or theories. Therefore, studies from a quantitative perspective, like this one, are still relatively new [3]. So far, scholars' research on blind boxes is primarily to investigate from the standpoint of enterprises or to consider this buying behavior from the perspective of increase [3,9].

Therefore, this study investigates the view of decreasing impulse purchases from the perspectives of consumers and the government, and it uses quantitative approaches to fill gaps in the present research. Furthermore, whereas there are existing studies exploring blind box purchase behavior from the perspective of curiosity, this study investigates the behavior that arouses curiosity from the standpoint of an objective environment, which can quantitatively validate more pre-causes of curiosity. The theoretical framework of this study uses the S-O-R framework and the adaptation level theory to explore the mechanism behind Chinese consumers' impulse buying of blind boxes from an objective and subjective perspective. This study has three research questions:

RQ1. Can fashion involvement, store atmosphere, perceived novelty, and surprise positively affect impulsive buying behavior through the mediating effect of curiosity?

RQ2. Which factor causing curiosity has the most influence?

RQ3. Does price consciousness moderate the relationship between curiosity and impulse buying?

The current research yields specific contributions. First, from the theoretical view, we have applied the S-O-R model and the adaptation level theory to provide an idea for the framework related to impulse buying and confirm the regulating relationship of price consciousness. Second, from the practical angle, our study helps to contribute to the literature on consumers' impulse buying of blind box products from different realms or related products adopting the blind box strategy.

The remainder of our study is structured as follows: the next section is a literature review that explains the theoretical underpinnings and details the development of our hypotheses for all variables. This is followed by a description of the research methods and procedures used and the results. Finally, a thorough discussion of the findings is offered, together with theoretical and practical implications, followed by study limitations and future research prospects.

2. Theoretical background of the study

2.1. Stimulus-organism-response framework

According to the S-O-R framework proposed in environmental psychology, an individual's emotional state is directly influenced by physical or social environmental stimuli, affecting how they behave in that setting [10]. Bagozzi [11] expanded the S-O-R paradigm to investigate consumer behavior in marketing. The S-O-R framework illustrates a process in which an element of the external environmental component (stimulus) affects consumers' internal states, ultimately leading to their approach or avoidance behaviors or responses [12]. Currently, much research in the literature examines impulse buying behavior utilizing the S-O-R framework. Scholars have found that physical store environmental factors (such as music and layout) positively influence consumer impulse buying behavior [13]. One study, based on the stimulus-organism-response framework [14], assembles the stimulus components of the live-streaming shopping environment and examines their influence on consumers' psychological circumstances. From this, a research model of impulsive buying intention is created. Also, Instagram has begun to be used as a research marketing tool [15]. The research examined the impulsive purchasing habits of Generation Z women in the fashion industry [15]. It concluded that opinion leaders, advertisements, and user-generated content serve as stimuli in eliciting positive emotions that, as organisms, then lead to impulse purchases.

The S-O-R framework is regarded as the preeminent model for studying consumer behavior [16]. This study used this framework to understand the user behavior behind the blind box impulsive buying behavior. From the angle of objective stimuli, this study illustrates the relationship of product characteristics or retail environment on curiosity (organism) in terms of objective stimuli to generate relevant responses.

2.2. Adaptation level theory

Helson put forth the adaptation level theory in 1964, which claims that a new stimulus is seen in relation to an "adaptation level" [17]. This theory can help people better comprehend how different people's value systems lead to diverse responses from them to react about price increase justification [17,18]. Additionally, this theory is applied in the context of pricing; the reference price is the adaptation level used to evaluate recently observed price information. In other words, the reference price serves as a baseline for the internal price against which the consumer compares the current price of a brand they have observed or paid for [19].

When a reference price is seen as reasonable or acceptable according to the consumer's internal price criteria, it influences the consumer's judgment. However, consumers reject the reference price if they believe it exceeds the acceptable price range [20]. In

addition, this theory contends that a consumer's evaluation of a price (a stimulus) is influenced by their prior experience or memories of previous prices [21]. So far, some researchers have explored this theory from the perspective of consumption. Besides, consumers frequently compare a brand's longevity to a reference point that is derived from the average longevity of the brand's category [22]. In a similar vein, it was discovered that consumers compare the homepage of the current store with websites they have previously visited, allowing them to create and adjust a reference price for the current retailer [23]. What's more, the adaptation level theory has furthermore been widely applied in advertising [24], online auctions [21], willingness to pay [25], etc. In the context of our research, using adaptation level theory as a basis can better explain the moderating effect of consumers' price consciousness on curiosity and purchase behavior. According to adaptation level theory, when consumers' price consciousness reaches a certain level, they begin to price products based on their prior experiences with blind box products, evaluate the product's price within an acceptable range, and then make their final purchase decisions.

