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# "Coolness" and "joy" in games: factors influencing mobile game players' willingness to make in-game purchases

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## Abstract

**Purpose** – This study aims to deeply explore the factors influencing mobile game players' willingness to make in-game purchases, providing references for game developers and marketers to formulate effective strategies.

**Design/methodology/approach** – This research integrates the coolness factors and hedonic motivation system acceptance model to construct a comprehensive theoretical model analyzing mobile game players' willingness to make in-game purchases. The framework includes multidimensional variables such as joy, coolness, immersion, and game experience. Using data from 392 surveys collected from mobile game forums and social networks, the study employs structural equation modeling to analyze the factors and mechanisms influencing players' willingness to make in-game purchases and to verify the related research hypotheses.

**Findings** – The findings reveal that coolness factors have a significant positive impact on game experience and immersion, which in turn affect players' willingness to make in-game purchases. Game experience has a significant positive impact on both immersion and purchase willingness. A good game experience not only increases players' immersion but also directly enhances their willingness to make in-game purchases. Immersion plays a mediating role in the influence of coolness factors and joy on purchase willingness.

**Originality/value** – By integrating coolness theory with the hedonic motivation system acceptance model, this study constructs a comprehensive model to explore mobile game players' willingness to make in-game purchases. The combination of variables, including personal psychological and social psychological factors, provides a thorough analysis of the factors influencing mobile game purchase willingness, enriching existing research.

**Keywords** Coolness factors, Joy, Immersion, Game experience,
Willingness to make in-game purchases in mobile games

**Paper type** Research paper

## 1. Introduction

Mobile games are typically defined as video game activities conducted on mobile devices. These devices include smartphones, tablets, and other portable gadgets. The key characteristics of mobile games are their portability, immediacy, and accessibility, allowing users to enjoy gaming anytime and anywhere. With advancements in technology and the proliferation of mobile devices, mobile gaming has become one of the most popular



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forms of gaming worldwide (Coutrot, 2019; Hendratno *et al.*, 2023; Liu, 2016). According to Precedence Research, the global mobile gaming market was valued at $212.06 billion in 2023 and is expected to reach approximately $499.53 billion by 2029, with the Asia-Pacific region leading the global market share. The Chinese mobile gaming market has become the largest single market worldwide, with actual sales revenue reaching 225.538 billion RMB in 2021 (Wang, 2023). Additionally, according to the "2023 China Game Industry Report," the actual sales revenue of the Chinese game market in 2023 was 302.964 billion RMB, with mobile game sales revenue showing a significant increase, accounting for 74.88% of the total, thus dominating the market. The rapid development of the mobile gaming industry has made it a critical part of the digital entertainment field. The diversity and convenience of mobile games attract a large number of young users (Liu, 2016). Consequently, research on the factors influencing the willingness to make in-game purchases in mobile games has become an increasingly prominent topic among scholars.

Empirical studies on the factors influencing the willingness to make in-game purchases in mobile games in existing literature mainly focus on two aspects:

The first aspect is the impact of personal factors on the willingness to make in-game purchases. Syahrivar *et al.* (2022) found that self-indulgence has a positive impact on the willingness to spend in freemium games, and through the mediating effect of this willingness, it further enhances the willingness to pay for virtual items. Similarly, competitiveness is a significant positive factor, with players who have a strong desire for competition being more likely to pay to enhance their gaming experience. Warouw (2014) pointed out that players' attitudes directly affect their willingness to purchase virtual goods, with players holding positive attitudes being more likely to buy virtual items. Ruangkanjanases and Sahaphong (2015) found that people's perceived quality and emotional value of a product influence their willingness to purchase online game items across generations. These personal factors influence players' psychological states, attitudes, and values, directly or indirectly affecting their willingness to make in-game purchases and forming a complex psychological motivation system.

The second aspect is the impact of social factors on the willingness to make in-game purchases. Syahrivar *et al.* (2022) pointed out that social interaction is a crucial factor promoting the willingness to pay for virtual items; the more frequent the social interaction, the higher the willingness to pay. This is consistent with the findings of Chandra *et al.* (2021), who found that social support significantly enhances players' willingness to pay. Additionally, subjective norms are also an important social factor. Warouw (2014) showed that the pressure and expectations players feel from their social circles enhance their willingness to purchase. Moreover, social support not only influences individuals' purchase decisions but also shows differences across generational groups. Ruangkanjanases and Sahaphong (2015) indicated that social support significantly impacts the purchase intentions of Generation X (born 1965–1985), while for Generation Y (born 1986–2000), the expression of social self-image is more important. This suggests that players of different age groups are influenced differently by social relationships and self-presentation. Overall, social factors influence players' willingness to make in-game purchases through various pathways, including social interaction, subjective norms, and social support, collectively enhancing their motivation to purchase virtual items in games.

The above research findings provide rich references and insights for this study. However, there is still room for further exploration of the factors influencing mobile game players' willingness to make in-game purchases. For instance, the impact of personal psychological factors and mental states, such as joy and immersion, on purchase willingness, and social psychological factors, such as the role of coolness in social interactions, may significantly influence mobile game players' purchase willingness, yet existing literature has relatively little coverage on these aspects.

