

How Design Cues Influence Virtual Fashion Purchase Intention: An S-O-R Perspective among Chinese Consumers

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ABSTRACT

This study investigates the effects of four design cues—visual appeal, novelty, interactivity, and symbolism or identity expression on virtual fashion purchase intention among Chinese consumers and examines the mediating role of emotional arousal in these relationships. Drawing on the Stimulus-Organism-Response (S-O-R) framework, data were collected through an online survey, yielding 605 valid responses, and analyzed using Consistent Partial Least Squares Structural Equation Modeling (PLSc-SEM). The findings reveal that all four design cues are positively associated with both emotional arousal and purchase intention, with interactivity exerting the strongest direct effect on purchase intention. Emotional arousal also has a positive effect on purchase intention and partially mediates the relationships between all four design cues and purchase intention. These findings highlight virtual fashion as a distinctive form of digital consumption in which consumers' purchase intentions are shaped not only by visual appeal but also by interactivity, symbolic meaning and identity expression, and the emotional responses elicited by these design cues.

Keywords: Virtual Fashion, Design Cues, Emotional Arousal, Purchase Intention, Stimulus-Organism-Response Framework

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บทคัดย่อ

การวิจัยนี้มีวัตถุประสงค์ เพื่อศึกษาอิทธิพลขององค์ประกอบการออกแบบ 4 ด้าน ได้แก่ ความดึงดูดทางสายตา ความแปลกใหม่ ปฏิสัมพันธ์ และความหมายเชิงสัญลักษณ์หรือการแสดงอัตลักษณ์ ที่มีต่อความตั้งใจซื้อแฟชั่นเสมือนจริงของผู้บริโภคชาวจีน รวมทั้งตรวจสอบบทบาทการเป็นตัวแปรสื่อกลางของการเร้าอารมณ์ในความสัมพันธ์ดังกล่าว โดยประยุกต์ใช้กรอบแนวคิดสิ่งเร้า สิ่งมีชีวิต การตอบสนอง (Stimulus-Organism-Response: S-O-R) เป็นกรอบในการศึกษา เก็บรวบรวมข้อมูลด้วยแบบสอบถามออนไลน์และได้แบบสอบถามที่สมบูรณ์จำนวน 605 ชุด จากนั้นวิเคราะห์ข้อมูลด้วยวิธี Consistent Partial Least Squares Structural Equation Modeling (PLSc-SEM) ผลการวิจัยพบว่า องค์ประกอบการออกแบบทั้ง 4 ด้านมีความสัมพันธ์เชิงบวกกับการเร้าอารมณ์และความตั้งใจซื้อ โดยปฏิสัมพันธ์มีอิทธิพลทางตรงต่อความตั้งใจซื้อมากที่สุด นอกจากนี้ การเร้าอารมณ์ยังมีอิทธิพลเชิงบวกต่อความตั้งใจซื้อและทำหน้าที่เป็นตัวแปรสื่อกลางบางส่วนในความสัมพันธ์ระหว่างองค์ประกอบการออกแบบทั้ง 4 ด้านกับความตั้งใจซื้อ ผลการศึกษาสะท้อนให้เห็นว่าแฟชั่นเสมือนจริงเป็นรูปแบบการบริโภคดิจิทัลที่มีลักษณะเฉพาะ โดยความตั้งใจซื้อของผู้บริโภคไม่ได้ขึ้นอยู่กับความดึงดูดทางสายตาเท่านั้น แต่ยังได้รับอิทธิพลจากปฏิสัมพันธ์ ความหมายเชิงสัญลักษณ์และการแสดงอัตลักษณ์ ตลอดจนการตอบสนองทางอารมณ์ที่เกิดจากองค์ประกอบการออกแบบดังกล่าว

คำสำคัญ : แฟชั่นเสมือนจริง องค์ประกอบการออกแบบ การเร้าอารมณ์ ความตั้งใจซื้อ S-O-R

1. INTRODUCTION

What makes virtual fashion different from traditional fashion is not just the digital setting. The difference also lies in the product itself. Traditional fashion gives consumers tangible goods. Virtual fashion exists as digital clothing and virtual assets that appear on avatars and digital platforms (Ki, Chong, Aw, Lam, & Wong, 2025; Venturini & Columbano, 2024). Consumers interact with these items through digital images to express themselves in virtual spaces (Chan, Henninger, Boardman, & Blazquez Cano, 2024; Venturini & Columbano, 2024). Once avatars are treated as extensions of the self, virtual items draw greater attention and gain stronger acceptance (Bae, Kim, & Cho, 2025; Park & Kim, 2024). This shift changes the way fashion is evaluated, with consumers relying on what they see on screen. Design cues thus play a crucial role in how consumers understand, emotionally respond to, and form purchase intentions regarding virtual fashion (Ki et al., 2025; Dai, Xiao, & Li, 2024; Lin, Chen, Qiu, Yu, & Xia, 2025).

Despite the rapid growth of virtual fashion research, the literature remains fragmented. Some studies focus on individual design elements, while others examine platform characteristics or broader online experiences (Chan et al., 2024; Lin et al., 2025; Prashar & Prashar, 2024). However, there is still limited understanding of how multiple design cues interact to shape consumer responses within a unified framework. While emotion has long been recognized as important in digital consumption, its role in virtual fashion remains unclear. Prior research often emphasizes concepts such as enjoyment or immersion, but emotional arousal has received less attention, particularly in terms of how it functions in the evaluation process (Ha & Lennon, 2010; Kim & Lennon, 2010). Consequently, it remains unclear how design cues and emotional processes jointly influence purchase intention in virtual fashion. This study examines how design cues influence purchase intention through emotional arousal.