3. Hypothesis development

3.1. Fashion involvement

The term 'fashion involvement' refers to the degree to which a person is influenced by various fashion-related factors, such as awareness, knowledge, interest, and reactions [26]. In this study, the fashion participation variable represents the product characteristics of the blind box, defined as the degree of consumer engagement with blind boxes. Fashion involvement is often applied in the field of consumer behavior. However, it is still debatable whether fashion participation affects consumer behavior. It has been revealed that by offering sensory or experiential cues of fashion products, fashion involvement may promote fashion-oriented impulsive buying [27]. Similar findings were drawn by Ref. [28], who discovered that customers' fashion-related impulse purchases are positively influenced by fashion involvement. In contrast, it has been shown that fashion involvement has no significant relationship with impulsive buying behavior [29]. This is because, in addition to sales promotions and hedonic shopping motives, positive emotions can also influence impulsive buying. Currently, the S-O-R model and fashion involvement are frequently examined together in the literature, and some academics consider fashion engagement to be one of the important variables in the stimulation process [30].

Regarding the relationship between fashion involvement and curiosity, some scholars have noted that consumers involved in fashion shopping exhibit hedonic tendencies, including curiosity, which makes them feel more excited and satisfied when exploring new worlds [28,31]. Fashion involvement is a core characteristic of fashion consumers [26]. Additionally, blind boxes are trendy fashion products, while fashion participation relates to the level of consciousness. Therefore, it has a certain relationship with curiosity. This research explores the influence of fashion involvement and curiosity in two ways. First, it contributes to the ongoing debate regarding the influence of fashion involvement on consumer behavior. Second, from a theoretical perspective, fashion involvement might encourage consumers' curiosity and lead to impulsive purchases.

However, there is currently no literature that quantitatively and directly assesses the connection between fashion engagement and curiosity. This research bridges that gap by applying theory to practice. Thus, the following hypothesis is proposed:

H1. Fashion involvement positively influences curiosity in the context of blind boxes.

3.2. Store atmosphere

The store atmosphere is a term that encompasses all physical and non-physical aspects that may influence customer behavior toward the retailer [32]. Moreover, store atmosphere can respond to customer purchases [33], and it is frequently utilized in conjunction with the S-O-R model as one of the extrinsic factors in the stimulation section [34,35]. Currently, a lot of literature has conferred the connection between store environment and curiosity. It was noted that a shop window is created by a skilled window decorator to enliven its visual marketing and pique consumers' curiosity [36]. Similarly, Hong and Ahn [37] consider the possibility that the information on display at the cafe might pique customers' curiosity and persuade them to visit a branded coffee shop. Likewise, Hsiao et al. [38] mentioned that when customers were fully submerged in the virtual reality shopping environment, the store's atmosphere sparked their curiosity and prompted them to make purchases.

Furthermore, other scholars' research on store atmosphere mentions that the way goods are displayed in stores is related to curiosity, and that store atmosphere can stimulate participants' curiosity about products [39]. Currently, the relationship between curiosity and store atmosphere mentioned in the literature is still theoretical. There is no literature that directly tests the relationship between store environment and curiosity in a quantitative way. Since most blind box stores have distinctive features, it is significant to investigate how store environment and curiosity relate to one another quantitatively. Based on the information presented, this study suggests the following hypothesis:

H2. Store atmosphere positively influences curiosity in the context of blind boxes.

3.3. Perceived novelty

Consumers assess a product's perceived novelty by comparing its features, functions, and benefits to existing products. Experts consider novelty items striking, original, new, and unusual, which piques consumer curiosity [40]. Many customers are drawn to blind boxes because of their novelty [1]. Therefore, the perceived novelty variable effectively reflects the characteristics of blind box products. At present, much literature discusses the relationship between novelty and curiosity. It was argued in the curiosity model that

deprivation induces a sense of curiosity. When a person lacks information about a new product, they are in a state of high perceived novelty, which increases their desire to be more curious about it [41–43]. Besides, some scholars also presume that the perceived novelty can generate curiosity [44,45]. The research on AI design background also highlights that, due to buyers being unfamiliar with AI design, particularly the AI design process, curiosity is sparked by the novelty of the unknown [46]. In short, curiosity, which drives exploratory urges [47] and motivates related behaviors [48], has been proposed as a fundamental result of novelty, leading to the proposal of hypothesis 3.

H3. Perceived novelty positively influences curiosity in the context of blind boxes.

3.4. Surprise

Surprise is described as the sense of specialness or freshness experienced by customers when encountering distinctive stimuli in unexpected circumstances while consuming services or goods [49]. Surprise brought on by consumption is often considered a fleeting emotion that arises when actual performance significantly deviates from expectations [50]. The view that surprise draws our attention and piques our curiosity is also supported [51]. Existing literature on blind boxes often mentions surprise, yet it has not been thoroughly examined as a central concept. This study addresses this gap by offering a deeper exploration of surprise in blind box marketing strategies [3,52].

At present, much literature elaborates on the relationship between surprise and curiosity. Many scholars believe that surprise can pique people's curiosity, confusion, and interest [47,53–55]. Surprise was stated to be a privileged motivator for curiosity [50]. Similarly, scholars have noted that surprise is a direct emotional response to incongruence when individuals find information that contradicts their expectations. Therefore, surprise arising from incongruence is a strong antecedent of curiosity [56]. Managers constantly strive to surprise customers to increase their curiosity and participation in marketing efforts [57]. What's more, a quantitative method was used to successfully examine whether surprise had a significantly positive effect on curiosity, based on an educational psychology perspective [54]. In all artificially intelligent systems, curiosity can be triggered by surprise and uncertainty [58]. Current literature on blind boxes has examined the relationship between uncertainty and curiosity, leaving the connection between surprise and curiosity unknown [3]. To date, only a few studies have quantified the relationship between surprise and curiosity. Additionally, the connection between these variables is rarely explored in consumer behavior research. It remains to be seen whether the relationship between surprise and curiosity applies to blind box research; however, theoretically, we propose the following hypothesis:

H4. Surprise positively influences curiosity in the context of blind boxes.