In this study, through surveys of mobile game players and personal gaming experiences, it was found that joy, immersion, and game experience are crucial reasons for players'

continuous in-game purchases. Therefore, this study considers joy, immersion, and game experience as important personal psychological variables. Additionally, given the collective characteristics of mobile game players, coolness theory as a social psychological factor plays a significant role in influencing their willingness to make in-game purchases.

This study's specific approach involves integrating coolness theory with the hedonic motivation system acceptance model, incorporating variables such as coolness factors, joy, immersion, and game experience into a new integrated model. Using data from 392 voluntarily surveyed players, structural equation modeling is employed to empirically analyze the main factors and mechanisms influencing players' willingness to make in-game purchases. The key findings of this study are that coolness factors and joy significantly enhance mobile game players' game experience and immersion. Moreover, a good game experience directly increases players' immersion and indirectly influences their willingness to make in-game purchases. Immersion plays a mediating role in the influence of coolness factors and joy on purchase willingness. These conclusions not only deepen the understanding of players' willingness to make in-game purchases but also provide game developers and marketers with more effective development strategies and marketing measures.

## 2. Literature review

### *2.1 Coolness*

Coolness is a quality that people generally desire but do not widely understand (Anik *et al.*, 2017). Sundar *et al.* (2014) identified that coolness factors mainly consist of three dimensions: attractiveness, originality, and subcultural appeal. Attractiveness refers to objects with aesthetic features and appearance that are more likely to attract people (Dion *et al.*, 1972). Originality refers to products with unique appearance or functions (Sundar *et al.*, 2014). Subcultural appeal refers to products or services that reflect the unique characteristics and interests of their users, allowing them to achieve self-differentiation (Cha, 2020; Rahman, 2013). When a technology is considered attractive, original, and has subcultural appeal, it is perceived as cool, and individuals tend to have a higher willingness to use products or services they find cool (Sundar *et al.*, 2014).

Current research on "coolness" mainly focuses on personal traits and product design. For instance, Dar-Nimrod *et al.* (2012) suggest that "cool" can be simplified into two conceptually coherent and distinct personality orientations: emphasizing extraversion and adapting to external evaluations, and being independent, rebellious, and countercultural. Tiwari *et al.* (2021) found that the coolness of technological products positively affects personal brand likability.

In the gaming field, the study of coolness factors has gained widespread attention. Nan *et al.* (2022), based on coolness theory and the technology acceptance model, developed a causal model exploring users' intentions to use video game consoles. Their study found that hedonic motivation, system quality, and service quality significantly impact user intentions. Alanadoly and Salem (2023), Salem *et al.* (2023) investigated the impact of perceived game value on consumer brand coolness in immersive games within the fashion industry, finding that brand coolness plays a crucial role in brand equity. Additionally, Nan *et al.* (2023) studied the effect of avatar attributes on the intention to continue playing in massively multiplayer online role-playing games (MMORPGs), revealing that avatar attractiveness and originality positively impact the flow state and intention to continue playing. Romero (2022), through studying luxury brand game advertisements, explored the impact of brand coolness on brand equity, demonstrating that brand coolness significantly enhances brand credibility and brand equity. These studies indicate that coolness factors are crucial in enhancing user experience and brand value (Table 1).

| Author (year) | Research subjects | Research content | Variable measurement |
|---|---|---|---|
| Nan *et al.* (2022) | Video Game Console | Developing a causal model primarily based on the Cool Theory and the Technology Acceptance Model to explore users' intention to use video game consoles | Pleasure motivation, system and service quality, perceived cost and game diversity, attractiveness, subcultural appeal, originality |
| Salem *et al.* (2023) | Immersive Games in the Fashion Industry | Investigate the impact of perceived value of games on consumers' brand coolness perception and its effect on consumers' relationship with brand assets | Brand assets, brand coolness, perceived enjoyment, self-expression, perceived emotional challenge |
| Nan *et al.* (2023) | Massively Multiplayer Online Role-Playing Games (MMORPGs) | Explore the impact of avatar attributes on the continued intention to play large-scale multiplayer online role-playing games | Attraction, originality, subculture attractiveness, avatar coolness, avatar identification, flow state, continued willingness |
| Alanadoly and Salem (2023) | Virtual assets within a gaming platform that collaborates with fashion brands | Perceived Coolness and Fashion Brand Assets under the Influence of Gaming Values | Brand coolness, perceived enjoyment, emotional involvement, gender |
| Romero (2022) | Luxury goods game advertising | Understanding the Use of Luxury Brand Game Advertisements: The Impact of Brand Coolness on Brand Assets | Brand credibility, brand coolness, brand assets |

**Table 1.** Application of coolness in gaming research

**Source(s):** Table by authors

### *2.2 Hedonic motivation system acceptance model*

The Hedonic Motivation System Acceptance Model (HMSAM) is an extension and enhancement of the HMS model, focusing on how people satisfy their intrinsic motivations. Unlike simply expressing intrinsic motivation through perceived enjoyment, HMSAM more complexly describes the composition of intrinsic motivation through the structure of Cognitive Absorption (CA). This structure includes joy, control, curiosity, focused immersion, and temporal dissociation (Lowry *et al.*, 2012).

