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# A Study on the Satisfaction of the Interaction Mode and Emotional Experience and Perceived Value of Cultural and Creative Products of Art Museums

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## Abstract

In order to explore the influence mechanism of cultural and creative products of art museums on user satisfaction in different interaction phases, this study adopts structural equation modelling and selects visitors for quantitative analysis. The results show that the pre-interaction phase mainly enhances satisfaction through emotional experience, the mid-interaction phase creates a more significant impact through the dual mediation of emotional experience and perceived value, and the post-interaction phase continues to strengthen the perceived value in order to enhance user satisfaction. This study enriches the theory of interaction research on emotional design and cultural creative products, and provides practical insights for art museums to enrich emotional interaction modes.

**Keywords:** Emotional Design, Emotional Experience, Perceived Value, User Satisfaction, Cultural and Creative Products for Art Museums

## Introduction

As the role of art museums in cultural communication becomes more and more obvious, their cultural creative products have become important cultural carriers (Chen Lingyun, 2018). In order to better meet the needs of the audience, museums optimise the user experience through emotional design, which has become the key to enhance the emotional experience and perceived value between the audience and cultural creative products (Han Yuxue et al., 2023). The traditional homogenisation of cultural creative product design fails to satisfy the deep emotional needs of the audience; therefore, exploring how to influence user satisfaction through emotional design is crucial to enhancing the attractiveness and market competitiveness of creative products in art museums.

Although affective design has been widely studied in user experience, its application in art museum cultural and creative products remains under-explored. Existing studies mainly focus on the impact of affective design on user behaviour and its application in cultural creative product development, but the exploration of interactive elements in affective design to enhance user satisfaction is still insufficient. Among them, the impact of different stages of interaction on user satisfaction has not been fully explored.

The research question of this paper is: how do the different dimensions of interaction of cultural and creative products of art museums affect the emotional experience and perceived value of users differently? The aim is to analyse the impact of different interaction dimensions on emotional experience and perceived value, and thus on user satisfaction. Its theoretical significance complements the theory on the relationship between interactive elements and users' emotional experience and perceived value in the field of cultural and creative products of art museums by subdividing the effects of different dimensions of interactive modes on emotional experience and perceived value; and secondly, verifies the mediating effect of emotional experience and perceived value between interactive modes and satisfaction. At the level of practical application, art museums can design interactive methods in phases according to the results of the study, so as to better stimulate users' emotional experience and perceived value, and improve their sense of identity and satisfaction with cultural and creative products. The dimensional approach to interaction proposed in this study also provides valuable references for the

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interactive design of other cultural and creative industries or products, and promotes the innovation and optimisation of related industries.

## Theoretical Framework

## Emotional Experience and Emotional Design

Emotional design is a design paradigm oriented to users' emotional needs, and its core lies in stimulating users' instinctive, behavioural, and reflective emotional responses through design elements (Donald Norman, 2015).The layering theory proposed by Norman (2015) points out that instinctive design focuses on sensory stimulation (e.g., colour, form), behavioural design strengthens the operational experience (e.g., interaction), and reflective design provokes deeper value recognition through cultural symbols. logic), and reflective layer design triggers deep value identity through cultural symbols. This theoretical framework provides a methodological basis for the design optimisation of museum cultural creative products. For example, Zhou Xinhai et al. (2023) constructed the path of 'design elements→emotion-driven→user satisfaction' based on emotional design elements such as interaction, images, colours and materials, confirming the practical value of emotional design in enhancing the attractiveness of cultural products (Zhou Xinhai et al., 2023). Emotional experience is a compound psychological feedback formed in the process of interaction between users and products, covering the dimensions of emotional resonance and cultural resonance (Zhengjun Wen et al., 2019). Research has pointed out that the emotional experience in the art museum scene has distinct cultural characteristics, and users not only obtain satisfaction through visual aesthetics and operational convenience, but also establish an emotional connection through in-depth interaction with cultural symbols. In this process, emotional resonance and cultural resonance show a synergistic effect, with the former originating from the fit between individual memories and the emotional elements of the product, and the latter relying on the user's understanding of the cultural connotations. Qiu Xiumei's (2020) case study shows that when users' individual memories are awakened in the interaction of cultural creative products, their identification with traditional culture is enhanced, and they thus perceive the cultural value of the products more deeply. "Emotional experience and affective design support each other, with the former focusing on the emotional transformation of users in the perception, operation and reflection phases, and the latter using design strategies to strengthen users' love for the product (Bi Yuyang, 2020; Luo Ruixin, 2023); The deep integration of the two optimises user satisfaction, providing a framework for this study to explore the mechanisms by which art museum interaction styles influence satisfaction. Specifically, the stages of affective design, such as visual attraction before interaction, behavioural guidance during interaction, and reflective reinforcement after interaction, echo the formation of emotional resonance and cultural resonance in emotional experience.

## Perceived Value Theory and Emotional Design

Perceived value theory emphasises consumers' comprehensive assessment of the value of a product, covering the dimensions of functional, emotional and cognitive value. Functional value refers to the utility of the product, emotional value is related to emotional experience, and cognitive value involves intellectual engagement. The theory suggests that the perceived value of an art museum product is not only dependent on the functionality and utility of the product, but is also closely related to the emotional resonance it triggers (Hekkert et al., 2006). Perceived value theory and affective design are complementary to each other, and perceived value plays an important role in users' acceptance and satisfaction with affective design (Qiu Xiumei, 2020). Some researchers believe that emotional design elements such as colours, materials, and interactivity can stimulate users' emotional value in product design, which in turn enhances perceived value (Kaitong Zhang, 2022). For example, aesthetic elements of design or brand stories can increase the emotional appeal of products and enhance consumers' emotional identity (Shi, A et al., 2021). Some researchers have also divided the perceived value model into the dimensions of functional value, emotional value, social value and price value. Emotional value refers to the emotional experience consumers have when using a product and this experience directly affects their overall perceived value of the product (Sondoh Jr et al., 2001). It is because of the complementary relationship between the theory of perceived value and affective design, i.e., affective design works directly on the emotional and cognitive dimensions of perceived value by enhancing the emotional experience, which in turn has an impact on user satisfaction, that provides theoretical support for this paper's investigation of the impact of interactive elements on user satisfaction.

**Application of Interactive Approach in Museums' Cultural and Creative Products**

Emotional design includes different elements such as colour, material, cultural symbols, interaction, etc. Among them, interaction is the dominant effect in the design of cultural creative products in museums (Tang Shanwen, 2012), therefore, interaction is the focus of this paper. By constructing the dynamic relationship network of 'audience-exhibit-space', interactive design can not only provide a more immersive experience for the audience, but also enhance the social education function and cultural communication effect of museums (Chang Xinyuan et al., 2024). The application of interactive methods is mainly reflected in three dimensions, including cognitive construction dimension, behavioural participation dimension, and emotional resonance dimension (Zhang Sitong, 2018). Through the increase of interactive methods in the design of cultural creative products, the audience can be triggered to actively participate, think and learn, and this interactive relationship breaks through the traditional one-way information transfer mode of the museum and transforms into a two-way interactive communication.

In practice, the application of interactive methods in museum cultural and creative products has expanded from simple touch screens and video playback to more complex technical means such as virtual reality (VR), augmented reality (AR), multi-touch, and voice interaction (Liu Wei, 2019) (Zhang Xin et al., 2024). These interactive methods can not only increase the interest of the product, but also help the audience better understand the cultural heritage of the museum (Tang Shanwen, 2012) (Liu Peiwen et al., 2024). For example, the Suzhou Museum's Wendeng Seed Cultural Creative Product, which combines the museum's unique cultural allusions with innovative design and combines the museum's culture with interactive experience, enables buyers to participate in interactions through mobile phones and applets after planting the Wendeng and share its growth process, further enhancing the emotional connection between users and the cultural creative product (Fan Baihao, 2024). In addition, interactive methods can also be added to the design process, so that the audience can participate in cultural discovery through entertainment, enhancing the emotional connection between the audience and the product. For example, the 'Archaeological Blind Box' cultural creative product of the Henan Museum combines archaeological elements with the modern blind box form, in which the consumer digs up the "treasures" buried in the soil by using miniature tools such as shovels, which not only adds an 'assembly' element, but also allows the audience to participate in the design of the product. This not only adds an interactive way of 'assembling', but also brings a sense of satisfaction (Long Lianghai, 2021).