3.5. Curiosity

Typically, curiosity is described as a person's psychological urge to explore novelty and the unknown [59]. Curiosity has significantly influenced human behavior, both positively and negatively [60]. Current literature indicates a link between impulsive buying behavior and curiosity. From the flow experience perspective, research in the context of cross-border e-commerce demonstrates that curiosity significantly influences impulse purchases [61].

Furthermore, some scholars hold the view that curiosity is a result of mystery appeals, according to research on shopping behavior. They have discovered that mystery appeals stimulate interest and that consumers' incentive to buy is influenced both directly and indirectly by curiosity. What's more, it was discovered that when unique package messaging is utilized, customer curiosity explains the increase in impulsive product purchases [62]. Between 2022 and 2023, there were two articles exploring the relationship between curiosity and purchase intention in a blind box context from a quantitative perspective [1,3].

Currently, there is limited quantitative exploration of the relationship between curiosity and purchase behavior, and the antecedents of curiosity can vary even within the same context. Therefore, the exploration in this paper offers additional support for existing research. Based on these observations, we propose the following hypothesis:

H5. Curiosity is positively related to impulsive buying behavior in the context of blind boxes.

3.6. Price consciousness

Price is an economic aspect a consumer considers when making various buying decisions for goods or services [63]. Price consciousness refers to how much time and energy consumers spend focusing on low prices [64]. In other words, highly price-conscious consumers tend to seek the best deals. Price consciousness is intimately tied to consumer behavior. Highly price-conscious consumers are more likely to have stronger search intents when they see advertisements or discounts [65]. Therefore, price-related considerations would have a substantial relationship with consumers' purchase decisions [66].

Additionally, while price consciousness generally functions as a moderating variable in the consumption field, it only operates under certain conditions. According to the research, consumer price consciousness moderates the relationship between purchase intention and information gratification but does not moderate the relationship between entertainment gratification and purchase intention [67]. Moreover, the study results do not support the idea that price consciousness moderates the relationship between purchase intention and actual second-hand clothing purchases [68]. It was discovered that price consciousness negatively affects the relationship between buying intention and actual purchase [65]. In opposite, the intriguing result of some scholars indicated that the

price consciousness variable has no relationship on the intention to purchase [66]. Given the above controversies, it is meaningful to test whether price consciousness moderates the relationship in the context of blind boxes. Theoretically, price-sensitive customers are likely to compare the prices of blind box products more thoroughly, thereby reducing their impulse to purchase. Based on this, we propose the following hypothesis:

H6. Price consciousness moderates the association between curiosity and impulsive buying behavior.

Consequently, Fig. 1 illustrates the research model of the current study.

4. Research methodology

4.1. Questionnaire development

Measurement items from earlier research were adopted and adapted for this study's setting. To ensure language equality and face validity, every measure from the body of current research was translated and then translated back [69]. Chinese translations of the survey were completed by two doctoral students specializing in English translation. After the initial translation, two marketing experts and teachers critically reviewed the Chinese version of the questionnaire and provided valuable insights. Based on their feedback, several revisions were made to enhance the quality and accuracy of the questionnaire. A pilot study with 50 participants was conducted before administering the formal survey to evaluate the reliability and understandability of the questionnaire items. In the final stage of document revision, a Canadian Chinese individual was engaged to proofread the final version, incorporating feedback from the interviewees. This step was taken to ensure the utmost accuracy and quality of the final document.

A four-item scale of curiosity and a four-item scale of fashion involvement were coming from Refs. [3,70]. A five-item scale of store atmosphere adapted from Refs. [71,72]. Five-item scale adapted from perceived novelty and a five-item scale of surprise were originated from Refs. [73,74]. Based on Rook and Fisher, eight items were used to measure impulsive buying behavior [75]. Five measurement items are based on Alford and Biswas to measure price consciousness [65]. All the measurement items employ the seven-point Likert scale.

4.2. Data collection and sampling

Data were collected via an online survey developed using "Sojump," a well-known online survey tool in China (www.wjx.cn). The survey was conducted from October 2023 to January 2024. The survey link was distributed through social media platforms including WeChat, Weibo, QQ, and Douban. A purposive sampling approach was employed to identify and reach the number of respondents. To encourage participation, a link to the questionnaire was posted under relevant blind box topics, offering a reward of 5 RMB for completion. A total of 320 questionnaires were collected, of which 306 were deemed valid and included in the analysis. The sample predominantly consisted of women, with 187 female participants and 119 male participants. All participants had personally purchased blind boxes. This gender distribution reflects the characteristics of the blind box consumer population. The sample also represented various age groups, as shown in Table 1. Of the respondents, 70.3 % identified as students, 76.8 % had earned an undergraduate degree, and 18.3 % had postgraduate degrees or higher. However, a substantial portion of respondents (57.8 %) had a monthly salary of less than RMB 3000. Among the blind box categories included in the survey, POPMART was the most popular, comprising approximately 60.5 % of the total, followed by DISNEY, which accounted for about 15 %.