A review of the existing literature on the Hedonic Motivation System Acceptance Model reveals that hedonic motivation is the core driving force, and immersion is an important mediating variable. Whether it is VR gaming, VR tourism, video-on-demand, museum experiences, TikTok usage in higher education, NFT gaming, or ChatGPT usage in language education, hedonic motivation has been proven to be the central driving force behind user acceptance and use of these technologies and systems. Research consistently shows that the enjoyment and pleasure users experience when using these technologies significantly enhance their intention to use them (Deng and Yu, 2023; Huda *et al.*, 2020; Kari and Kosa, 2023; Kim and Hall, 2019; Perez *et al.*, 2023; Qu and Wu, 2024; Wu *et al.*, 2021). Furthermore, immersion plays a crucial mediating role between hedonic motivation and user behavior intention. For instance, perceived enjoyment enhances users' immersion experience, which in turn promotes their intention to continue using the technology (Wu *et al.*, 2021).

In the consumer domain, the Hedonic Motivation System Acceptance Model has been widely applied. Ertz *et al.* (2022) studied the factors influencing mobile shopping intentions

among consumers in China and the United States, finding that perceived ease of use, perceived usefulness, control, and joy significantly impacted mobile shopping intentions. Tu and Jia (2024) extended the HMSAM model by incorporating aesthetic variables, exploring key elements influencing user experiences with AR technology, and finding that immersion and willingness to pay are significantly affected by aesthetics, curiosity, and perceived behavioral control. Chen *et al.* (2021) combined the Theory of Planned Behavior (TPB) with HMSAM to study intrinsic factors influencing fitness enthusiasts' green dietary behaviors, discovering that social recognition, environmental ethics, and purchase enjoyment significantly affect behavioral intentions. Kim and Hall (2019) examined the continued use intentions of VR tourism technology, finding that perceived convenience, flow state, and subjective well-being are significant factors influencing continued use intentions. Shridhar *et al.* (2023) investigated factors affecting consumer purchasing behavior in the Instagram application, revealing that product presentation strategies, pricing, and customer reviews significantly impact purchase intentions. These studies demonstrate the significant explanatory power and applicability of the HMSAM model in various contexts regarding consumer behavior (Table 2).

## 3. Hypothesis development

### *3.1 The influence of joy on game experience and immersion*

Game experience is part of online customer experience. Bilgihan *et al.* (2016) pointed out that joy is one of the prerequisites for a unified online customer experience. Lee Teh and Pak (2021) found that positive feelings of love and joy significantly enhance the overall game experience for players. According to the Hedonic Motivation System Acceptance Model, immersion deepens with an increase in joy (Lowry *et al.*, 2012). Additionally, Leveau and Camus (2023) proposed that there is a reciprocal influence between joy and immersion. Based on the above, it can be inferred that joy positively affects game experience and immersion. Therefore, the following hypotheses are proposed:

*H1*. Joy has a significant positive impact on game experience.

*H2*. Joy has a significant positive impact on immersion.

### *3.2 The influence of coolness factors on game experience and immersion*

Elements of coolness factors such as attractiveness, originality, and subcultural appeal may positively impact individual game experiences (Jamshidi *et al.*, 2023). Consumers are generally attracted to objects or individuals with aesthetic appeal (Dion *et al.*, 1972), leading them to more positively evaluate online mobile game products with attractive appearances and features. Online mobile game products with unique functions or appearances are often perceived as original, making consumers feel distinctive when using these products and positively recognizing their originality, thereby enhancing their willingness to purchase these unique products (Sundar and Marathe, 2010).In mainstream society, game products with unique appearances and functions are relatively rare, so consumers perceive participation in online mobile games as a conspicuous behavior, further promoting the development of subcultures associated with online mobile game products (Kim *et al.*, 2015). These factors are closely related to game experience and immersion (Huang *et al.*, 2011; Jamshidi *et al.*, 2023). Based on the above, it can be inferred that coolness factors positively affect game experience and immersion. Therefore, the following hypotheses are proposed:

*H3*. Coolness factors have a significant positive impact on game experience.

| Author (year) | Research subjects | Theoretical model | Research content | Variable measurement |
|---|---|---|---|---|
| Ertz *et al.* (2022) | Willingness to shop via mobile devices | HMSAM | Factors influencing the mobile shopping intention of consumers in China and the United States | Perceived ease of use, perceived usefulness, control, pleasure, and mobile shopping intention |
| Tu and Jia (2024) | Immersion and willingness to pay in AR broadcasting | HMSAM | How AR technology affects key elements of user online experience, immersion, and willingness to pay | Aesthetics, perceived ease of use, perceived usefulness, curiosity, perceived behavioral control, pleasure, immersion, and willingness to pay |
| Chen *et al.* (2021) | The intrinsic motivation of fitness enthusiasts for green diet | TPB、HMSAM | Factors influencing fitness enthusiasts' consumption of green food (an environmentally friendly way of food consumption) | Social approval, environmental ethics, curiosity, purchase enjoyment, perceived usefulness, subjective norm, perceived behavioral control, and behavioral intention |
| Kim and Hall (2019) | The continued use intention of virtual reality tourism technology | HMSAM | The impact of consumer hedonic behavior on continued usage | Perceived convenience, perceived usefulness, perceived enjoyment, flow state, subjective well-being, ease of use, and intention to continue using |
| Shridhar *et al.* (2023) | Consumer purchase intention | HMSAM | Factors influencing consumer purchasing behavior in the Instagram application | Product display strategy, price, customer reviews, influencer type, repurchase intention, gender, age, user daily income, purchase intention |

**Source(s):** Table by authors

**Table 2.** Application studies of the hedonic motivation system acceptance model in the consumer domain

*H4.* Coolness factors have a significant positive impact on immersion.