The study extends the S-O-R framework by incorporating emotional arousal as a mediating mechanism in the virtual fashion context. Unlike broader emotional constructs such as enjoyment, emotional arousal captures an immediate and intense response to design cues, making it particularly relevant in digital environments where consumers engage with virtual representations rather than physical products. It provides a more direct way to understand how design features such as visual appeal, interactivity, and novelty influence purchase intention through emotional pathways, especially in the absence of physical interaction (Mehrabian & Russell, 1974; Ha & Lennon, 2010).

2. LITERATURE REVIEW

2.1 The S-O-R Framework in Virtual Fashion

The S-O-R framework provides a useful foundation to explain how consumers respond to external cues. Mehrabian and Russell (1974) initially proposed this framework. Their core logic states that external stimuli impact an individual's internal state. This state in turn shapes behavioral responses. Donovan

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and Rossiter (1982) later introduced this logic into the retail environment. They argued that environmental cues can influence consumers' approach or avoidance behaviors through emotional reactions. Scholars have widely used the S-O-R framework in consumer research since then. It is applied to study how external information affects consumer responses through psychological mechanisms (Chen, Ni, & Zhang, 2024; Lin et al., 2025).

This framework is also relevant to the present study. In virtual fashion consumption, consumers cannot interact with the products physically, so they highly rely on the external presented design cues to evaluate the products. These cues often further influence consumers' internal reactions and subsequent decisions (Kim & Lennon, 2010; Lavoye, Sipilä, Mero, & Tarkiainen, 2023; Lin et al., 2025).

Accordingly, this study uses the S-O-R framework to explain the formation process of consumers' responses in virtual fashion. Here, design cues constitute the stimulus factors, emotional arousal reflects consumers' internal reactions, and purchase intention represents their behavioral tendencies. This framework helps explain how design cues and emotional responses jointly shape purchase intention.

2.2 Virtual Fashion as Aesthetic and Symbolic Consumption

Virtual fashion represents a form of consumption that combines aesthetic and symbolic qualities. What distinguishes it is its strong aesthetic orientation. As a digital product, it does not provide material functions such as protection, comfort, or durability (Boughlala & Mazzucotelli Salice, 2024; Venturini & Columbano, 2024). Instead, it is created for visual display and identity projection in digital environments (Dai et al., 2024; Lin et al., 2025). Unlike NFT fashion items, which emphasize ownership and tradability, or AR try-on, which supports physical purchase decisions, its value lies mainly in visual experience and the atmosphere it creates. Consumer evaluation therefore centers on visual appeal rather than functionality (Venturini & Columbano, 2024; Alexander, Blazquez, Chrimes, & Boardman, 2025).

It also carries strong symbolic value. Avatars act as a medium for identity expression, they allow individuals to present who they are or who they want to be (Song & Li, 2025; Oh, Kim, & Choo, 2023). Through digital clothing and customization, users signal personal taste, social identity, and group belonging (Kalyvaki, McIntosh, & Nash, 2023; Sharma, 2024). These choices reflect both the actual and the ideal self (Hansen, 2015; Ma, 2025). Compared with AR systems tied to the physical body, virtual fashion enables more flexible forms of self-representation, and its value is driven less by scarcity than by meaning and aesthetic expression. Aesthetic and symbolic dimensions thus jointly shape how consumers perceive its value (Kabalska & Wagner, 2025).

2.3 Design Cues in Virtual Fashion Evaluation

In virtual fashion contexts, product evaluations are shaped by multiple design-related features rather than visual appearance alone (Huggard & Särämäkari, 2023; Lin, Li, & Xia, 2024). Virtual fashion lacks the direct tactile experience of traditional clothing; therefore, consumers rely on multiple design cues when forming purchase judgments (Baytar & Ashdown, 2015; Lin et al., 2024). As a result, virtual fashion evaluation is a multi-cue process, and design cues are central to consumer decision-making.

This study focuses on four design cues that are particularly salient in virtual fashion evaluation: visual appeal, novelty, interactivity, and symbolism or identity expression. Visual appeal captures the perceived aesthetic harmony of a design (Yang, Kho, Moe, & Kim, 2025; Lin et al., 2024), while novelty reflects the extent to which a design appears new and distinctive (Khelladi, Lejealle, Rezaee Vessal, Castellano, & Graziano, 2024; Venturini & Columbano, 2024). Interactivity refers to the degree to which consumers can actively engage with and explore the product during evaluation (Sekri, Bouzaabia, Rzem, & Juárez-Varón, 2025; Lin et al., 2024). Symbolism or identity expression (SIE) indicates whether a product conveys social meaning and aligns with consumers' self-concept (Song & Li, 2025; Bardzell, Pace, & Terrell, 2010). Although symbolic value and identity expression are conceptually distinct, empirical evidence suggests that they function as coexisting facets of a higher-order construct; they are therefore combined in this study as a single SIE dimension to capture the integrated nature of digital self-expression (Armstrong, Kang, & Lang, 2018).

Together, these four cues capture how consumers evaluate virtual fashion: how it looks, how distinctive it appears, how it can be experienced, and what it expresses (Dai et al., 2024; Yang et al., 2025). They therefore provide a comprehensive basis for understanding consumers' pre-purchase judgments.

2.4 Design Cues, Emotional Arousal, and Purchase Intention

In virtual fashion, design cues may influence consumer responses through both direct and indirect paths. Emotional arousal, defined as the level of psychological activation triggered by external stimuli, reflects the intensity of emotion rather than its valence (Mehrabian & Russell, 1974). This construct is particularly relevant in virtual fashion, where consumers often evaluate products through brief screen-based exposure and rely on rapid affective reactions to form initial impressions (Yoo & Kim, 2014; Park, Ko, & Do, 2023; Yin, Huang, & Ma, 2023).