4.3. Demographic statistics

To assess the structural models and measurements, we used Partial Least Squares Structural Equation Modeling (PLS-SEM) and SmartPLS v3.3.9 software. SmartPLS is an effective tool for analyzing sophisticated structural equation models, particularly when dealing with complex relationships involving moderators and mediators in business and marketing contexts, even in studies with limited sample sizes [76]. Moreover, it necessitated minimal restrictions on the measurement scales, the sample size, and the data normality [77]. In addition, compared to the CB-SEM, the PLS-SEM has more statistical power [78].

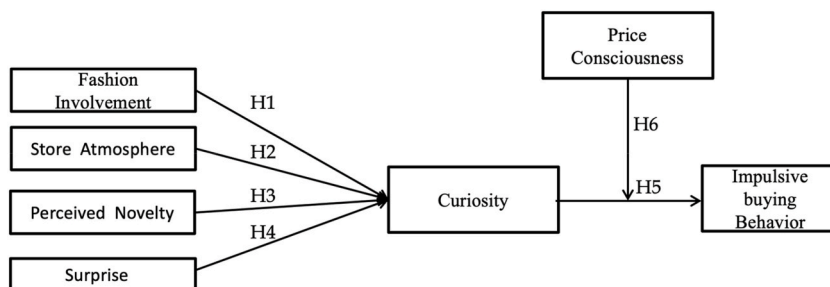


Fig. 1. Research model.

Table 1
Demographic profile (N = 306).

		Frequency	Percentage (%)
Gender	Male	119	38.9
	Female	187	61.1
	Total	306	100.0
Age	≤20	75	24.5
	21–25	169	55.2
	≥ 26	62	20.3
	Total	306	100.0
Education	Primary school or below	3	1.0
	High school	11	3.6
	Undergraduate	235	76.8
	Graduate or over	56	18.3
	Others	1	0.3
	Total	306	100.0
Job	Manager	24	7.8
	Housewife	2	0.7
	Student	215	70.3
	Self-employed	35	11.4
	Others	30	9.8
	Total	306	100.0
Salary	<RMB3000	177	57.8
	RMB 3001-6000	69	22.5
	RMB 6001-10000	32	10.5
	≤ RMB 10001	28	9.2
	Total	306	100.0
Brand	POPMART	185	60.5
	52TOYS	12	3.9
	TOPTOY	22	7.2
	DISNEY	46	15.0
	19∧3	2	0.7
	TsonnyAngel	3	1.0
	Tokidoki	12	3.9
	Others	24	7.8
	Total	306	100.0
Frequency buying	Less than 2	118	38.6
	3-5 times	94	30.7
	6-10 times	37	12.1
	over 11 times	57	18.6
	Total	306	100.0

Note: Table 1 presents an original illustration of the demographic statistics of the respondents.

4.4. Analysis and results

4.4.1. Measurement model

The measurement model was examined by analyzing the constructs' reliability and validity. The Cronbach's alpha and composite reliability (CR) values for each construct exceeded the suggested level of 0.7 [78], as shown in Table 2. According to Ref. [79], the scores for rho_A ranged from 0.784 to 0.923, exceeding the threshold value of 0.7. These findings demonstrate the strong reliability of our constructs. Typically, the average variance extracted (AVE) is used to test convergent validity. In this study, all the constructs' AVE values ranged from 0.517 to 0.731, exceeding the recommended threshold of 0.5 [77]. Next, discriminant validity was assessed by comparing the inter-construct correlations with each construct's square root of the AVE. As shown in Table 4, all square root AVE values were greater than any of the correlation coefficients [80]. Therefore, good discriminant validity is suggested by it. For the final method, we employed the heterotrait-monotrait (HTMT) ratio of correlations technique, which claims that discriminant validity can be guaranteed if the HTMT value of any two latent variables is less than the crucial value of 0.9 [77]. Table 3 shows that any two latent variables have an HTMT value that is less than 0.9, providing proof of the validity of the discriminant.

To further understand how the target audience responded to each construct, this research analyzed the standard deviations and means for each construct. Mean scores show the data's central tendency, while standard deviation indicates the amount of variance in the data [81,82]. Table 4 displays the means and standard deviations of the seven constructs in 7-point Likert scale for this study. Indeed, the mean values in the antecedent variables in the sequence for curiosity are as follows: Perceived Novelty (Mean = 5.92, SD = 0.820), Store Atmosphere (Mean = 5.80, SD = 0.741), Fashion Involvement (Mean = 5.27, SD = 1.135), Surprise (Mean = 5.18, SD = 1.014). As described above, Perceived Novelty and Store Atmosphere are the most popular factors among customers. In addition, the value of Price Consciousness (Mean = 5.05, SD = 1.290) shows that most of this group people in high price consciousness.

4.4.2. Common method variance

In this work, common method variance was tested using Harman's exploratory factor analysis test. Common method variance is a

Table 2
Construct reliability and validity.