### *3.3 The influence of game experience on immersion*

Game experience includes the perceptions and emotional experiences individuals gain in games, playing a key role in enhancing players' immersion (Dworak *et al.*, 2020). Studies have shown a direct link between game experience and immersion, where factors like emotional state balance, consistency of character appearance and expression, and emotional resonance can significantly enhance players' situational empathy and immersion (Sierra Rativa *et al.*, 2020). Particularly in virtual reality environments, the design of emotional challenges has been found to significantly enhance players' positive emotional experiences (Ahmed *et al.*, 2017; Peng *et al.*, 2019).Therefore, we infer that game experience positively influences immersion.Thus, the following hypothesis is proposed:

*H5.* Game experience has a significant positive impact on immersion.

### 3.4 The mediating role of game experience

Jang *et al.* (2021) found that players who had good purchase experiences with in-game items had higher game purchase intentions. Similarly, Luo (2020) demonstrated that customer experience significantly positively affects online game purchase experience. Game experience may mediate the impact on players' mobile game spending intentions (Bilgihan *et al.*, 2016; Jamshidi *et al.*, 2023; Tandon *et al.*, 2016; Temirgali, 2023). Joy and coolness factors may indirectly affect willingness to recharge in mobile games through game experience. Based on the above, it can be inferred that game experience mediates the relationship between joy and willingness to recharge in mobile games, as well as between coolness factors and willingness to make in-game purchases in mobile games. Therefore, the following hypotheses are proposed:

*H6.* Game experience has a significant positive impact on willingness to make in-game purchases in mobile games.

*H7.* Game experience mediates the relationship between joy and willingness to make in-game purchases in mobile games

*H8.* Game experience mediates the relationship between coolness factors and willingness to make in-game purchases in mobile games.

### 3.5 The mediating role of immersion

Studies have shown that immersion plays an important mediating role in user behavior (Hewei, 2022). Immersion may mediate the impact on players' willingness to make in-game purchases in mobile games (Chang and Yu, 2023; Hewei, 2022; Huang *et al.*, 2011; Leveau and Camus, 2023). Based on the above, it can be inferred that immersion mediates the relationship between joy and willingness to recharge in mobile games, as well as between coolness factors and willingness to recharge in mobile games. Therefore, the following hypotheses are proposed:

*H9.* Immersion has a significant positive impact on willingness to make in-game purchases in mobile games.

*H10.* Immersion mediates the relationship between joy and willingness to make in-game purchases in mobile games.

*H11.* Immersion mediates the relationship between coolness factors and willingness to make in-game purchases in mobile games.

### 3.6 The linked mediation effect of game experience and immersion

Game experience and immersion may jointly influence players' willingness to make in-game purchases in mobile games through a mediating relationship. Studies have shown that the relationship between game experience and immersion in user behavior exhibits a mediating effect (Bilgihan *et al.*, 2016; Chang and Yu, 2023; Hewei, 2022; Jamshidi *et al.*, 2023; Tandon *et al.*, 2016). Based on the above, it can be inferred that game experience and immersion jointly mediate the relationship between joy and willingness to recharge in mobile games, as well as between coolness factors and willingness to recharge in mobile games. Therefore, the following hypotheses are proposed:

*H12.* Game experience and immersion jointly mediate the relationship between joy and willingness to make in-game purchases in mobile games.

*H13.* Game experience and immersion jointly mediate the relationship between coolness factors and willingness to make in-game purchases in mobile games.

Based on the above, this study constructs a research model of factors influencing willingness to make in-game purchases in mobile games with five variables, as shown in Figure 1.

## 4. Research design

### *4.1 Questionnaire design*

The questionnaire used a Likert seven-point scale, with numbers 1, 2, 3, 4, 5, 6, 7 indicating "strongly disagree," "disagree," "somewhat disagree," "neutral," "somewhat agree," "agree," and "strongly agree," respectively. "Strongly disagree" indicates that the described situation in the question is completely different from reality, while "strongly agree" indicates that the described situation is completely consistent with reality, and "neutral" indicates neutrality. The research tools used in this study consisted of 6 parts. The first part was the player background questionnaire, consisting of two questions. The second part referenced Lin (2021) and Zhao *et al.* (2018) for the design of the questionnaire on joy, determining the specific measurement items for joy in player mobile game recharge intention, and compiling 5 questions. The third part was the questionnaire on coolness factors, referring to Nan *et al.* (2022) for the design of the questionnaire on coolness factors, which included attractiveness, originality, and sub-cultural attractiveness as sub-dimensions, determining the specific measurement items for coolness factors in player mobile game recharge intention, and compiling 9 questions. The fourth part was the game experience questionnaire, referring to Serra-Cantallops *et al.* (2020) for the design of the questionnaire on game experience, determining the specific measurement items for game experience in player mobile game recharge intention, and compiling 5 questions. The fifth part was the immersion questionnaire, referring to Yoo *et al.* (2018) and Huang *et al.* (2021) for the design of the questionnaire on immersion, determining the specific measurement items for immersion in player mobile game recharge intention, and compiling 5 questions. The sixth part was the questionnaire on willingness to make in-game purchases in mobile games, referring to Rajeh *et al.* (2021) and Fang *et al.* (2018) for the design of the questionnaire on willingness to use and behavior intention, determining the specific measurement items for player's willingness to make in-game purchases in mobile games, and compiling 3 questions.