Visual appeal and interactivity often evoke positive emotional responses, which in turn drive engagement and purchase intention (Lin et al., 2025; Lee, Xu, & Porterfield, 2022). Novelty mainly influences arousal but shows an inconsistent direct effect on purchase intention (Lin et al., 2024; Mo & Luh, 2023). By contrast, symbolism shapes purchase decisions through emotional attachment and

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self-relevance (Jang & Kim, 2025; Lavoye et al., 2023; Park & Kim, 2024). These responses form part of the organismic pathway in the S-O-R framework. Based on this, the following hypotheses are proposed:

H1a: Visual appeal positively influences emotional arousal toward virtual fashion.

H1b: Novelty positively influences emotional arousal toward virtual fashion.

H1c: Interactivity positively influences emotional arousal toward virtual fashion.

H1d: Symbolism or identity expression positively influences emotional arousal toward virtual fashion.

H2a: Visual appeal positively influences purchase intention toward virtual fashion.

H2b: Novelty positively influences purchase intention toward virtual fashion.

H2c: Interactivity positively influences purchase intention toward virtual fashion.

H2d: Symbolism or identity expression positively influences purchase intention toward virtual fashion.

2.5 Emotional Arousal as an Organismic Pathway to Purchase Intention

In this study, emotional arousal is treated as a key organismic mechanism linking design cues to purchase intention. Compared with broader experiential states such as flow or immersion, it more directly captures consumers' immediate activation during short virtual fashion evaluation. When consumers feel more stimulated and excited by design cues, they are more likely to engage positively with the product and show stronger purchase intention (Eroglu, Machleit, & Davis, 2003; Jang & Kim, 2025). Emotional arousal may therefore function as a mediating mechanism between design cues and purchase intention (Huang, Leong, & Ismail, 2024; Tran, Huynh Ngoc, & Le Thi Bich, 2025). Based on this, the following hypotheses are proposed:

H3: Emotional arousal positively influences purchase intention toward virtual fashion.

H4a: Emotional arousal mediates the relationship between visual appeal and purchase intention toward virtual fashion.

H4b: Emotional arousal mediates the relationship between novelty and purchase intention toward virtual fashion.

H4c: Emotional arousal mediates the relationship between interactivity and purchase intention toward virtual fashion.

H4d: Emotional arousal mediates the relationship between symbolism or identity expression and purchase intention toward virtual fashion.

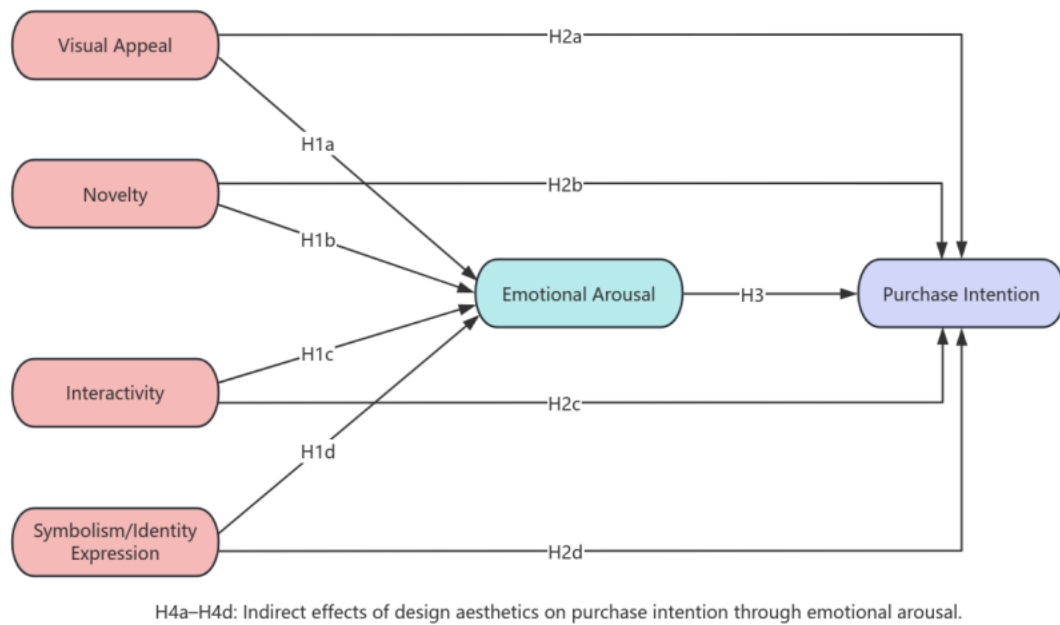


Figure 1. Proposed Research Model

Note: H4a–H4d represent the hypothesized indirect effects of visual appeal, novelty, interactivity, and symbolism or identity expression on purchase intention through emotional arousal.

Beyond the direct and mediating effects discussed above, consumer responses to virtual fashion may vary across groups. Prior research shows that consumers differ in how they perceive and respond to digital fashion products and displays (Chan et al., 2024; Lee et al., 2022). This raises the question of whether the proposed model operates in the same way across groups. Education and occupation, in particular, may influence how consumers interpret design cues and form purchase decisions. Therefore, this study uses multi-group analysis to test differences in structural paths across groups. Based on this, the following hypotheses are proposed:

H5: Structural path relationships differ significantly across education-based groups.

H6: Structural path relationships differ significantly across occupation-based groups.

3. RESEARCH METHOD

3.1 Research Design

This study adopts a quantitative cross-sectional online survey design and uses the S-O-R framework to examine the relationships among design cues, emotional arousal, and purchase intention in virtual fashion contexts. An online questionnaire was suitable for this study because it captures consumers' perceptions, emotional responses, and purchase intentions in a digital environment. The study focused on Chinese consumers with at least some knowledge of or experience with virtual fashion. China provides an appropriate research context due to its large and active digital consumer market and the rapid development of virtual fashion within online communities, gaming platforms, and immersive retail environments (Tian & Lee, 2022; Wei, Lee, & Shen, 2018).