Variable	Item	Loading	Cronbach's α	rho_A	CR	AVE
Curiosity	CU1	0.862	0.866	0.871	0.908	0.712
	CU2	0.819				
	CU3	0.865				
	CU4	0.829				
Fashion involvement	FI1	0.778	0.876	0.88	0.915	0.731
	FI2	0.863				
	FI3	0.896				
	FI4	0.878				
Impulsive buying behavior	IBB1	0.859	0.92	0.923	0.935	0.643
	IBB2	0.753				
	IBB3	0.83				
	IBB4	0.806				
	IBB5	0.845				
	IBB6	0.841				
	IBB8	0.721				
	IBB9	0.746				
	Perceived novelty	PN1				
PN2		0.825				
PN3		0.816				
PN4		0.813				
PN5		0.781				
Price consciousness	PRICEC1	0.743	0.889	0.895	0.912	0.675
	PRICEC2	0.846				
	PRICEC3	0.889				
	PRICEC4	0.84				
	PRICEC5	0.784				
Store atmosphere	STO1	0.716	0.813	0.82	0.865	0.517
	STO2	0.784				
	STO3	0.754				
	STO4	0.683				
	STO5	0.713				
	STO6	0.656				
Surprise	SUR1	0.733	0.78	0.784	0.849	0.53
	SUR2	0.778				
	SUR3	0.752				
	SUR4	0.725				
	SUR5	0.647				

Note: Table 2 represents an original illustration of construct reliability and validity, developed by the authors.

Table 3
The heterotrait-monotrait ratio (HTMT) for constructs.

Constructs	PRICEC	CU	FI	IBB	PN	STO	SUR
PRICEC							
CU	0.15						
FI	0.078	0.395					
IBB	0.081	0.369	0.367				
PN	0.199	0.765	0.472	0.271			
STO	0.178	0.652	0.564	0.273	0.75		
SUR	0.18	0.565	0.639	0.445	0.624	0.637	

Note: PRICEC=Price consciousness, PN = Perceived novelty, CU= Curiosity, IBB=Impulsive buying behavior, STO= Store atmosphere, FI= Fashion involvement, SU = surprise. HTMT <0.90.

significant issue when one latent component makes up more than 50 % of the overall variation of the measures [83]. Only 14.590 % of the variation could be explained by a single factor, according to component analysis, and as a result, the data were judged to be free of common method variance. We additionally used the variance inflation factor (VIF) to examine the potential existence of multicollinearity. The findings demonstrated that no VIF values exceeded the threshold value of 5, indicating that the data were free of multicollinearity problems [78].

4.4.3. Structural model

Using a structural model analysis, we assess the determinant coefficient (R^2), predictive relevance (Q^2), effect size (f^2), and hypothesized path linkages of the research model which are shown in Table 4 and Fig. 2. To estimate the model's explanatory power, the determinant coefficient R^2 was first evaluated. R^2 values around 0.670, 0.333, and 0.190 indicate strong, moderate, and weak explanatory power, respectively. According to the findings, curiosity and Impulsive buying behavior have R^2 values of 0.491 and

Table 4
Result of descriptive analysis.

Construct	No. of mean items	Mean	Standard Deviation
1. Curiosity	4	5.64	0.984
2. Fashion Involvement	4	5.27	1.135
3. Store Atmosphere	6	5.80	0.741
4. Perceived Novelty	5	5.92	0.824
5. Surprise	5	5.18	1.014
6. Impulsive buying behavior	8	4.35	1.390
7. Price Consciousness	5	5.05	1.290

Note: Table 4 represents an original illustration developed by the authors.

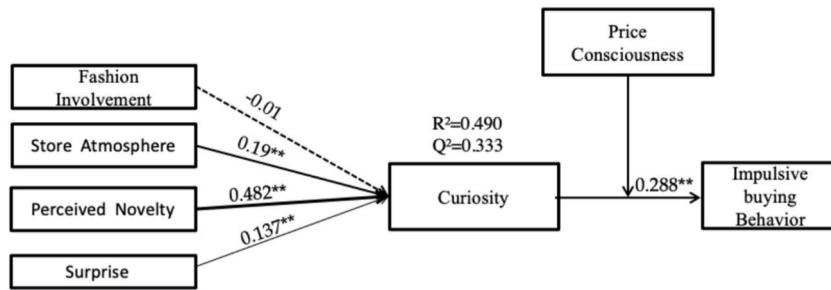


Fig. 2. Structural model.

Note: **p < 0.05, ***p < 0.01, →no relationship, →significant relationship.

0.169, respectively, demonstrating that the R2 of curiosity is moderate and impulsive buying behavior is weak. Following that, we used the blindfolding method to calculate the Stone-Geisser Q² value to assess the predictive accuracy of the model. The Q² values for curiosity and impulsive buying behavior are 0.333 and 0.102, respectively, both of which are more than zero, indicating that the route model’s prediction accuracy is sufficient [82]. According to Cohen’s guidelines, which state that effect sizes of 0.02, 0.15, and 0.35 correspond to small, medium, and large effects, this study further analyzed the effect size f² [83].

To verify the significance of the path coefficients in the research model, we utilized the partial least squares structural equation modeling (PLS-SEM) bootstrapping subsampling technique with 5000 sub-samples [82].