## Research Gap

Although existing research has paid attention to the influence of colour, material, cultural symbols and other elements of emotional design on user experience, there is still a significant gap in exploring the different dimensions of interaction styles. Specifically, in the field of cultural and creative products of art museums, a clear theoretical framework has not yet been formed on how interaction affects users' emotional experience and perceived value through different dimensions, and further contributes to satisfaction. In addition, current research mostly focuses on the application of technology, and although some studies suggest that emotional experience and perceived value may mediate the relationship between interaction styles and satisfaction, empirical support for their specific path of action is still limited. Based on the above gaps, this study proposes hypothesis 1, the influence of interaction mode on user satisfaction has stage differentiation. Specifically, it is manifested as follows: the indirect effect on satisfaction through emotional experience is weak in the pre-interaction stage; the middle stage of interaction has a significant positive effect on user satisfaction through emotional experience and perceived value; and the post-interaction stage has a moderate indirect effect on user satisfaction through the mediating role of emotional value. Hypothesis 2: Emotional experience and perceived value play a mediating role. Specifically, affective experience is a key mediator between the mid-interaction stage and satisfaction, and perceived value is a partial mediator between interaction style and satisfaction.

### Research Methodology

## Research Design

This study adopts a quantitative research method, taking user satisfaction as the dependent variable, the interaction mode of emotional design as the independent variable, and emotional experience and perceived value as the mediating variables, to explore the effects of different interaction modes of cultural creative products of art museums on emotional experience and perceived value, as detailed in the research structure Figure 1.The quantitative research method adopts structural equation modelling (SEM) to validate the relationship between the interactive elements of the emotional design

and the the relationship between user satisfaction, while exploring the mediating effects in emotional experience and perceived value. The research model, as shown in

Figure 2, is divided into three phases: before, during and after, to test the path of interaction on emotional experience, perceived value and satisfaction, respectively.

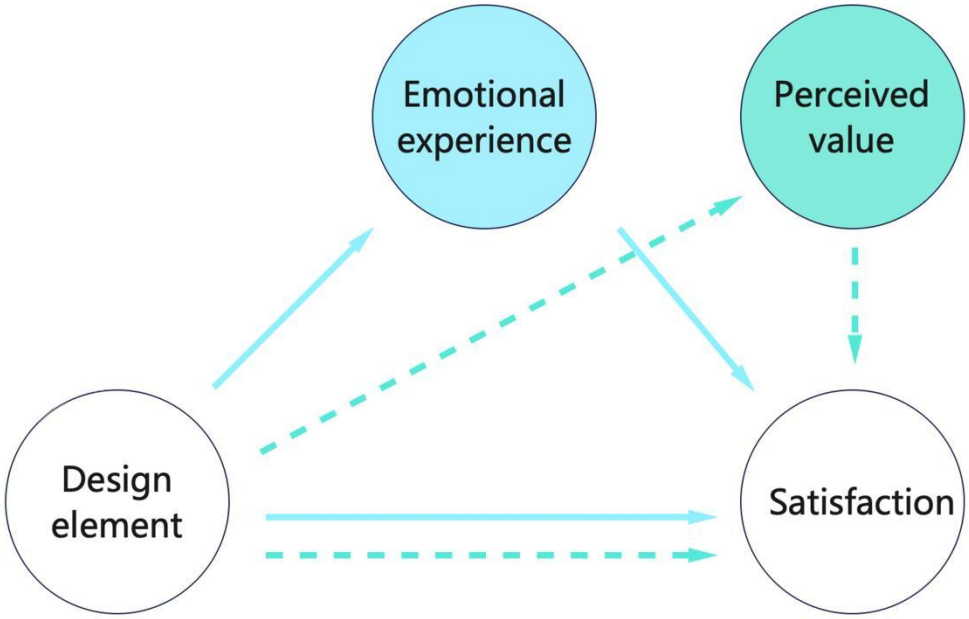
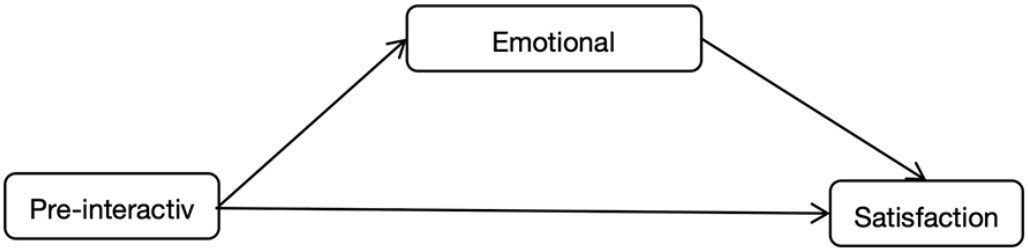