3.2 Population and Sample

Research data were collected from Chinese consumers through an online questionnaire distributed on the Wenjuanxing platform. Respondents were recruited using online distribution channels, including social media sharing. Participation was voluntary, and no monetary incentives were provided. Participants were informed about the purpose of the study, and all responses were collected anonymously and used only for academic research.

Before the formal distribution, the study conducted a pilot test and collected 31 questionnaires. The pilot test assessed whether the item wording was clear and easy to understand and examined the scales' preliminary reliability. This pilot sample served only for pretesting and was not included in the final analysis.

The formal survey yielded 650 responses. After screening the data, invalid questionnaires were removed, including those with excessively short completion times, those that failed the screening question, and those showing response patterns indicative of inattentive or inconsistent answering (e.g., straightlining), to ensure data quality. After data cleaning, 605 valid responses were retained for the final analysis. The online platform facilitated access to consumers who are more active in digital environments, which aligns with the context of virtual fashion consumption.

3.3 Measurement

Measurement scales were adapted and revised from the literature for use in the study. Visual appeal, novelty, interactivity, and symbolism were adapted from prior studies (Nguyen, Tran, Do, & Tran, 2024; Lin et al., 2025; Deng, Shen, & Ji, 2024; Frassetto, Ieva, & Molla-Descals, 2024; Lin et al., 2024; Sekri et al., 2025; Baños et al., 2000; Seo, Kim, Jung, & Lee, 2017), with additional sources informing specific constructs. Emotional arousal was assessed using items adapted from Fang, Chou, and Hsu

(2016), based on the PAD framework proposed by Mehrabian and Russell (1974). Purchase intention was measured with items from Lin et al. (2025) and Li, Guo, Wu, and Spence (2022). All items were translated into Chinese using a back-translation procedure and slightly revised for wording clarity and contextual fit. All constructs were measured on a 5-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The questionnaire also collected demographic information, including gender, age, education, occupation, and monthly income. Full measurement items are provided in the Appendix A.

3.4 Instruments and Data Collection Procedures

The final questionnaire consisted of five sections: demographic information, perceived design cues, emotional arousal, purchase intention, and open-ended comments. Respondents first completed the demographic items and design cue measures. They then watched a standardized virtual fashion stimulus video embedded in the questionnaire, followed by the emotional arousal and purchase intention measures.

The video lasted approximately 23 seconds and featured a virtual fashion item displayed on an avatar. It was designed to simulate how consumers browse and interact with products in a virtual fashion environment. The stimulus included multiple display features, such as different viewing angles, 360-degree rotation, zoom functions and close-up details. To ensure valid measurement of emotional arousal, respondents were required to watch the entire video before proceeding, so that their responses were based on full exposure. Screenshots of the video are provided in the appendix B, and a link to the full video is also available for readers who wish to view the exact stimulus used in this study. The study used a single video stimulus, which may limit the range of virtual fashion representations. Future research could include multiple clips with different fashion styles or genders to provide broader coverage.

Although the questionnaire included open-ended questions, these responses were not used because many were incomplete or not relevant to the study. This did not affect the findings, as the analysis relied on the quantitative data from the design cues, emotional arousal, and purchase intention sections.

3.5 Data Analysis Methods

This study used consistent partial least squares structural equation modeling (PLSc-SEM) with 5,000 bootstrap resamples in SmartPLS 4 (Ringle, Wende, & Becker, 2022) to assess the measurement and structural models. This method is appropriate for this study because the model included multiple latent constructs, used reflective measurement, and examined both direct and indirect relationships (Hair, Sarstedt, Ringle, & Gudergan, 2024; Hair, Hult, Ringle, & Sarstedt, 2017; Henseler, Ringle, & Sarstedt,

2016). The analysis covered indicator reliability, internal consistency reliability, convergent validity, discriminant validity, and the hypothesized structural paths. The study also conducted multi-group analysis (MGA) to examine whether structural relationships differed across education and occupation groups. Before doing so, it assessed measurement invariance using the MICOM procedure (Henseler et al., 2016; Zhang, Wang, Cao, & Wang, 2018).

Because all data were collected using a self-reported questionnaire, common method bias (CMB) was a potential concern. To address this issue, the study applied both procedural and statistical remedies. Procedurally, the study used pilot testing, screening questions, section-based questionnaire design, a standardized stimulus, and anonymous responses to reduce response bias. Statistically, a full collinearity test was conducted in SmartPLS 4. All variance inflation factor (VIF) values ranged from 1.038 to 1.479, well below the recommended threshold of 3.3. This indicates that collinearity is not a concern and that CMB is unlikely to bias the results (Kock, 2015; Kock & Lynn, 2012).

4. RESULTS

4.1 Sample Characteristics

Table 1 summarizes the demographic characteristics of the final valid sample (N = 605). The sample showed a relatively balanced gender distribution and consisted mainly of younger Chinese consumers, with respondents aged 19–30 forming the largest group. Most respondents also had at least a bachelor's degree. The sample further included participants from different occupational and income groups.

Table 1: Sample Demographic Characteristics (N = 605)

Variable	Category	n	%
Gender	Male	288	47.60
	Female	317	52.40
Age	18 years old or below	201	33.22
	19–30 years old	252	41.65
	31–40 years old	126	20.83
	Above 40 years old	26	4.30
Highest education level	Below bachelor's degree	220	36.36
	Bachelor's degree	275	45.45
	Master's degree	98	16.20
	Above master's degree	12	1.98

Table 1: Sample Demographic Characteristics (N = 605) (Cont.)