Four of the five direct relationship hypotheses are supported by the findings of the direct association test, as shown in Table 5. More specifically, three variables—store atmosphere (β = 0.19, t = 3.265, p < 0.05), perceived novelty (β = 0.482, t = 8.01, p < 0.05), and surprise (β = 0.137, t = 2.352, p < 0.05)—were found to favorably increase curiosity, which supports H2, H3, and H4. However, fashion involvement is not significantly related to impulsive buying behavior (β = −0.01, t = 0.062, p > 0.1), H1 is not supported. In addition, it is discovered that curiosity can influence impulse purchase behavior favorably (β = 0.288, t = 5.041, p < 0.05), supporting H5.

On the one hand, for the mediation relationship test, according to the findings in Table 6, apart from those between fashion participation and curiosity, all the t value > 1.96 (p values < 0.05) intervals. This means that curiosity plays an important role in the relationship between store atmosphere, surprise, perceived novelty, and impulse buying behavior.

Regarding the moderation relationship test, Fig. 3 shows that the green line (representing the higher price consciousness group) has a gentler slope than the red line (representing the lower price consciousness group). This suggests that the influence of curiosity on impulsive buying behavior is weaker when price consciousness is higher, thus supporting H6.

5. Discussion and implication

In this research, Chinese customers who had purchased blind boxes were chosen as research subjects to evaluate the relationships among variables, such as fashion participation, surprise, store atmosphere, perceived novelty, curiosity, and impulsive buying

Table 5
The results for path coefficient (N = 306).

Hypothesis	Relationships	SE	t-values	Decision	R ²	F ²	Q ²
H1	FI - > CU	0.062	0.161	Not supported		0	
H2	STO - > CU	0.058	3.265	Supported		0.038	
H3	PN→CU	0.06	8.01	Supported	0.490	0.25	0.333
H4	SUR→CU	0.058	2.352	Supported		0.022	
H5	CU→IBB	0.057	5.041	Supported	0.169	0.070	0.102

Note: Table 5 represents an original illustration of the results for path coefficient, developed by the authors.

Table 6
Results of structural model (Indirect relationship).

No	Path	Indirect Effect	STD	t-values	95%CI(LL-UL)	Supported
1	PN -> CU -> IBB	0.139	0.032	4.383	0.081–0.206	YES
2	STO -> CU -> IBB	0.055	0.021	2.585	0.019–0.103	YES
3	FI -> CU -> IBB	-0.003	0.019	0.152	-0.038–0.038	NO
4	SUR -> CU -> IBB	0.039	0.02	1.963	0.010–0.088	YES

Note: PN = Perceived novelty, CU= Curiosity, IBB=Impulsive buying behavior, STO= Store atmosphere, FI= Fashion involvement, SU = surprise. Table 6 represents an original illustration developed by the authors.

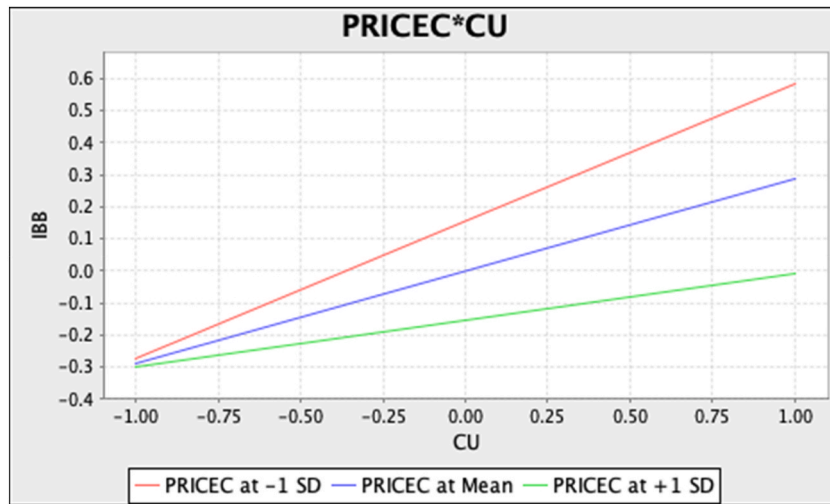


Fig. 3. The moderator of the price consciousness.

Note: Fig. 3 demonstrates that the relationship between curiosity and impulsive buying behavior is moderated by price consciousness, with the effect being strongest for individuals who are less price-conscious.

behavior. Meanwhile, price consciousness was used as a moderator variable in the research. In addition, we applied the S-O-R model to study impulse buying behavior in a blind box background. The first five hypotheses we investigated (H1–H5) had direct connections to blind box impulsive buying, while the sixth (H6) was a moderating hypothesis.

However, contrary to the predicted results, hypothesis 1 was not supported. Fashion involvement does not affect curiosity, and consequently, cannot positively affect impulsive buying behavior through curiosity. This result likely stems from the insufficient appeal of the blind box’s fashion element compared to its other features in stimulating consumer curiosity. Future research should focus on the different characteristics of blind box products [3]. Furthermore, this conclusion offers insights into the relationship between fashion involvement and consumer behavior. The nature of this relationship appears to be context-dependent. Although a theoretical connection might be inferred, in this study, fashion involvement did not lead to impulsive buying behavior for blind box products. H2-H4 are all supported, among which the perceived novelty has the most substantial positive relationship on curiosity ($f^2 = 0.25$), the store atmosphere ($f^2 = 0.038$) is in the middle, and surprise is followed behind ($f^2 = 0.022$). This result of the variable ranking is due to the collected population. On the one hand, 61.4 % of people have bought blind boxes more than 3 times. Therefore, people who have purchased many times will be less surprised by the strategy of blind box sales of the same kind. On the other hand, 60.5 % of them have bought POP MART. In fact, POP MART represents the blind box toys, they have different product lines, and the series of each group is constantly updated. Thus, the novelty of the updated product line will be more attractive than the surprise of the blind box itself, and they will be more interested in exploring new styles. The H2 result of store atmosphere proves the theoretical relationship between the two variables that the store environment works on curiosity [39]. Various brands of blind box shops are decorated with different store styles. Among these, attractive design and cleanliness can put consumers in a better mood to explore and buy. Finally, the result supporting H5 is consistent with recent research. Nevertheless, the value relationship between curiosity and impulse purchases is lower than in the other studies. The cause of it is still related to the relevant population and the current collection time.