### *4.2 Data source*

The questionnaire survey was conducted from November 2023 to December 2023. This study used a convenient sampling method for online surveys, and respondents chose to participate voluntarily. Since the target respondents were mobile game players, we could

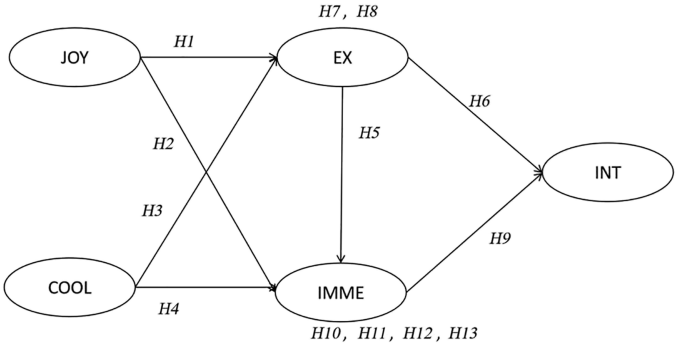



**Figure 1.**
Research model of factors influencing willingness to make in-game purchases in mobile games

**Source(s):** Figure by authors

contact them through online channels. This study posted our survey links on several well-known mobile game forums such as taptap, Baidutieba, and steam, as well as player social networks such as QQ group chat and WeChat group chat. We included a lottery link at the end of the survey link, with rewards being virtual products in the game. This study surveyed a total of 470 mobile game players, distributed 470 questionnaires, collected 426 responses (response rate of 90.64%), and finally obtained 392 valid questionnaires, with an effective rate of 92.02%.

## 5. Empirical analysis

### *5.1 Sample statistics*

The basic data report of this study includes gender, mobile game age, education level, and daily mobile game playing time.Among the gender distribution, the majority were females, accounting for 205 people (52.3%). In terms of mobile game age, the majority were those with 3 years or less of experience, accounting for 218 people (55.6%). Regarding education level, the majority were undergraduates, accounting for 247 people (63.0%). In terms of daily mobile game playing time, the majority were those playing 3 h or less per day, accounting for 218 people (55.6%). Basic information is shown in Table 3.

### *5.2 Descriptive statistics and reliability and validity*

According to Table 4, the mean values of the variables range between 4.41 and 5.29. The standardized factor loadings, composite reliability, and average variance extracted (AVE) all meet the standards set by Fornell and Larcker (1981). Therefore, this study demonstrates good reliability and validity.

### *5.3 Discriminant validity*

As shown in Table 5, the square root of the AVE (Average Variance Extracted) for each construct on the diagonal is greater than the correlation coefficients off the diagonal. Therefore, each construct in this study demonstrates good discriminant validity.

### *5.4 Model fit*

Based on the Bollen-Stine bootstrap correction results presented in Table 6, all the fit indices meet the scholars' standards. This indicates that the data in this study are suitable for Structural Equation Modeling (SEM) analysis.

| Variable | Value label | Frequency | Variable | Value label | Frequency |
|---|---|---|---|---|---|
| Gender | Male | 187(47.7) | Mobile game age | 3 years or below | 218(55.6) |
| | Female | 205(52.3) | | More than 3 years | 174(44.4) |
| Education level | High School or Below | 5(1.3) | Daily mobile game playing time | 3 h or below | 218(55.6) |
| | Associate Degree | 122(31.1) | | More than 3 h | 174(44.4) |
| | Bachelor's Degree | 247(63.0) | | | |
| | Master's Degree or above | 18(4.6) | | | |