Figure 1 Research Structure Chart



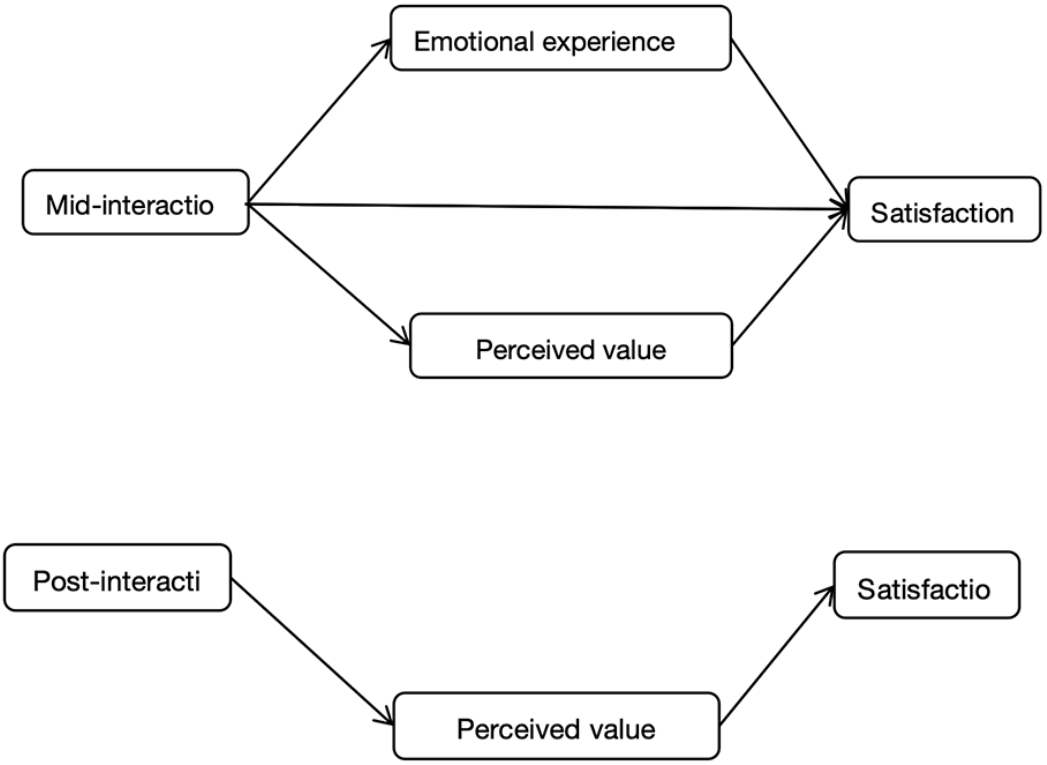



**Figure 2 Research Model**

**Sample Selection**

The final sample size of this study is 150 art museum visitors, using a random sampling strategy to classify the target group into six age groups: late adolescence (under 18 years old), early adulthood (18-30 years old), mid-adulthood (31-40 years old), transition to adulthood (41-50 years old), maturity (51-60 years old), and old age (60 years old and above). The sample collection site was selected to be Tianjin Binhai Museum of Art, which is in line with the institutional attribute of 'regional art museum' and has abundant cases of cultural and creative product development and display. The stimulus for the experiment was the museum's cultural creative product 'Intangible Cultural Heritage Experience Kit', as shown in Figure 3. The product takes the important intangible cultural heritage of Tianjin as its core, and builds a multimedia interactive experience mode through the product's supporting experience manual and video tutorials, etc. Users can assemble the intangible cultural heritage products through DIY, forming a co-creative behaviour between users and intangible cultural heritage skills, and this product has become a widely recognized cultural creative product by virtue of its immersive experience and modern interactive design. Based on the analysis of the stimulus conducted in the early stage, its interaction can be divided into three dimensions including: pre (watching), mid (disassembling, sweeping, learning, playing/assembling), and post (results/feedback), in which the mid-dimension achieves in-depth co-creative behaviours between the users and the intangible cultural heritage skills through multi-step operations (disassembling the materials, sweeping to learn and assembling with their own hands), as detailed in Figure 4. Double control criteria were set in the visitor screening process: firstly, the time dimension was limited to weekend visitors in two consecutive natural months; secondly, the spatial dimension excluded group visitors and guided tour participants to safeguard the sample's decision-making autonomy. The demographic characteristics of the sample are shown in Appendix 1. A total of 150 valid samples were collected, with a balanced gender distribution (48.0% males and 52.0% females), ages of 41-50 (23.3%) and 51-60 (18.7%), and educational attainment of senior high school and below (30.7%), bachelor's degree/college (38.7%), and master's degree and above (30.7%).


Figure 3 Stimulus Intangible Cultural Heritage Experience Kit Photos

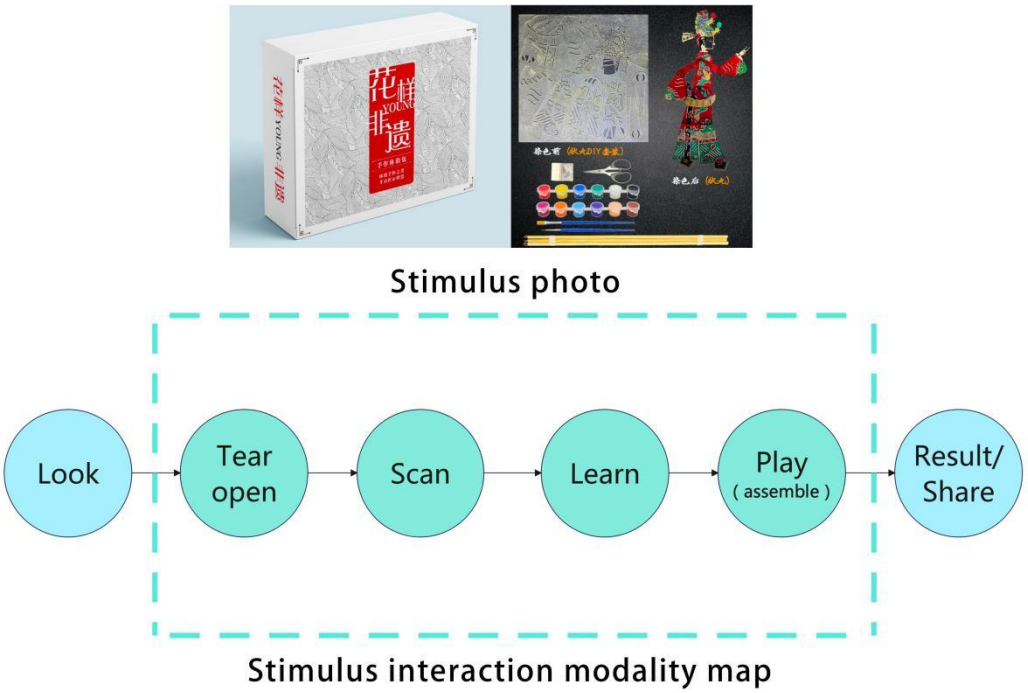



**Figure 4 Stimulus Interaction Modality Map**

**Data Collection Method**

In this study, a five-point Likert scale (Likert scale) was used for quantitative data collection, with the scale interval set from 1 (strongly disagree) to 5 (strongly agree) to quantitatively assess the intensity of users' perception of the product's emotional design interaction elements after using the product. The questionnaire was developed to cover three dimensions of interaction with reference to three scales, firstly for emotional experience, the Positive and Negative Emotions Scale (PANAS) (Watson et al., 1988), see Appendix 2 for details (Zhang Weidonget al., 2004) was used to incorporate cultural resonance, e.g., "The interaction deepened my understanding of traditional culture ", which was used to measure the emotional response after the experience. Secondly in terms of perceived value, the PERVAL scale (Sweeney J C et al., 2001), detailed in Annex 3 (Zhao Kinglandet al., 2022), was adapted

to emphasise cognitive values e.g. 'The interaction enhanced my knowledge of intangible cultural heritage', and affective values e.g. 'The interactive design evokes an emotional connection for me'. As for satisfaction, Oliver's classic theoretical framework of satisfaction (Oliver R L et al., 1997) (Anderson E W et al., 1994), as detailed in Appendix 4 (Zhu Qinfang et al., 2017), was used for the assessment, and items specific to the interaction such as "the interaction design increased my level of participation". The questionnaire was structured logically as follows: demographic information, description of the interaction, and (emotional experience, perceived value, and satisfaction) in the ordinal scale. The pre-study (N=23) revealed semantic ambiguity and insufficient discrimination (D-value <0.3) in question item 7, resulting in poor internal consistency (pretest α=0.72), so it was excluded. The revised scale was tested for reliability by SPSS 27.0, and the reliability test showed that the Cronbach's α of each dimension was >0.7 (pre-interaction α=0.884, affective experience α=0.839), which was in line with the psychometric standard; the KMO value in the validity test was =0.822 (Bartlett's test p<0.001) , indicating that the data are suitable for factor analysis, see Appendix 5 for details.In addition, after the sphericity test, principal component analysis was used for factor extraction, and the commonly used maximum variance method was used for factor rotation.Appendix 6 is the table of total variance explained after this exploratory factor analysis, and the total variance explanatory power reached about 66.983%, which means that the factor explanatory power is better, and the six factors extracted can more completely retain the original data information. Meanwhile, the extracted variance of the unrotated first factor loadings is 24.136%, which is lower than 40%, indicating that the questionnaire does not have serious common method bias.

## 4 Empirical research

### 4.1 Structural Equation of Emotional Experience

In this study, the experiment was divided into three studies of pre-interaction and structural equations were built to test them separately using AMOS28.0. In addition, the hypotheses were tested through three phases: Study 1, Study 2 and Study 3, which examined the direct effect and mediation path of pre-interaction on affective experience and satisfaction; Study 2 analysed the double mediation effect of mid-interaction on satisfaction through affective experience and perceived value; and Study 3 verified the indirect effect of post-interaction on satisfaction through perceived value. In this study, the results of the empirical analyses in Study 1 are incorporated into this subsection to examine the path of the influence of the 'pre-interaction' on affective experience and satisfaction, as shown in Figure 5, which illustrates the structural equations of the validation model of Study 1.