Considering the moderating role of price consciousness, this study tested one hypothesis (H6). The findings suggest that price consciousness negatively moderates the relationship between curiosity and impulse buying. For consumers who are more sensitive to blind box prices, they are less likely to make impulse purchases [65,84]. Hence, H6 demonstrates that customers are influenced by product price.

5.1. Theoretical implications

This article contributes to the literature in several ways on impulse buying and blind box product selling strategies from three aspects. First, this research has made more explorations on the causes of curiosity, the relationship among which store atmosphere, perceived novelty, fashion involvement, and curiosity have not been verified from a quantitative point of view in the previous literature. Therefore, this part fills a certain literature gap. Furthermore, there has been controversy on the relationship between fashion involvement and curiosity [28,29]. This study finds that the two are irrelevant in the context of blind box impulse buying, which can provide a certain reference for the current debate because the relationship varies under different backgrounds.

Second, this study proposes a concise and integrative framework relating objective stimuli such as product characteristics or retail environment, and curiosity which is an intrinsic motivation to produce final impulse purchase outcomes [85]. This research finally confirms how the atmosphere stimulates customers' curiosity and generates impulse purchases. Meanwhile, the S-O-R paradigm's applicability is supported by our findings. According to this paradigm, atmosphere influences consumers' internal states, which in turn influences responses. Then, our findings expand on the prior findings in two ways: 1) it involves an original model that links three product characteristics with one retail context-related variable to consumer curiosity. 2) it investigates three groups of variable relationships that have not been measured quantitatively in previous literature so far.

Third, we tested the moderating relationship of price consciousness based on the adaptation level theory. Previous literature shows that the price conscience variable does not play a regulating role under every marketing condition [64,66]. Thus, adding this variable to test the moderating relationship can provide some reference for the impulse buying model. Based on the reference which explains more price-sensitive customers are less possible to make impulse purchases provides meaningful evidence. In addition, this theory provides some angles to the results of negatively moderate impulsive buying behavior.

5.2. Practical implications

Blind box sales strategies are currently being applied in a variety of areas, including food, tourism, mobile games, and so on [1,9]. Since 2019, China has progressively experienced a "blind box" surge, and research on blind box sales strategy is still in its early stages [3]. This study put forward practical significance for blind box strategy and impulse consumption. Meanwhile, it also provides some valuable illumination for consumers and the government.

This research demonstrates that price consciousness can negatively moderate the relationship between curiosity and impulse buying. On the one hand, for consumers, impulsive shoppers comprise 41 % of Generation Z consumers, followed by 34 % of Millennials and 32 % of Generation X [86]. Thus, younger consumers and guardians of minors could get some suggestions from this research. They can apply this inference into practice and aim to reduce the probability of impulsive consumption by increasing price consciousness.

In addition, consumers should cultivate their price awareness. When seeing similar blind box products, they should remind themselves whether there are lower prices, discounts, and substitutes (such as similar products in the second-hand market) for this product on different platforms. In this way, they can increase price consciousness could decrease the rate of impulse purchases. Besides, considering the positive relationship between store atmosphere, perceived novelty, and surprise with curiosity, consumers should also increase their awareness in pre-buying, thinking more when encountering these product elements and stores. In addition, they should check more reviews from people who have bought them.

On the other hand, it is about the government. There are over 26,000 complaints about blind boxes on a single complaint platform in China [87]. Although the current government conducts price ceiling control on blind boxes [88], it is not enough to improve consumers' price consciousness from the price control alone. According to China Daily reports [89], some enthusiasts spend hundreds of thousands of yuan annually on blind boxes. Simply imposing price restrictions on the products will not fully curb consumer enthusiasm. The government should also employ both online and offline methods, such as newspapers, posters, and online media, to enhance awareness. The promotional content can be expanded into two main aspects: First, the promotion should emphasize the material costs of the blind boxes to increase consumers' sensitivity to the relationship between product prices and production costs, thereby improving their price consciousness.

Second, the government can also address regression cases involving blind box buyers and integrate blind box stores and related products with these cases to create reminders. This approach will not only reduce consumers' sense of surprise but also help them develop a conditioned reflex when encountering similar products, prompting more conscious consideration.

6. Limitations, future research, and conclusion

This study has some limitations. First, cross-sectional data were employed in this study to confirm the correlations in the research model, which may limit conclusions about causality. Future research should focus on experimental designs to improve the outcomes. Second, to explore more ways to suppress impulsive buying behaviors, future studies should include additional moderator and mediator variables in the research model and adopt different theoretical frameworks.