**Source(s):** Table denoted by authors

**Table 3.**
Frequency table

| Variable | | Mean | Std Dev | Std | Cronbach's α | CR | AVE |
|---|---|---|---|---|---|---|---|
| JOY | JOY01 | 5.23 | 1.2 | 0.805 | 0.91 | 0.915 | 0.682 |
| | JOY02 | 5.29 | 1.2 | 0.828 | | | |
| | JOY03 | 5.25 | 1.22 | 0.834 | | | |
| | JOY04 | 5.24 | 1.25 | 0.841 | | | |
| | JOY05 | 5.2 | 1.31 | 0.822 | | | |
| COOL | COOL01 | 4.87 | 1.3 | 0.718 | 0.92 | 0.921 | 0.567 |
| | COOL02 | 4.68 | 1.4 | 0.775 | | | |
| | COOL03 | 5.05 | 1.27 | 0.601 | | | |
| | COOL04 | 4.88 | 1.35 | 0.694 | | | |
| | COOL05 | 4.9 | 1.38 | 0.7 | | | |
| | COOL06 | 4.69 | 1.5 | 0.786 | | | |
| | COOL07 | 4.42 | 1.68 | 0.842 | | | |
| | COOL08 | 4.41 | 1.66 | 0.828 | | | |
| | COOL09 | 4.47 | 1.6 | 0.8 | | | |
| EX | EX01 | 4.82 | 1.41 | 0.768 | 0.89 | 0.893 | 0.625 |
| | EX02 | 4.92 | 1.33 | 0.814 | | | |
| | EX03 | 5.04 | 1.31 | 0.81 | | | |
| | EX04 | 4.89 | 1.42 | 0.797 | | | |
| | EX05 | 5 | 1.39 | 0.761 | | | |
| IMME | IMME01 | 4.92 | 1.38 | 0.715 | 0.9 | 0.894 | 0.628 |
| | IMME02 | 4.88 | 1.44 | 0.761 | | | |
| | IMME03 | 4.78 | 1.44 | 0.797 | | | |
| | IMME04 | 4.86 | 1.44 | 0.817 | | | |
| | IMME05 | 4.87 | 1.45 | 0.865 | | | |
| INT | INT01 | 4.45 | 1.69 | 0.859 | 0.83 | 0.842 | 0.642 |
| | INT02 | 4.62 | 1.7 | 0.842 | | | |
| | INT03 | 4.91 | 1.45 | 0.692 | | | |

**Note(s):** Mean: mean; Std Dev: standard deviation; Std: standardized factor loadings; SMC: multiple correlation squared; CR. Synthetic Reliability; AVE: Average Variance Extraction; JOY: Joy; COOL: Coolness Factor; EX: Gaming Experience; IMME: Immersion; INT: Willingness to make in-game purchases in mobile games
**Source(s):** Table denoted by authors

**Table 4.** Descriptive statistics and reliability

| | AVE | JOY | COOL | EX | IMME | INT |
|---|---|---|---|---|---|---|
| JOY | 0.682 | 0.826 | | | | |
| COOL | 0.567 | 0.589 | 0.753 | | | |
| EX | 0.625 | 0.698 | 0.668 | 0.791 | | |
| IMME | 0.628 | 0.640 | 0.714 | 0.683 | 0.792 | |
| INT | 0.642 | 0.523 | 0.551 | 0.635 | 0.696 | 0.801 |

**Note(s):** JOY: joy; COOL: coolness factors; EX: gaming experience; IMME: immersion; INT: willingness to make in-game purchases in mobile games
**Source(s):** Table denoted by authors

**Table 5.** Discriminant validity of the measurement model

### *5.5 Path analysis*

Based on the results in Table 7, it can be observed that Pleasure (JOY) and Coolness Factors (COOL) both have a significant impact on Gaming Experience (EX), with an explanatory power of 58.8%.Furthermore, Pleasure (JOY), Coolness Factors (COOL), and Gaming Experience (EX) significantly influence Immersion (IMME), with an explanatory power of 61%.Additionally, both Gaming Experience (EX) and Immersion (IMME) significantly affect

| Model fit | Criteria | Model fit of research model | Model fit of bollen-stine |
|---|---|---|---|
| ML$\chi$2 | The small the better | 1092.682 | 389.517 |
| DF | The large the better | 316.000 | 316.000 |
| Normed Chi-sqr ($\chi$2/DF) | 1 < $\chi$2/DF < 3 | 3.458 | 1.233 |
| RMSEA | <0.08 | 0.079 | 0.024 |
| SRMR | <0.08 | 0.072 | 0.072 |
| TLI (NNFI) | >0.9 | 0.886 | 0.989 |
| CFI | >0.9 | 0.898 | 0.990 |
| GFI | >0.9 | 0.862 | 0.951 |
| AGFI | >0.9 | 0.847 | 0.945 |

**Source(s):** Table denoted by authors

**Table 6.**
Bollen-Stine modified model fit

| DV | IV | Unstd | S.E. | Unstd./S.E. | *p*-value | Std | R2 |
|---|---|---|---|---|---|---|---|
| EX | JOY | 0.521 | 0.064 | 8.163 | 0.000 | 0.466 | 0.588 |
| | COOL | 0.456 | 0.066 | 6.890 | 0.000 | 0.393 | |
| IMME | JOY | 0.221 | 0.063 | 3.529 | 0.000 | 0.217 | 0.610 |
| | COOL | 0.440 | 0.066 | 6.670 | 0.000 | 0.417 | |
| | EX | 0.230 | 0.062 | 3.705 | 0.000 | 0.253 | |
| INT | EX | 0.398 | 0.089 | 4.455 | 0.000 | 0.299 | 0.532 |
| | IMME | 0.718 | 0.106 | 6.753 | 0.000 | 0.491 | |

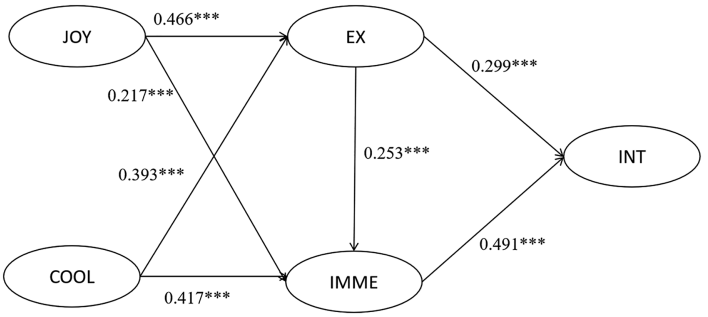
**Source(s):** Table denoted by authors

**Table 7.**
Regression coefficients

the willingness to make in-game purchases in mobile games(INT), with an explanatory power of 53.2%. This signifies that the model has a good explanatory ability (Figure 2).