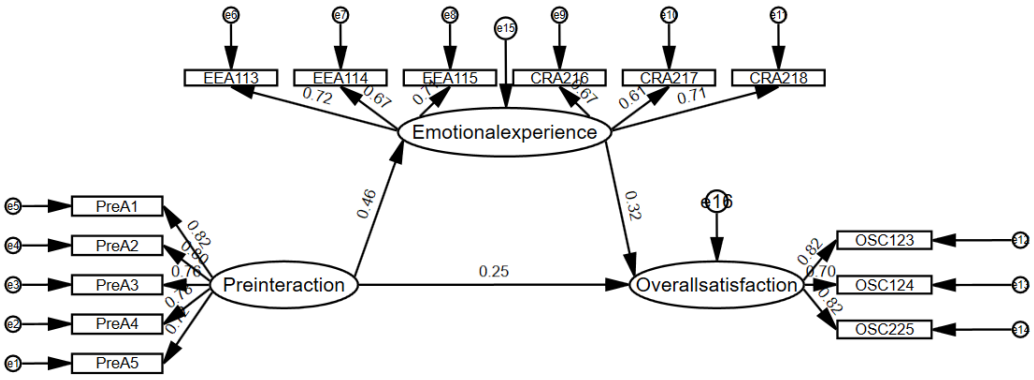



**Figure 5 Schematic diagram of the structural equations of the study one validation model**

**Model fit**

With the help of AMOS 28.0, the structural equation model of Study 1 was validated and analysed and the main fit indicators are shown in Appendix 7 . The results show that CMIN/DF = 1.119, GFI = 0.928, RMR = 0.052, RMSEA = 0.028, CFI = 0.990, NFI = 0.914, and TLI = 0.988, and all the metrics

are within the range of the threshold criteria (e.g., GFI ≥ 0.90, RMSEA ≤ 0.08, etc.) commonly adopted by international journals, which indicates that the model fit is good.

## Analysis

The results of the structural equation path analysis are shown in Appendix 8. It can be seen that the standardised path coefficient of 'Pre-interaction → Emotional Experience' is 0.458 ($p < 0.001$), reaching a significant level; the path coefficient of 'Emotional Experience → Overall Satisfaction' is 0.318 ($p = 0.003$), which means that The path coefficient of 'emotional experience → overall satisfaction' is 0.318 ($p = 0.003$), indicating that emotional experience has a positive effect on satisfaction; the path coefficient of 'pre-interaction → overall satisfaction' is 0.245 ($p = 0.018$), which is also significant.

### Hypothesis Testing

In order to examine the mediating role of 'emotional experience', a bootstrap mediation analysis was conducted, as shown in Appendix 9. The results showed that the indirect effect of 'pre-interaction→emotional experience→overall satisfaction' was 0.146 ($p = 0.003$), and the direct effect was 0.245 ($p = 0.028$), both of which were significant, suggesting that emotional experience played a partial mediating role. The direct effect was 0.245 ($p = 0.028$), both of which were significant, suggesting that affective experience played a partial mediating role. In conclusion, the hypotheses of Study 1 were supported.

4.2 Perceived Value Structure Equation

This section incorporates the empirical process of Study 2 to test the path of 'mid-interaction' on perceived value and satisfaction, as shown in the structural equations of the validation model of Study 2 in Figure 6.

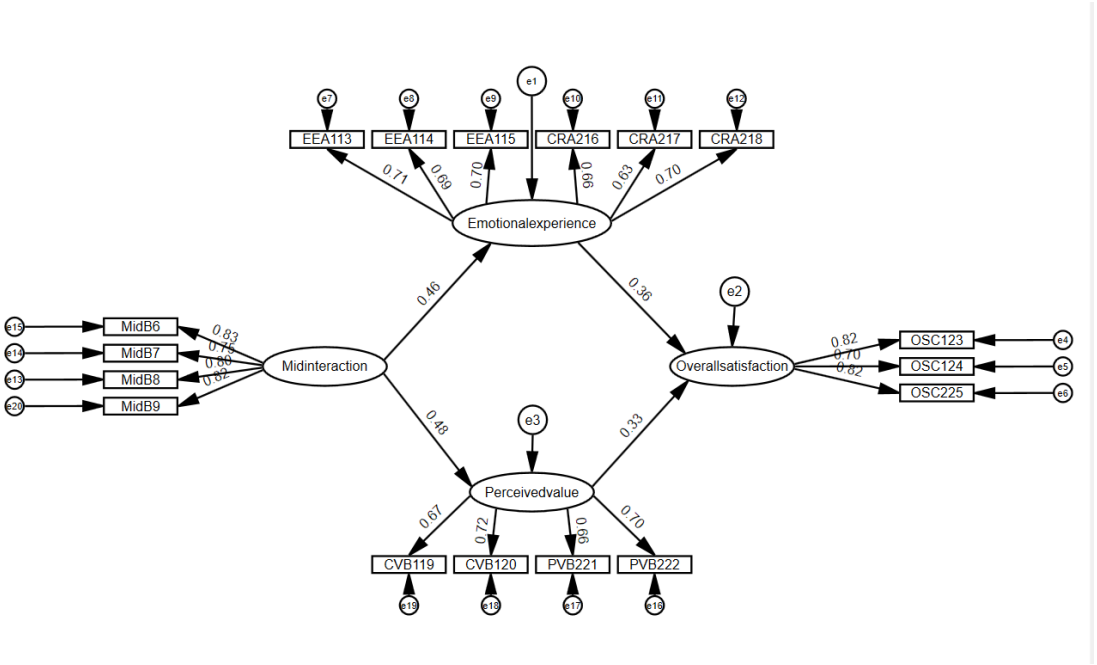



**Figure 6 Schematic of the Structural Equations of the Validation Model for Study 2**

### Model fit

In this paper, the research model is constructed in AMOS, and the maximum likelihood method is used to validate and analyse the model, and the fitting indexes of the model are shown in Appendix 10.The value of the df of the model is 1.132, the value of the GFI is 0.909, the value of the RMSEA is 0.030, the value of the RMR is 0.071, and the values of the relative fitting indexes CFI is 0.985, NFI is 0.844, and TLI is 0.982, which shows that the model fits reasonably well. 0.844 for CFI, 0.982 for NFI, and 0.844 for TLI. All the model fit indicators are within a reasonable range of values, which shows that the model fit is reasonable.

**Analysis**

The results of the path analysis are shown in Appendix 11. The standardised path coefficient of 'mid-interaction → perceived value' is 0.483 ($p < 0.001$), indicating that the mid-interaction design can significantly increase perceived value; the path coefficient of 'emotional experience → overall satisfaction' is 0.362 ($p < 0.001$); the path coefficient of 'perceived value → overall satisfaction' is 0.332 ($p < 0.001$), which is also significant. The path coefficient of 'emotional experience→overall satisfaction' is 0.362 ($p < 0.001$); the path coefficient of 'perceived value→overall satisfaction' is 0.332 ($p < 0.001$), which is also significant.

4.2.3 Hypothesis testing

The results of the mediation analyses are shown in Appendix 12, with an indirect effect of 0.168 ($p < 0.001$) for 'mid-interaction → affective experience → overall satisfaction' and an indirect effect of 0.160 ($p = 0.001$). Thus, the hypotheses that mid-interaction enhances user satisfaction by simultaneously increasing emotional experience and perceived value are supported.

4.3 Interactive post-validation and overall hypothesis testing

This section corresponds to Study 3, which focuses on the impact of 'late interaction' on perceived value and satisfaction, and comprehensively tests the consistency of the overall data with the proposed hypotheses, and the model is shown in Figure 7.