Variable	Category	n	%
Occupation	Student	201	33.22
	Employed in fashion industry	103	17.02
	Employed in another industry	258	42.64
	Self-employed	31	5.12
	Other	12	1.98
Monthly income	Less than 3,000 Yuan	220	36.36
	3,001–5,000 Yuan	96	15.87
	5,001–8,000 Yuan	192	31.74
	8,001–12,000 Yuan	76	12.56
	More than 12,000 Yuan	21	3.47

Note: N = 605. Percentages are based on the final valid sample.

4.2 Measurement Model

The measurement model assessment results are reported in Tables 2 and 3. Most outer loadings exceeded the threshold of 0.70, ranging from 0.625 to 0.897, with two items slightly below 0.70 ($N5 = 0.684$, $SIE5 = 0.625$). The study retained both items because they helped preserve the content coverage of novelty and symbolism or identity expression in virtual fashion (Hair et al., 2017; Henseler et al., 2016).

All VIF values were below 3.30, ranging from 1.674 to 2.497. This indicates that collinearity was not a concern at the indicator level. Cronbach's alpha ranged from 0.837 to 0.886, ρ_A from 0.838 to 0.887, and ρ_C ranged from 0.837 to 0.886. In addition, all AVE values exceeded 0.50 (ranged from 0.531 to 0.609). These results indicate that all constructs demonstrated acceptable internal consistency reliability and convergent validity (Hair et al., 2017).

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Table 2: Measurement Model Results (PLSc-SEM)

Construct	Indicator	Outer loading	Indicator VIF	Cronbach's alpha	rho_A	rho_C	AVE
EA	EA1	0.763	1.972	0.886	0.887	0.886	0.609
	EA2	0.778	2.206				
	EA3	0.764	2.056				
	EA4	0.815	2.013				
	EA5	0.780	2.497				
IN	IN1	0.799	2.031	0.882	0.884	0.882	0.600
	IN2	0.788	2.212				
	IN3	0.704	2.029				
	IN4	0.781	2.035				
	IN5	0.796	2.050				
N	N1	0.716	1.784	0.851	0.851	0.850	0.531
	N2	0.739	1.845				
	N3	0.770	1.674				
	N4	0.733	1.711				
	N5	0.684	1.991				
PI	PI1	0.761	1.846	0.837	0.838	0.837	0.563
	PI2	0.763	1.811				
	PI3	0.728	1.789				
	PI4	0.749	1.796				
SIE	SIE1	0.848	2.414	0.873	0.885	0.871	0.580
	SIE2	0.676	2.001				
	SIE3	0.726	1.817				
	SIE4	0.897	2.015				
	SIE5	0.625	1.847				

Table 2: Measurement Model Results (PLSc-SEM) (Cont.)

Construct	Indicator	Outer loading	Indicator VIF	Cronbach's alpha	rho_A	rho_C	AVE
VA	VA1	0.765	1.981	0.880	0.882	0.880	0.595
	VA2	0.749	1.866				
	VA3	0.781	2.063				
	VA4	0.846	2.335				
	VA5	0.708	2.065				

Note: EA = emotional arousal; IN = interactivity; N = novelty; PI = purchase intention; SIE = symbolism or identity expression; VA = visual appeal. Results are based on the consistent PLS-SEM algorithm. Most outer loadings exceeded the recommended threshold of .70. Cronbach's alpha, rho_A, and rho_C values all exceeded .70, AVE values all exceeded .50, and VIF values were all below 3.30.

Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT), as shown in Table 3. All HTMT values were below the 0.85 (ranging from 0.364 to 0.517). The highest value was observed between interactivity and purchase intention (0.517), which remained well below the threshold (Henseler et al., 2016). The 95% confidence intervals for HTMT values did not include 1.0, which further supports discriminant validity. The constructs were empirically distinct. Model fit was also acceptable, with an SRMR value of 0.028. Overall, the measurement model is adequate and indicates that the constructs were suitable for subsequent structural model analysis (Hair et al., 2017).

Table 3: HTMT Results for Discriminant Validity

	EA	IN	N	PI	SIE	VA
EA						
IN	0.450					
N	0.473	0.364				
PI	0.495	0.517	0.478			
SIE	0.435	0.388	0.409	0.496		
VA	0.504	0.447	0.501	0.513	0.463	

Note: EA = emotional arousal; IN = interactivity; N = novelty; PI = purchase intention; SIE = symbolism or identity expression; VA = visual appeal. HTMT values below .85 indicate adequate discriminant validity.

4.3 Structural Model

The structural model results are presented in Tables 4, 5, and 6. Table 4 shows that all hypothesized direct effects were significant and in the expected positive direction. The four design cues each had significant positive effects on emotional arousal. Visual appeal ($\beta = 0.228$, $p < 0.001$) had the strongest effect on emotional arousal, followed by novelty ($\beta = 0.217$, $p < 0.001$), interactivity ($\beta = 0.206$, $p < 0.001$), and symbolism or identity expression ($\beta = 0.163$, $p = 0.001$). These results support H1a, H1b, H1c, and H1d.

The four design cues also had significant positive effects on purchase intention. Interactivity showed the strongest direct effect ($\beta = 0.245$, $p < 0.001$). Emotional arousal also had a significant positive effect on purchase intention ($\beta = 0.138$, $t = 2.697$, $p = 0.007$), supporting H3. Although the effect was modest, emotional arousal was positively associated with purchase intention.

Effect sizes (f^2) were also examined. f^2 values for all paths in the structural model ranged from 0.022 to 0.078, indicating small but meaningful effect sizes across the model (Cohen, 1988). The model explained 38.2% of the variance in emotional arousal and 45.7% of the variance in purchase intention, indicating acceptable explanatory power for both endogenous constructs (Hair et al., 2017).