*5.6 Mediation effect analysis*

From Table 8, which analyzes the indirect effects of the mediation model, it can be observed that the *p*-values for the three specific indirect effects, JOY→EX→INT, JOY→IMME→INT, and JOY→EX→IMME→INT, are all significant, and the confidence intervals do not include 0, indicating that these specific indirect effects are established and that the mediation effects




**Note(s):** *$p < 0.05$;**$p < 0.01$;***$p < 0.001$
All present standardised regression coefficients

**Source(s):** Figure by authors

**Figure 2.**
Path analysis

| Effect | Point estimate | Product of coefficients S.E. | *Z*-value | *p*-value | Bootstrap 1000 times Bias-corrected 95% Lower bound | Upper bound |
|---|---|---|---|---|---|---|
| *Overall effect* | | | | | | |
| JOY → INT | 0.452 | 0.084 | 5.347 | 0.000 | 0.292 | 0.621 |
| *Specific indirect effects* | | | | | | |
| JOY → EX → INT | 0.207 | 0.082 | 2.529 | 0.011 | 0.071 | 0.395 |
| JOY → IMME → INT | 0.158 | 0.082 | 1.921 | 0.055 | 0.022 | 0.319 |
| JOY → EX → IMME → INT | 0.086 | 0.064 | 1.356 | 0.175 | 0.024 | 0.252 |
| *Overall effect* | | | | | | |
| COOL → INT | 0.572 | 0.091 | 6.274 | 0.000 | 0.417 | 0.761 |
| *Specific indirect effects* | | | | | | |
| COOL → EX → INT | 0.181 | 0.081 | 2.240 | 0.025 | 0.051 | 0.367 |
| COOL → IMME → INT | 0.316 | 0.109 | 2.884 | 0.004 | 0.118 | 0.552 |
| COOL → EX → IMME → INT | 0.075 | 0.051 | 1.472 | 0.141 | 0.023 | 0.224 |

**Source(s):** Table denoted by authors

**Table 8.** Analysis of indirect effects in mediation model

are significant.Similarly, for the two specific indirect effects, COOL→EX→INT and COOL→IMME→INT, the *p*-values are also significant, and the confidence intervals do not include 0, indicating that these specific indirect effects are established and that the mediation effects are significant.

## 6. Conclusion and discussion

### *6.1 Research results and conclusions*

The main results of this study are as follows (Table 9):

(1) The main effects of the 7 research hypotheses, H1, H2, H3, H4, H5, H6, H9, are supported. H1 and H2 indicate that joy has a significant positive impact on game experience and immersion, which is consistent with the research of Bilgihan *et al.* (2016), Lee Teh and Pak (2021), Leveau and Camus (2023), Lowry *et al.* (2012), and others. The validation of H3 and H4 shows that coolness factors have a significant positive impact on game experience and immersion, which is consistent with the research of Dion *et al.* (1972), Huang *et al.* (2011), Jamshidi *et al.* (2023), Kim *et al.* (2015), Sundar and Marathe (2010), and others. The validation of H5 shows that game experience has a significant positive impact on immersion, which is consistent with the research of Ahmed *et al.* (2017), Dworak *et al.* (2020), Peng *et al.* (2019), Sierra Rativa *et al.* (2020), and others. The validation of H6 and H9 shows that game experience and immersion have a significant positive impact on the willingness to make in-game purchases in mobile games, which is consistent with the research of Hewei (2022), Jang *et al.* (2021), Luo (2020), and others.

(2) The mediating effects of the 6 research hypotheses, H7, H8, H10, H11, H12, H13, are supported. The validation of H7 and H8 shows that joy and coolness factors have a significant positive impact on the willingness to make in-game purchases in mobile games through game experience, which is consistent with the research of Bilgihan *et al.* (2016), Jamshidi *et al.* (2023), Tandon *et al.* (2016), Temirgali (2023), and others.The validation of H10 and H11 shows that joy and coolness factors have a

| Effect | Hypothesis | Hypothesis content | Decision |
|---|---|---|---|
| Main effect | H1 | Joy has a significant positive impact on game experience | Supported |
| | H2 | Joy has a significant positive impact on immersion | Supported |
| | H3 | Coolness factors have a significant positive impact on game experience | Supported |
| | H4 | Coolness factors have a significant positive impact on immersion | Supported |
| | H5 | Game experience has a significant positive impact on immersion | Supported |
| | H6 | Game experience has a significant positive impact on willingness to make in-game purchases in mobile games | Supported |
| | H9 | Immersion has a significant positive impact on willingness to make in-game purchases in mobile games | Supported |
| Mediation effect | H7 | Game experience mediates the relationship between joy and willingness to make in-game purchases in mobile games | Supported |
| | H8 | Game experience mediates the relationship between coolness factors and willingness to make in-game purchases in mobile games | Supported |
| | H10 | Immersion mediates the relationship between joy and willingness to make in-game purchases in mobile games | Supported |
| | H11 | Immersion mediates the relationship between coolness factors and willingness to make in-game purchases in mobile games | Supported |
| | H12 | Game experience and immersion jointly mediate the relationship between joy and willingness to make in-game purchases in mobile games | Supported |
| | H13 | Game experience and immersion jointly mediate the relationship between coolness factors and willingness to make in-game purchases in mobile games | Supported |