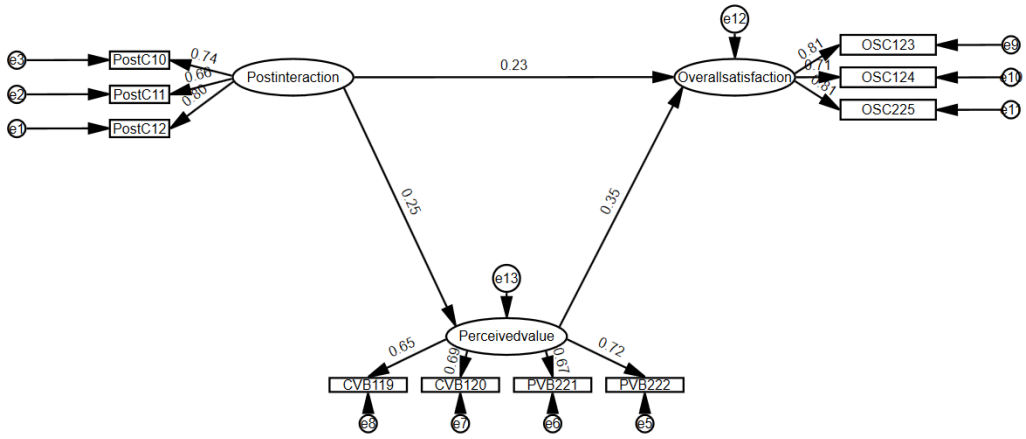



**Figure 7 Schematic of the Structural Equations for the Study of the Three Validation Models**

**Model fit**

In this paper, the research model is constructed in AMOS, and the maximum likelihood method is used to validate and analyse the model, and the fitting indexes of the model are shown in Appendix 13.The value of the df of the model is 1.172, the value of the GFI is 0.934, the value of the RMSEA is 0.069, the value of the RMR is 0.063, and the values of the relative fitting indexes CFI is 0.953, NFI is 0.896, and TLI is 0.984, which shows that the model fits reasonably well. 0.896 for CFI, 0.984 for NFI, and 0.953 for CFI, 0.896 for NFI, and 0.984 for TLI. All the indicators of the model fit are within a reasonable range of values, which shows that the model fit is more reasonable.

**Analysis**

As shown in Appendix 14, the standardised path coefficient of 'late interaction → perceived value' is 0.252 ($p = 0.018$), indicating that late interaction still has a significant impact on users' perceived value; the path coefficient of 'late interaction → overall satisfaction' is 0.230 ($p = 0.023$); the coefficient

of 'perceived value → overall satisfaction' is 0.350 ($p < 0.001$). The path coefficient of 'late interaction → overall satisfaction' is 0.230 ($p = 0.023$); the coefficient of 'perceived value → overall satisfaction' is 0.350 ($p < 0.001$).

**Hypothesis Testing**

The results of a further mediation test (Bootstrap method) are shown in Appendix 15. The indirect effect of 'Late Interaction → Perceived Value → Overall Satisfaction' is 0.088 ($p = 0.022$), with a 95% confidence interval that does not include zero, suggesting that Perceived Value plays a partial mediating role. In conclusion, the core hypothesis of Study 3 was verified.

## Discussion

Starting from the dual perspectives of affective design and perceived value theory, this study comprehensively explores the mechanism of the influence of cultural and creative products of art museums on user satisfaction at different stages of interaction. Based on the results of the previous empirical analyses and the corresponding exploratory factor analyses, structural equation modelling and mediation effect tests, the conclusions of this paper coincide with the perspectives of the previous theoretical framework. First, in terms of affective experience and affective design, the results of Study 1 indicate that the pre-interaction has a significant positive effect on affective experience and satisfaction, and that affective experience plays a partially mediating role in it. This is consistent with Norman's (2015) theory of 'using instinctive design at the early stage of interaction to attract users and enhance intimacy', and also echoes the path of 'emotional design elements → user satisfaction' proposed by Zhou Xinhai et al (2023). It can be seen that in the display and initial interaction of museum creative products, the positive emotions stimulated by visual attraction and ease of operation can help to enhance the first impression and satisfaction of users.

Second, perceived value theory and affective design were strongly supported in the results of Study 2. The multi-step experience in the middle of the interaction (e.g., disassembling the materials, scanning the code to learn, and assembling the product) significantly increased the emotional and cognitive values of the users, which in turn increased their overall satisfaction with the product. This is in line with the theory of perceived value, which emphasises that 'when affective and cognitive values are increased together, it enhances the user's approval of the product' (Sweeney & Soutar, 2001; Han & Yue, 2023). In addition, both affective experience and perceived value play a mediating role in the middle stage of the interaction, which confirms the theoretical framework of this study, which suggests that 'affective experience and perceived value have a key mediating effect between affective design and satisfaction'.

In addition, with regard to the application of interactive approaches in museum cultural and creative products, Study 3 confirmed that the late stage of interaction can still affect user satisfaction partly through perceived value. Similar to Liu, Peiwen et al.'s (2024) finding that sustained interaction design leads to stronger cultural resonance and identification, this study's 'late interaction' empowers users with more opportunities to give feedback or share their achievements, which is statistically significant in the positive results. It is worth noting that the mediating effect of perceived value on satisfaction still holds, suggesting that the use of appropriate affective design elements (e.g., display of results, feedback of experience) in the later stages of the interaction can still stimulate users to identify with the cultural product at a deeper level. This result echoes Qiu Xiumei's (2020) conclusion that 'cultural symbols and feedback mechanisms enhance users' sense of lasting identity'.

It should be emphasised that the results of the exploratory and validation factor analyses presented in Appendix 16, such as the variance explained by the unrotated first-order factors did not exceed 40% and the factor loadings were all greater than 0.5, further proved that the structure of this study's scales was reasonable and excluded the more serious common methodological bias. These tests ensure the scientific rigour of the empirical study and support the derivation of the multidimensional relationship of 'interaction mode-emotional experience-perceived value-satisfaction' at the level of measurement tools.

## Research Conclusion

This study focuses on the interaction mode of cultural and creative products in art museums, explores how different stages of interaction affect user satisfaction in the context of affective design, and systematically considers emotional experience and perceived value by incorporating them into the mediation mechanism. The main conclusions are as follows: firstly, the pre-interaction stage has a significant effect on the enhancement of user satisfaction, and is mediated partly through emotional experience. Users are attracted by the visual aesthetics and easy operation at the first time, which can

quickly generate positive emotional experience and thus enhance the overall satisfaction. Second, the mid-interaction has a positive effect on both affective experience and perceived value, and has a more significant effect on satisfaction. The multi-step ‘disassemble, sweep, learn, play/assemble’ fully mobilises users' cognitive and affective values, showing ‘dual intermediary’ characteristics, which confirms that emotional design can enhance satisfaction by stimulating deep-level interactions. Furthermore, the later stage of interaction can still positively influence the perceived value and satisfaction. The sharing of results or feedback strengthens users' in-depth knowledge of cultural connotations and emotional connection, leading to a steady increase in satisfaction. Although the influence of this stage is slightly weaker than that of the middle stage, it still cannot be ignored. Based on this, the value of the study is reflected in the following aspects. Firstly, this study enriches the theoretical framework of the interaction between emotional design and museum cultural and creative products, and confirms the multi-level path of ‘emotional experience - perceived value - user satisfaction’. Secondly, it provides a phased design idea for art museums when designing the interaction mode of cultural and creative products, highlighting the importance of implanting emotional design elements before, during and after the interaction.

Based on the application of the conclusions and practical insights: in the pre-interaction period, the visual impact and simple and effective information transmission can be strengthened, so that the user can produce a preliminary positive emotional experience; in the mid-interaction period, a diversified operation and experience process can be set up (e.g., DIY assembly, scanning and learning, and immersive gameplay), so as to strengthen the user's cognitive and emotional value; in the post-interaction period, the results can be added to the display and feedback mechanism, so that the user can Review the value of the product at the same time, the emotional resonance will be extended to the depth of the identity of the art museum culture, thus further enhancing the overall satisfaction.

In summary, this study shows that different stages of affective design and interaction have an important impact on user satisfaction, and achieve a hierarchical positive effect through emotional experience and perceived value. We look forward to further expanding this study in other types of museums or cultural scenarios to improve the theoretical understanding and practical guidance of emotional design in the field of cultural and creative products.