Table 4: Final Structural Model Results for Direct Effects

Hypothesis	Path	β	SE	t	p	95% CI (BC)	f^2	Result
H1a	VA $\rightarrow$ EA	0.228	0.053	4.268	< .001	[0.124, 0.331]	0.022	Supported
H1b	N $\rightarrow$ EA	0.217	0.055	3.958	< .001	[0.112, 0.330]	0.051	Supported
H1c	IN $\rightarrow$ EA	0.206	0.050	4.126	< .001	[0.112, 0.308]	0.078	Supported
H1d	SIE $\rightarrow$ EA	0.163	0.048	3.365	0.001	[0.072, 0.260]	0.031	Supported
H2a	VA $\rightarrow$ PI	0.159	0.061	2.616	0.009	[0.043, 0.283]	0.028	Supported
H2b	N $\rightarrow$ PI	0.158	0.055	2.887	0.004	[0.058, 0.274]	0.030	Supported
H2c	IN $\rightarrow$ PI	0.245	0.059	4.135	< .001	[0.131, 0.364]	0.056	Supported
H2d	SIE $\rightarrow$ PI	0.209	0.052	4.031	< .001	[0.110, 0.315]	0.022	Supported
H3	EA $\rightarrow$ PI	0.138	0.051	2.697	0.007	[0.039, 0.239]	0.031	Supported

Note: VA = visual appeal; N = novelty; IN = interactivity; SIE = symbolism or identity expression; EA = emotional arousal; PI = purchase intention; β = standardized path coefficient; SE = standard error; CI = bias-corrected confidence interval. Results are based on Consistent PLS-SEM bootstrapping with 5,000 resamples (N = 605).

Table 5 presents the specific indirect effects for each of the design cues on purchase intention through emotional arousal. All indirect paths were significant, with the strongest indirect effect for visual appeal ($\beta = 0.031$, $p = 0.040$), followed by novelty ($\beta = 0.030$, $p = 0.022$), interactivity ($\beta = 0.028$, $p = 0.022$), and symbolism or identity expression ($\beta = 0.022$, $p = 0.045$). Although the effect sizes are relatively small, emotional arousal served as a partial mediator in these relationships (Hair et al., 2024).

Table 5: Specific Indirect Effects

Hypothesis	Indirect Path	β	SE	t	p	95% CI (BC)	Result
H4a	VA $\rightarrow$ EA $\rightarrow$ PI	0.031	0.015	2.053	0.040	[0.007, 0.067]	Supported
H4b	N $\rightarrow$ EA $\rightarrow$ PI	0.030	0.013	2.283	0.022	[0.007, 0.058]	Supported
H4c	IN $\rightarrow$ EA $\rightarrow$ PI	0.028	0.012	2.291	0.022	[0.007, 0.055]	Supported
H4d	SIE $\rightarrow$ EA $\rightarrow$ PI	0.022	0.011	2.007	0.045	[0.004, 0.048]	Supported

Note: VA = visual appeal; N = novelty; IN = interactivity; SIE = symbolism or identity expression; EA = emotional arousal; PI = purchase intention; β = standardized indirect effect; SE = standard error; CI = bias-corrected confidence interval. Results are based on consistent PLS-SEM bootstrapping (N = 605).

Predictive assessment was further examined using PLSpredict and CVPAT, as shown in Table 6. The Q^2_{predict} values for emotional arousal (0.307) and purchase intention (0.336) were both above zero, indicating predictive relevance. In addition, the PLS-SEM model produced lower RMSE values than the linear benchmark model for both emotional arousal (0.835 vs. 1.130) and purchase intention (0.817 vs. 1.081). The CVPAT results also supported the predictive superiority of the PLS-SEM model over the linear benchmark model, further indicating acceptable predictive power (Hair et al., 2024).

Table 6: Predictive Assessment Results

Construct	Q^2_{predict}	PLS-SEM RMSE	LM RMSE	CVPAT t	CVPAT p	Comparison result
EA	0.307	0.835	1.130	3.417	0.001	PLS better than LM
PI	0.336	0.817	1.081	3.310	0.001	PLS better than LM

Note: Q^2_{predict} values above zero indicate predictive relevance, and lower RMSE values indicate better predictive performance. CVPAT results also supported the predictive superiority of the PLS-SEM model over the linear benchmark model at the overall level ($t = 4.683$, $p < .001$). For both constructs, the PLS-SEM model produced lower prediction errors than the linear benchmark model, indicating acceptable predictive power.

4.4 Multi-Group Analysis

To evaluate H5 and H6, the study compared structural path differences across education and occupation groups. Before performing the analysis, measurement invariance was assessed using the MICOM procedure (Henseler, Ringle, & Sarstedt, 2016). The results of the MICOM procedure indicated full measurement invariance for education groups and partial invariance for occupation groups, as some constructs did not meet the criterion for equality of composite mean ($p = 0.029$).

Table 7 and Table 8 present the results of the multi-group analysis. Significant differences were found in the effect of novelty on purchase intention across education ($p = 0.024$) and occupation ($p = 0.008$) groups, supporting H5 and H6 partially. Specifically, novelty had a stronger effect on purchase intention in the lower education group ($\beta = 0.193$) compared to the higher education group ($\beta = -0.051$), while the student group showed a stronger effect than the non-student group ($\beta = 0.298$ vs. $\beta = 0.069$). These results suggest that education level and occupation moderate the relationship between novelty and purchase intention.

The multi-group analysis shows that group differences were limited to novelty and symbolism or identity expression, and should be interpreted as supplementary subgroup patterns rather than broad structural variation.