Third, this research may not provide a representative sample since it used an online collection method, and 70 % of the surveyed occupational groups are students (predominantly college students). Therefore, the findings may not be generalizable. In the future, the mall intercept method in physical stores should be incorporated to diversify the occupations in the survey sample.

Additionally, the sample for this study was collected only in China, potentially limiting the universal applicability of the results. Therefore, future research could compare results from two or more countries, allowing more cultural variances to be reflected in the

model.

Lastly, it would be valuable for scholars to expand this topic into the field of biology, linking brain functions, such as the ventromedial prefrontal cortex related to impulsive behavior and the insula linked to price perception, with this study.

Although research on blind box strategies and purchases is currently quite novel, most existing studies encourage this type of purchase behavior from the perspective of enterprises. It is worth noting that the focus of this research is primarily on both enterprise and consumer levels.

This study captures important characteristics of the blind box store environment and product features, exploring impulse buying behavior through the lens of curiosity mediation. It also employs negative moderator variables to affect the final impulse buying behavior, ultimately finding that price consciousness can have a significant moderating relationship.

Our research makes a new exploration into the causes of curiosity, effectively applies the S-O-R framework, and examines the moderating role of price consciousness. Moreover, this study provides valuable advice for customers who want to curb their impulse purchases and for governments creating regulations for related products.

CRedit authorship contribution statement

Xiyun Gong: Writing – review & editing, Writing – original draft, Software, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Choy Leong Yee:** Writing – review & editing, Writing – original draft, Validation, Supervision, Resources, Project administration, Investigation, Conceptualization. **Shin Yiing Lee:** Writing – review & editing, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition. **Abu Naser Mohammad Saif:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation. **Meilian Liu:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Investigation. **Fariah Anonhi:** Writing – review & editing, Visualization, Validation, Resources, Investigation, Funding acquisition.

Ethics statement

Ethical clearance for this research was approved by the Ethics Committee for Research Involving Human Subjects of Universiti Putra Malaysia (JKEUPM) with the approval number JKEUPM-2023-238. The date of approval is 04 September 2023. In addition, verbal informed consent was obtained from the participants who agreed to take part in the survey after being informed of all pertinent aspects, including the study's purpose, procedures, risks, and benefits. Unlike written informed consent, no physical documentation was signed; the consent was obtained orally.

Data availability statement

Data can be made available upon reasonable request to the corresponding author.

Survey items

Construct	Items	Research items	Ref.
Curiosity	CU1	I really enjoy the uncertainty of blind boxes.	Zhang et al. (2022) [3]
	CU2	I love the wonderful experience of seeking new things given by blind boxes.	
	CU3	I prefer the exciting unpredictability of blind boxes.	
	CU4	I'm the kind of person who can accept uncertainty in a blind box.	
Fashion involvement	FI1	I think fashion products to be important in general.	Novak et al. (2000) [70]
	FI2	Fashion products mean a lot to me.	
	FI3	Fashion product matters to me.	
	FI4	Fashion product is of concern to me.	
Impulsive buying behavior	IBB1	I often buy the blind boxes spontaneously.	Rook and Fisher (1995) [75]
	IBB2	"Just do it" describes the way I buy the blind boxes.	
	IBB3	I often buy the blind boxes without thinking.	
	IBB4	"I see it, I buy it" describes me when I see the blind boxes or my favorite things.	
	IBB5	"Buy now, think it about it later" describes me.	
	IBB6	Sometimes I feel like buying the blind boxes on the spur of the moment.	
	IBB7	I don't carefully plan most of my purchases.	
	IBB8	Sometimes I am a bit reckless about what I buy.	
Perceived novelty	PN1	The item in Blind box is new to me.	Dang (2020) [73]
	PN2	There is novelty in the blind box.	
	PN3	The item in blind box satisfies my curiosity.	
	PN4	The item in blind box offers novel experience.	
	PN5	The item in Blind box makes me feel like I'm exploring new things.	
Price consciousness	PC1	I find myself checking the prices of the blind box I want to buy.	Alford and Biswas (2002) [65]
	PC2	I am willing to go through extra effort to find lower priced the blind boxes.	
	PC3	I will shop for blind box at more than one store to take advantage of low prices.	
	PC4	I would always shop at more than one store to find low prices of blind boxes.	

(continued on next page)

(continued)

Construct	Items	Research items	Ref.
Store atmosphere	PC5	The money saved by finding lower prices of the blind boxes is usually worth the time and effort.	
	STO1	This blind box store was clean.	Chang et al. (2014); Yoo et al. (1998) [71,72]
	STO2	This blind box store was a relaxing place to shop.	
	STO3	The blind box store was a pleasant place to shop.	
	STO4	The blind box store has an impressive interior design.	
	STO5	The decorations in the blind box store were pleasant and attractive.	
Surprise	STO6	The music in the blind box store is relaxing and delightful.	Sharma and Nayak (2019) [74]
	SUR1	I am thoroughly inspired by blind boxes.	
	SUR2	I am fascinated to see the blind box.	
	SUR3	I am astonished by the blind box.	
	SUR4	I am surprised about the blind box.	
	SUR5	I am amazed by the blind box.	

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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