## REFERENCES


[1] Anderson, E. W., Fornell, C., & Lehmann, D. R. (1994). Customer satisfaction, market share, and profitability: Findings from Sweden. Journal of Marketing, 58(3), 53–66.

[2] Benjamin, W. (2002). The work of art in the age of mechanical reproduction (C. Wang, Trans.). China Urban Publishing House.

[3] Chen, G. (2016). Illustrated emotional design and case review. Chemical Industry Press.

[4] Chen, L. (2018). Research on the development of museum cultural creative products (Doctoral dissertation, Shanghai University). Retrieved from https://cnki.wenx.top/kcms2/article/abstract?v=fNwONIwGMRLv4EXA3l6OdDY9D44BGHf2qh35h_y9Nzg7XWrcbRc3r49TzrWIsu11Bnk7fWdmWt67qiXNdlHyFk7tMGROGbNppUI4gpLm3jqFPumR6Ezue0L9M_Y6ZBHjyEbkpWhe7nuteNWCBItZTJckvoWIfhvoR9qGCCQ_z-hmfwxwTajtXjrRJvXhO5ryz8IAfCmI4gs=&uniplatform=NZKPT&language=CHS

[5] Collins, R. (2009). Interaction ritual chains. Beijing: The Commercial Press.

[6] Chang, X., & Han, D. (2024). Emotional design strategies in digital exhibition of museums in the era of intelligence. Journal of Xinzhou Normal University, 04, 119–123.

[7] Duff, K. J. (2012). Social psychology (S. Wen & L. Yingshan, Trans.). China Renmin University Press.

[8] Fan, B. (2024). Research on the impact of tourists' perceived value on the purchase intention of cultural creative products in Suzhou Museum (Master's thesis, Guangxi Minzu University).

[9] https://cnki.wenx.top/kcms2/article/abstract?v=hmawDzFpZzRAetECdYyiPldIz-JA12dccXpDB_elSa5D4ceMgOUGtZeCSvICpuSolf5vXNW70yoXkazyqO1AiThyTaItR4SXJQPzUxD0VGFdURVACbH1s_h1PRAyMWOecYDgw7hcwWl4Bmiu-syZCS-0rnu54_-zGhoOfCFgR7xRfLbJcBNc3DeExXrHomhl&uniplatform=NZKPT&language=CHS

[10] Hawkins, J. (2011). Creative ecology (L. Hai, Trans.). Beijing United Publishing Company.

[11] Han, Y., & Yue, H. (2023). Research on emotional design of museum cultural creative products. China Metallurgical Education, 06, 112–114.

[12] https://doi.org/10.16312/j.cnki.cn11-3775/g4.2023.06.009

[13] Herbert, C., Kissler, J., Junghofer, M., Peyk, P., & Rockstroh, B. (2006). Processing of emotional adjectives: Evidence from startle EMG and ERPs. Psychophysiology, 43(2), 197–206. https://doi.org/10.1111/j.1469-8986.2006.00385.x
[14] Lang, S. (1986). Feeling and form. China Social Sciences Press.
[15] Liu, P., Zhu, C., & Liu, Q. (2024). Research on interactive narrative of art museum exhibitions based on AR technology: A case study of "The Hidden Art" AR digital art exhibition. Toy World, 10, 135–137.
[16] Liu, W., & Liu, Q. (2019). Exploration of interactive design in digital museums. Drama Home, 27, 156.
[17] Liu, Y. (2023). Research and application of Dunhuang cultural creative product design based on emotional design-AHP (Master's thesis, Lanzhou University of Technology). https://link.cnki.net/doi/10.27206/d.cnki.ggsgu.2023.001823
[18] Long, L. (2021). Henan Museum archaeological blind box: Innovation and heartfelt intentions. Sales and Market (Management Edition), 02, 100.
[19] Lü, M., Yang, J., & Tian, R. (2023). Emotional design of rural cultural tourism IP image. Industrial Design, 2023(01), 113–115.
[20] Meyer, D. L. (1990). Visual aesthetics. Shanghai People's Publishing House.
[21] Miao, L. (2022). Research on the application of emotional design in museum new media displays. Southeast Culture, 02, 163–168.
[22] Norman, D. A. (2015). The design of everyday things 3: Emotional design (2nd ed.). Beijing: CITIC Press.
[23] Oliver, R. L., Rust, R. T., & Varki, S. (1997). Customer delight: Foundations, findings, and managerial insight. Journal of Retailing, 73(3), 311–336.
[24] Qiu, X. (2020). Research on emotional design of cultural creative products. Industrial Design, 07, 71–72.
[25] Ren, M. (2023). Research on the impact of perceived value of cultural creative products from the Palace Museum on purchase intention (Master's thesis, Tianjin University of Finance and Economics).
[26] https://cnki.wenx.top/kcms2/article/abstract?v=hmawDzFpZzTx1R4KbMDoTxH_1uTmDIJMpocMUjEp1t9zcu1d5ZcFdX2PP20vXJWLPgYh42jY-mWOcl9eMPVBv9LMfAP_2CwOiHiAoxe0jwwcNJxXyX2hX96zhkcnBN3ACR9SFiJybQ13AzxAe7RKeWIremUQIVWQpi8Nq-J5mYot01pzDuuwrdUSWDsOECSu&uniplatform=NZKPT&language=CHS
[27] Saussure, F. (2001). Course in general linguistics (2nd ed.). Beijing: The Commercial Press.
[28] Shi, A., Huo, F., & Hou, G. (2021). Effects of design aesthetics on the perceived value of a product. Frontiers in Psychology, 12, 670800.
[29] Sondoh Jr, S. L., Fook, L. M., Tanakinjal, G. H., & Chai, W. L. (2020). Perceived Value And Customer Satisfaction Of Smartphone Brand Among Youth: The Moderating Effect Of Gender. Malaysian Journal of Business and Economics (MJBE), 7(1), 39-39.
[30] Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. Journal of Retailing, 77(1), 203–220.
[31] Tang, S. W. (2012). Interactive design in museum exhibitions (Master's thesis, Nanjing University of the Arts). Retrieved from
[32] https://cnki.wenx.top/kcms2/article/abstract?v=fNwONIwGMRLHaDpafBpJSSJyN0Dy9G-qhrn6i5lD9vxiKnyM0zFt7VHA9J4vBIcLQl9Def5uuNYbyu_8wC5mM7vCfd9dxI8lIr2w40BchvVJirTturT8kauD3I6z6T-p3Zq9gkcytBOPac9lWGqGQ1ImHzvoUKFwtZVfpDQhTilvcwJ41Pr9MXRV521Y9WkX3NgrYB_hJE8=&uniplatform=NZKPT&language=CHS
[33] Turner, J., & Stets, J. (2007). The sociology of emotions. Shanghai: Shanghai People's Publishing House.
[34] van Gorp, T., & Adams, E. (2014). Emotions and design (Y. Juanjuan, Trans.). People's Posts and Telecommunications Publishing House.
[35] Wang, L., Lin, X., & Zhu, J. (2021). Research on Dunhuang cultural creative design strategy based on emotional design: A case study of "New Dunhuang". Architecture and Culture, 06, 63–65. https://doi.org/10.19875/j.cnki.jzywh.2021.06.021.
[36] Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology, 54(6), 1063-1070.
[37] Wang, X., Gu, Y. Y., & Chen, C. J. (2020). Study on the design of Cantonese cultural and creative products using Analytic Hierarchy Process. Mathematical Problems in Engineering, 2020, 1–7. https://doi.org/10.1155/2020/1491576
[38] Weber, M. (2010). Basic concepts of sociology (H. Cong, Trans.). Beijing: Beijing Publishing House.
[39] Wen, Z., Dong, W., & Li, J. (2019). Study on the emotional design of reading room furniture for the aged community. In Proceedings of the 2019 International Conference on Literature, Art and Human Development (ICLAHD 2019) (Issue 1, pp. 32–35).
[40] Yu, L. (2009). Product design and development (Y. D. Sen, Trans.). Harbin: Northeast University of Finance and Economics Press.