Table 7: MICOM Results for Education and Occupation Groups

Panel A: Education Groups

Construct	Step 2 p value	Step 2 Result	Step 3a p value	Step 3a Result	Step 3b p value	Step 3b Result
EA	0.058	Pass	0.606	Pass	0.822	Pass
IN	0.746	Pass	0.819	Pass	0.695	Pass
N	0.353	Pass	0.309	Pass	0.707	Pass
PI	1.000	Pass	0.960	Pass	0.609	Pass
SIE	0.895	Pass	0.102	Pass	0.100	Pass
VA	0.579	Pass	0.857	Pass	0.977	Pass

Table 7: MICOM Results for Education and Occupation Groups (Cont.)

Panel B: Occupation Groups

Construct	Step 2 p value	Step 2 Result	Step 3a p value	Step 3a Result	Step 3b p value	Step 3b Result
EA	0.058	Pass	0.606	Pass	0.822	Pass
IN	0.746	Pass	0.819	Pass	0.695	Pass
N	0.353	Pass	0.309	Pass	0.707	Pass
PI	1.000	Pass	0.960	Pass	0.609	Pass
SIE	0.895	Pass	0.102	Pass	0.100	Pass
VA	0.579	Pass	0.857	Pass	0.977	Pass

Note: Step 2 assesses compositional invariance; Steps 3a and 3b assess equality of composite means and variances. A permutation p value above .05 indicates invariance. Education groups: undergraduate or below vs. postgraduate and above; occupation groups: student vs. non-student.

Table 8: Multi-Group Analysis Results for Education and Occupation Groups

Path	Education Groups			Occupation Groups		
	Postgraduate and above	Undergraduate or below	p value	Non-student	Student	p value
EA → PI	0.202	0.128	0.517	0.167	0.066	0.229
IN → EA	0.114	0.204	0.413	0.193	0.202	0.892
IN → PI	0.247	0.208	0.768	0.200	0.263	0.548
N → EA	0.322	0.179	0.203	0.209	0.190	0.855
N → PI	-0.051	0.193	0.024*	0.069	0.298	0.008**
SIE → EA	0.227	0.162	0.561	0.143	0.196	0.548
SIE → PI	0.307	0.156	0.178	0.288	0.032	0.001**
VA → EA	0.250	0.203	0.690	0.187	0.269	0.357
VA → PI	0.162	0.150	0.944	0.119	0.217	0.318

Note. Education groups were coded as undergraduate or below and postgraduate and above. Occupation groups were coded as student and non-student. Permutation p values below .05 indicate significant differences between groups. * p < .05. ** p < .01.

5. DISCUSSION AND CONCLUSION

5.1 Major Findings

One key finding of this study is that design cues are central to how consumers evaluate virtual fashion, rather than merely compensating for the absence of physical experience. In this context, consumer judgment relies more heavily on visual presentation, reflecting a shift in evaluation logic (Jai et al., 2021; Dai et al., 2024). Emotional arousal plays an important but partial mediating role. Consumers also rely on other forms of judgment, including product understanding and identity fit (Lin et al., 2024; Park et al., 2023).

Interactivity showed the strongest direct effect on purchase intention. Interactive features such as virtual try-on help consumers better understand otherwise abstract products. They reduce uncertainty, strengthen the sense of control, and make products easier to evaluate. The understanding gained through active participation may therefore shape purchase decisions more strongly than visual appeal (Lin et al., 2024; Wen & Li, 2025; Kang, Shin, & Ponto, 2020).

Symbolic meaning also plays a role before purchase. In physical fashion, symbolic value often develops through wearing and later social feedback. Virtual fashion brings that process forward. Through avatars and digital representation, consumers can judge more directly whether a product fits the identity they want to express. Purchase judgment therefore involves more than appearance. It includes identity-related meaning as part of the decision itself rather than as an added layer after purchase (Park et al., 2023; Kim, Oh, Choi, & Jung, 2025; Lavoye et al., 2023).

The multi-group analysis added a useful layer to these findings, as most relationships remained stable across groups, with differences mainly observed in novelty and symbolism or identity expression. Novelty had a stronger effect among students and respondents with lower education levels, whereas symbolism or identity expression was more influential among non-students. This difference may reflect underlying motivational differences across groups. Students are often more open to new experiences and may approach virtual fashion as a form of exploration and entertainment. In contrast, non-students are more likely to use virtual fashion for self-presentation and social signaling, which makes symbolic meaning more relevant in their decision-making (Khelladi et al., 2024; Venturini & Columbano, 2024; Oh et al., 2023).

5.2 Theoretical Implications

This study extends the S-O-R framework by showing that, in virtual fashion, consumer evaluation is driven more by digital design cues than by material attributes. Instead, it reflects a distinct context shaped by digital presentation, interactive experience, and symbolic meaning. In this setting, consumers do not rely solely on material attributes. Their evaluations depend on design cues and the experiences these cues generate.

Product evaluation in virtual fashion involves both emotional and cognitive processes. Design cues such as interactivity and symbolism influence consumer behavior by eliciting emotional arousal and perceived value, which mediate the link between stimuli and purchase intention. These responses interact with other psychological factors and jointly shape consumer decisions, pointing to a more layered form of engagement in which emotional and cognitive processes are closely intertwined.

Emotional arousal also plays a significant mediating role between design cues and purchase intention, although the mediation is partial. Purchase intention therefore reflects both emotional activation and cognitive judgment, rather than being driven by a single pathway. The organism component in the S-O-R framework remains important, but it does not fully capture consumer responses in digital consumption contexts.