[41] Zhao, K., Xu, X., & Zhong, M. (2022). The influence mechanism of tourism satisfaction in Shaanxi: A perspective based on the PERVAL theory. Journal of Shaanxi Administrative College, 04, 107-114. https://doi.org/10.13411/j.cnki.sxsx.2022.04.020

[42] Zhang, K. (2022). Research on emotional design of museum exhibitions based on augmented reality technology (Master's thesis, Qingdao University of Technology). https://link.cnki.net/doi/10.27263/d.cnki.gqudc.2022.000368

[43] Zhang, X., & Jiang, Y. (2024). Research on museum website interface design based on emotional design theory: A case study of the Palace Museum website. Art Education Research, 04, 90–93.

[44] Zhang, S. T. (2018). The interaction between museums and audiences and the realization of approaches. Heritage and Preservation Research, 4, 100-102.

[45] https://doi.org/10.19490/j.cnki.issn2096-0913.2018.04.021

[46] Zhang, W., Diao, J., & Schick, C. J. (2004). Cross-cultural measurement of positive and negative emotions: An examination of the PANAS dimensional structure. Psychological Science, 01, 77-79. https://doi.org/10.16719/j.cnki.1671-6981.2004.01.020

[47] Zhou, X., Cao, X., & Wu, J. (2023). Research on emotional-oriented cultural creative product design. Packaging Engineering, 44(04), 339–342.

[48] Zhou, Y. (2015). Embodiment of emotional design in museum exhibitions. Art World, 07, 78.

[49] Zhu, Q. (2017). The impact of relational benefits on positive word-of-mouth behavior (Master's thesis, South China University of Technology). Available from China National Knowledge Infrastructure.

[50] https://cnki.wenx.top/kcms2/article/abstract?v=6h6U53PWxNQZpekHsKue4r6zQNcdaKRkzlh8Mj0WwP-BXaWSbnZDEaCVpXPYhnw68zGfU8vApGxXI9x9wiTnrRAyZAAnIkjhM_Ic4jNPG2aFY52PGpQAsFLEG2OuhDTRmpBGOki9-_TIqX1g1tLKgJF-nMCwtcUtTXt6c2GiWvHBalW7kgze4i4urnwU190fpGA_Dm6CAP4=&uniplatform=NZKPT&language=CHS

[51] Zhu, X., Ma, Z., & Deng, H. (2022). Research and practice of emotional design in trendy toy cultural creative products. Industrial Innovation Research, 13, 72–74.

Appendix

| | | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 72 | 48.0 |
| | Female | 78 | 52.0 |
| Age | Under 18 years old | 23 | 15.3 |
| | 18-30 years old | 22 | 14.7 |
| | 31-40 years old | 19 | 12.7 |
| | 41-50 years old | 35 | 23.3 |
| | 51-60 years old | 28 | 18.7 |
| | 60 years old and over | 23 | 15.3 |
| Education | High school and under | 46 | 30.7 |
| | Undergraduate /Post-secondary | 58 | 38.7 |
| | Master's degree and over | 46 | 30.7 |
| | Total | 150 | 100.0 |

Appendix 1, Table of Statistical Characteristics of the Sample Population

| Item | Factor load | | Commonality | CR value |
|---|---|---|---|---|
| | PA | NA | | |
| lively | | | | |
| keen | | | | |
| cheerful | | | | |
| keen | | | | |
| thrilled | | | | |
| proud | | | | |
| glad | | | | |
| Energetic | | | | |
| Grateful | | | | |
| Shameful | | | | |
| Awful | | | | |
| Scared | | | | |
| Tight | | | | |
| Frightened | | | | |
| Guilty | | | | |
| Irritable | | | | |
| Shaking with fright | | | | |
| Dread | | | | |

Note: PA = positive affect, NA = negative affect. All CR values are significant at the $p<0.001$ level.

Appendix 2, PANAS scale

| Latent variable | Measurement term | Factor loading | Cronbach's Alpha | AVE | Combined Reliability (CR) |
|---|---|---|---|---|---|
| Functional value | SQ1 | | | | |
| | SQ2 | | | | |
| | SQ3 | | | | |
| | SQ4 | | | | |
| | SQ5 | | | | |
| Sentimental value | EMV (1) | | | | |
| | EMV (2) | | | | |
| | EMV (3) | | | | |
| | EMV (4) | | | | |
| Novelty value | NV (1) | | | | |
| | NV (2) | | | | |
| | NV (3) | | | | |
| | NV (4) | | | | |
| | NV (5) | | | | |
| Advertising value | XD (1) | | | | |
| | XD (2) | | | | |
| | XD (3) | | | | |
| Social value | SV (1) | | | | |
| | SV (2) | | | | |
| | SV (3) | | | | |
| | SV (4) | | | | |
| | SV (5) | | | | |
| | SV (6) | | | | |
| Satisfaction | SAT (1) | | | | |
| | SAT (2) | | | | |
| | SAT (3) | | | | |
| | SAT (4) | | | | |
| Stance | ATT (1) | | | | |
| | ATT (2) | | | | |

Appendix 3, PERVAL scale

| Anderson and Fornell;Oliver Scale | | | |
|---|---|---|---|
| Variant | Serial number | Measurement item | Sources of indicators |
| Customer satisfaction | SA1 | It's a wise choice to buy cultural and creative products in this art museum. | Anderson and Fornell(1994); Oliver (1997) ; |
| | SA2 | SA2I was delighted by the interactive experience of buying cultural and creative products from this art museum. | |
| | SA3 | SA3Overall, I was satisfied with the interactive experience of purchasing cultural and creative products from this art museum. | |
| | SA4 | SA4I think the interactive experience of purchasing cultural and creative products with this art museum meets my expectations. | |
| | SA5 | SA5I feel good about using this art museum to buy cultural and creative products. | |

Appendix 4, Anderson and Fornell;Oliver scale

| KMO and Bartlett's test | | |
|---|---|---|
| KMO Sample Suitability Quantity | | .822 |
| Bartlett's test of sphericity | Approximate chi-square | 1739.723 |
| | Degrees of freedom | 300 |
| | Significance | .000 |

| Variant | Alpha、Cronbach Alpha | Item count |
|---|---|---|
| Pre-interactive | .884 | 5 |
| Mid-interaction | .876 | 4 |
| Post-interaction | .777 | 3 |
| Emotional experience | .839 | 6 |
| Perceived value | .778 | 4 |
| Overall satisfaction | .819 | 3 |

Appendix 5、Reliability test form, validity test (KMO & Bartlett's test)