5.3 Practical Implications

Product development in virtual fashion should go beyond visual optimization and consider how products are experienced and used for self-expression in digital environments. Interactivity should be treated as a core part of the virtual fashion product experience rather than as an added feature. Functions such as virtual try-on, rotation, and personalization can help consumers understand products more clearly and may reduce uncertainty before purchase.

Identity-oriented design is also important. Designers should consider style narrative and identity expression early in the development process. This is especially important in environments that rely on avatars and other digital display settings, where such cues may shape consumer response more directly. Brands that want to strengthen consumer response should also pay attention to the value of emotional engagement in design. Emotional appeal cannot replace design quality itself. A more effective strategy is to combine attractive presentation with strong design content.

Although the overall pattern of relationships remained relatively stable across groups, brands may still need to adjust design emphasis and communication strategy across market segments. These differences were limited, but they suggest that not all consumers respond to the same design cues in exactly the same way.

5.4 Limitations and Future Research

This study has several limitations. It used a cross-sectional survey design, so causal relationships should be interpreted with caution. All variables were measured through self-report, including emotional arousal. Although arousal was assessed immediately after stimulus exposure, subjective responses may not fully capture immediate emotional states. There was a short time gap between the video stimulus and the measurement of emotional arousal. This may have reduced the immediacy of the response.

A single virtual fashion stimulus was used, so specific design preferences may have influenced the results. The sample consisted only of Chinese consumers, which may restrict generalizability to other cultural contexts. The analysis also focused on purchase intention rather than actual behavior.

Another limitation concerns the age distribution, with 74.8% of respondents aged 30 or younger. While this aligns with the core user group of virtual fashion (Milanesi, Monteverde, Runfolo, Kursan Milaković, & Guercini, 2024), it may limit applicability to older consumers. Younger respondents, especially those with greater exposure to digital environments, tend to show stronger acceptance of virtual products and higher novelty-seeking tendencies. This may have amplified their responses to novelty cues.

Future research could address these limitations by including more diverse age groups and cultural contexts, and by using multiple virtual fashion stimuli to reduce design-specific effects. It could also refine open-ended questions to generate more meaningful qualitative insights and apply methods such as thematic analysis to better integrate qualitative and quantitative data. Another direction is to examine whether these findings hold in other markets, particularly Southeast Asia. Cultural differences in identity, social expression, and digital consumption may shape responses to virtual fashion and inform market expansion strategies.

5.5 Conclusion

This study examined how design cues shape virtual fashion purchase intention among Chinese consumers and considered the role of emotional arousal in this process. The findings show that visual appeal, novelty, interactivity, and symbolism or identity expression all contribute positively to purchase intention, while emotional arousal serves as a significant but partial mediating pathway. Taken together, the results suggest that virtual fashion represents a distinct digital consumption context in which presentation, interaction, and personal meaning outweigh material attributes, while the overall model remains stable across groups.

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Appendix A: Measurement Items

Variables	Items	Content	References
Visual Appeal	VA1	The style of virtual fashion matches my personal aesthetic preferences.	Nguyen et al. (2024); Lin et al. (2025)
	VA2	The design of virtual fashion products on digital platforms is very eye-catching.	
	VA3	I am particularly attracted by the appearance of virtual fashion products.	
	VA4	I find the virtual clothing aesthetically appealing.	
	VA5	The style and overall appearance of the virtual clothing are aesthetically pleasing.	
Novelty	N1	I want to experience the emerging technologies used in virtual fashion.	Deng et al. (2024); Frasquet et al. (2024)
	N2	I am curious about how virtual fashion differs from traditional fashion.	
	N3	Virtual fashion designs I have seen are novel.	
	N4	I find the design of virtual fashion to be unique and distinctive.	
	N5	I find the visual experience of virtual fashion to be striking and impressive.	
Interactivity	IN1	The experience of wearing or using virtual fashion feels similar to real-life fashion experiences.	Lin et al. (2025); Sekri et al. (2025); Baños et al. (2000)
	IN2	Through interacting with the virtual fashion display, I can get a real and complete picture of the product.	
	IN3	The degree of interaction with the virtual fashion display is outstanding.	
	IN4	When I interact with virtual fashion, I can immediately see the results of my actions.	
	IN5	I feel like an active participant when engaging with virtual fashion displays.	

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Variables	Items	Content	References
Symbolism or Identity Expression	SIE1	Virtual fashion helps me present diverse aspects of my personality and style.	Lin et al. (2024); Seo et al. (2017)
	SIE2	Wearing virtual fashion strengthens my identification with certain groups or communities.	
	SIE3	Virtual fashion helps me express who I am.	
	SIE4	The virtual fashion I wear represents something personal about me.	
	SIE5	I feel a personal connection to the virtual fashion I wear.	
Emotional Arousal	EA1	This virtual fashion design arouses my desire to own it.	et al. (2016); Mehrabian and Russell (1974)
	EA2	This virtual fashion design makes me feel fascinated.	
	EA3	This virtual fashion design pleasantly surprises me.	
	EA4	When I see this virtual fashion design, I feel highly stimulated and excited.	
	EA5	This virtual fashion design makes me feel more alert and energized.	
Purchase Intention	PI1	I want to try buying virtual fashion items.	Lin et al. (2025); Li et al. (2022)
	PI2	I intend to buy virtual fashion products in the future.	
	PI3	I am likely to buy virtual fashion products in the near future.	
	PI4	I actively seek out virtual fashion products.	

Note: All items were measured on a 5-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”).

Appendix B: Screenshots of the Virtual Fashion Stimulus Video



(a) Front view

(b) Side view

(c) Close-up view

Note: The figure shows screenshots from the standardized virtual fashion stimulus video used in the questionnaire. The full video is available via the following link: https://www.bilibili.com/video/BV19FH2zsEbs/?share_source=copy_web&vd_source=16ddbca703d02d27f332a1d9011031f8