| Total Variance Explained | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Initial eigenvalue | | | Extract the sum of the squares of the loads | | | Rotating load sum of squares | | |
| Components | Total | Percentage of variance | Cumulative % | Total | Percentage of variance | Cumulative% | Total | Percentage of variance | Cumulative % |
| 1 | 6.034 | 24.136 | 24.136 | 6.034 | 24.136 | 24.136 | 3.559 | 14.236 | 14.236 |
| 2 | 3.999 | 15.997 | 40.133 | 3.999 | 15.997 | 40.133 | 3.349 | 13.396 | 27.632 |
| 3 | 2.525 | 10.101 | 50.234 | 2.525 | 10.101 | 50.234 | 3.021 | 12.084 | 39.716 |
| 4 | 1.672 | 6.689 | 56.923 | 1.672 | 6.689 | 56.923 | 2.498 | 9.992 | 49.708 |
| 5 | 1.325 | 5.299 | 62.222 | 1.325 | 5.299 | 62.222 | 2.183 | 8.733 | 58.441 |
| 6 | 1.190 | 4.761 | 66.983 | 1.190 | 4.761 | 66.983 | 2.135 | 8.542 | 66.983 |
| 7 | .833 | 3.333 | 70.316 | | | | | | |
| 8 | .771 | 3.083 | 73.400 | | | | | | |
| 9 | .655 | 2.620 | 76.020 | | | | | | |
| 10 | .622 | 2.489 | 78.508 | | | | | | |
| 11 | .555 | 2.219 | 80.728 | | | | | | |
| 12 | .525 | 2.101 | 82.828 | | | | | | |
| 13 | .475 | 1.901 | 84.729 | | | | | | |
| 14 | .460 | 1.839 | 86.568 | | | | | | |
| 15 | .429 | 1.715 | 88.283 | | | | | | |
| 16 | .394 | 1.575 | 89.859 | | | | | | |
| 17 | .371 | 1.483 | 91.341 | | | | | | |
| 18 | .357 | 1.427 | 92.768 | | | | | | |
| 19 | .313 | 1.254 | 94.022 | | | | | | |
| 20 | .296 | 1.186 | 95.208 | | | | | | |
| 21 | .286 | 1.144 | 96.352 | | | | | | |
| 22 | .275 | 1.099 | 97.450 | | | | | | |
| 23 | .251 | 1.003 | 98.453 | | | | | | |
| 24 | .229 | .916 | 99.369 | | | | | | |
| 25 | .158 | .631 | 100.000 | | | | | | |
| Extraction method: principal component analysis | | | | | | | | | |

Appendix 6、Total Variance Interpretation Table

| | CMIN/DF | GFI | RMR | RMSEA | NFI | IFI | TLI | CFI |
|---|---|---|---|---|---|---|---|---|
| Standard | ≤3.00 | ≥0.90 | ≤0.08 | ≤0.08 | ≥0.90 | ≥0.90 | ≥0.90 | ≥0.90 |
| Measured values | 1.119 | 0.928 | 0.052 | 0.028 | 0.914 | 0.990 | 0.988 | 0.990 |

Appendix 7、Main Fit Indicators for Study 1 (Structural Equation of Emotional Experience) Model

| Hopeless | | Standardised path coefficients | S.E. | C.R. | P | Conclusion |
|---|---|---|---|---|---|---|
| H | Pre-interaction-Emotional experience | .458 | .097 | 4.532 | *** | Set up |
| | Emotional experience-Overall satisfaction | .318 | .111 | 2.929 | .003 | Set up |
| | Pre-interactive-Overall satisfaction | .245 | .102 | 2.358 | .018 | Set up |

Appendix 8、Coefficients and Significance of Major Paths in Study 1 (Structural Equation of Emotional Experience)

| Hopeless | path | Effect | SE | S.E. | P | LB（95%CI） | UB（95%CI） | Conclusion |
|---|---|---|---|---|---|---|---|---|
| | Pre-interaction-Emotional experience-Overall satisfaction | Total | .391 | .087 | .001 | .221 | .549 | Established |
| | | Direct | .245 | .107 | .028 | .029 | .441 | Established |
| | | Indirect | .146 | .057 | .003 | .049 | .269 | Established |

Appendix 9、Results of mediation analyses for Study 1 (Structural Equations of Emotional Experience)

| | CMIN/DF | GFI | RMR | RMSEA | NFI | IFI | TLI | CFI |
|---|---|---|---|---|---|---|---|---|
| Standard | ≤3.00 | ≥0.90 | ≤0.08 | ≤0.08 | ≥0.90 | ≥0.90 | ≥0.90 | ≥0.90 |
| Measured values | 1.132 | 0.909 | 0.071 | 0.030 | 0.844 | 0.985 | 0.982 | 0.985 |

Appendix 10、Main Fit Indicators for the Study II (Perceived Value Structural Equation) Model

| Hopeless | path | SE | Estimate | S.E. | C.R. | P | Conclusion |
|---|---|---|---|---|---|---|---|
| | Mid-interaction→ Perceived value | .483 | .356 | .076 | 4.665 | *** | Established |
| | Emotional experience→ Overall satisfaction | .362 | .377 | .081 | 4.655 | *** | Established |
| | Perceived value→ Overall satisfaction | .332 | .380 | .103 | 3.697 | *** | Established |

Appendix 11、Study 2 (Perceived Value Structure Equation) Main Path Coefficients and Significance

| Parameter | Estimate | Lower | Upper | P | Conclusion |
|---|---|---|---|---|---|
| Mid-interaction→Emotional experience→Overall satisfaction | .168 | .072 | Established | .000 | Established |
| Mid-interaction→Perceived value →Overall satisfaction | .160 | .058 | Established | .001 | Established |

Appendix 12、Results of mediation analyses for Study 2 (Perceived Value Structure Equation)

| | CMIN/DF | GFI | RMR | RMSEA | NFI | IFI | TLI | CFI |
|---|---|---|---|---|---|---|---|---|
| Standard | ≤3.00 | ≥0.90 | ≤0.08 | ≤0.08 | ≥0.90 | ≥0.90 | ≥0.90 | ≥0.90 |
| Measured values | 1.172 | 0.934 | 0.063 | 0.069 | 0.896 | 0.954 | 0.934 | 0.953 |

Appendix 13、Main fit metrics of the model for Study 3 (Interactive Late Validation Model)

| Hopeless | Path | SE | S.E. | C.R. | P | Conclusion |
|---|---|---|---|---|---|---|
| | Post-interaction→ Perceived value | .252 | .093 | 2.373 | .018 | Established |
| | Post-interaction→Overall satisfaction | .230 | .088 | 2.275 | .023 | Established |
| | Perceived value→Overall satisfaction | .350 | .105 | 3.309 | *** | Established |

Appendix 14、Study 3 primary path coefficients and significance

| Hopeless | path | Effect | SE | S.E. | P | LB（95%CI） | UB（95%CI） | Conclusion |
|---|---|---|---|---|---|---|---|---|
| | Post-interaction→Perceived value→Overall satisfaction | Total | .318 | .105 | .005 | .144 | .488 | Established |
| | | Direct | .230 | .109 | .035 | .048 | .414 | Established |
| | | Indirect | .088 | .044 | .022 | .022 | .164 | Established |

Appendix 15、Results of Study III intermediation analyses

| Rotated component matrix[a] | | | | | | |
|---|---|---|---|---|---|---|
| | Ingredient | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Pre-interactiveA1 | .848 | | | | | |
| Pre-interactiveA2 | .823 | | | | | |
| Pre-interactiveA3 | .758 | | | | | |
| Pre-interactiveA4 | .805 | | | | | |
| Pre-interactiveA5 | .744 | | | | | |
| Mid-interactionB6 | | | .803 | | | |
| Mid-interactionB7 | | | .806 | | | |
| Mid-interactionB8 | | | .799 | | | |
| Mid-interactionB9 | | | .800 | | | |
| Post-interactionC10 | | | | | .831 | |
| Post-interactionC11 | | | | | .767 | |
| Post-interactionC12 | | | | | .844 | |
| Emotional experienceA113 | | .699 | | | | |
| Emotional experienceA114 | | .626 | | | | |
| Emotional experienceA115 | | .777 | | | | |
| Cultural resonanceA216 | | .667 | | | | |
| Cultural resonanceA217 | | .671 | | | | |
| Cultural resonanceA218 | | .762 | | | | |
| Cognitive valueB119 | | | | .730 | | |
| Cognitive valueB120 | | | | .724 | | |
| Sentimental valueB221 | | | | .712 | | |
| Sentimental valueB222 | | | | .793 | | |
| Overall satisfactionC123 | | | | | | .821 |
| Overall satisfactionC124 | | | | | | .694 |
| Interactive engagementC225 | | | | | | .825 |
| Extraction method: principal component analysis | | | | | | |
| Rotation method: Kaiser normalised maximum variance method | | | | | | |
| a. Rotation has converged after 7 iterations | | | | | | |

Appendix 16、Rotated component matrix