**Source(s):** Table by authors

**Table 9.**
Research results

significant positive impact on the willingness to make in-game purchases in mobile games through immersion, which is consistent with the research of Chang and Yu (2023), Hewei (2022), Huang *et al.* (2011), Leveau and Camus (2023), and others.The validation of H12 and H13 shows that game experience and immersion play a linked mediating role in the relationship between coolness factors and the willingness to make in-game purchases in mobile games, as well as between joy and the willingness to recharge in mobile games, which is consistent with the research of Bilgihan *et al.* (2016), Lee Teh and Pak (2021), Chang and Yu (2023), Hewei (2022), Jamshidi *et al.* (2023), Tandon *et al.* (2016), and others.

Based on the above research results, this study draws the following main conclusions:

(1) The factors of coolness and joy significantly enhance the game experience and immersion of mobile game players.

This study verified that the factors of coolness and joy have a significant positive impact on the game experience and immersion. Coolness factors, including attractiveness, originality, and sub-cultural appeal of the game, significantly enhance the game experience and immersion of players. Similarly, the pleasant emotions make players more willing to spend time and energy in the game, enhancing their overall game experience and engagement. This indicates that joy and coolness, as two key factors, play an important role in promoting players' subjective game experience and emotional investment.

(2) A good game experience directly enhances the immersion of mobile game players and indirectly affects their willingness to recharge.

The study shows that the game experience has a significant positive impact on immersion and willingness to make in-game purchases. A good game experience not only increases players' immersion but also directly enhances their willingness to recharge. This means that the pleasant experience and high satisfaction that players get in the game prompt them to spend more in the game. This finding emphasizes the game experience as an important mediating variable, which plays a crucial connecting role by enhancing immersion and directly influencing the willingness to recharge.

(3) Immersion mediates the impact of coolness factors and joy on the willingness to recharge.

This study verified the mediating role of immersion in the impact of coolness factors and joy on the willingness to make in-game purchases. Coolness factors and joy indirectly enhance players' willingness to recharge by increasing their immersion. This result reveals how players' immersive experiences in the game are gradually transformed into actual consumption behavior through the perception of joy and coolness. In addition, the study found that game experience and immersion play a chained mediating role in the impact of joy and coolness factors on the willingness to recharge. This means that joy and coolness factors first enhance the game experience, then increase immersion through the game experience, and ultimately enhance players' willingness to make in-game purchases in mobile games, forming a complete causal chain.

### *6.2 Theoretical contribution*

The theoretical contribution of this study lies in integrating the hedonic motivation system acceptance model and the coolness theory, combining individual psychological factors such as joy and immersion with social psychological factors such as coolness, and applying them to the research of willingness to recharge in mobile games. It deeply analyzes the influencing factors and mechanisms of players' willingness to make in-game purchases in mobile games. Therefore, the main contribution of this study is to recombine variables such as coolness, joy, and immersion, and construct an integrated model of coolness theory and hedonic motivation system acceptance model.

### *6.3 Practical implications*

The study systematically reveals the complex impact mechanism of coolness factors and joy on player's willingness to recharge in mobile games through game experience and immersion. The research findings not only enrich the theoretical understanding of player recharge behavior but also provide practical strategic guidance for game developers in designing and promoting games. Game developers should focus on emotional and visual innovation in game design to meet players' psychological needs for joy and coolness. Enhancing players' joy by designing fun and challenging game content, while increasing the game's coolness by adding fashionable elements and unique designs, can enhance their willingness to make in-game purchases. Additionally, immersion is an important mediating factor in the willingness to make in-game purchases in mobile games. Game developers should create a deep sense of immersion by optimizing game sound effects, graphics quality, storyline, and using Virtual Reality (VR) and Augmented Reality (AR) technologies. Finally, game marketing should combine coolness factors and develop personalized promotion strategies. For example, enhancing the game's fashion and uniqueness through social media and Key Opinion Leaders (KOL) promotion, and enhancing players' joy experience through limited-time activities and specific scenario designs. Additionally, providing personalized recommendations and services based on player behavior data to meet the needs of different players can enhance their game experience and willingness to make in-game purchases.

*6.4 Research limitations and future prospects*

This study still has limitations that need to be addressed in future research. While this study collected individual characteristics of mobile game players, such as gender, mobile game experience, education level, and daily gaming time, it did not explore the correlation between individual characteristics and mobile game recharge intentions. Therefore, future research can use individual characteristics as control variables to explore their impact on player's willingness to make in-game purchases in mobile games.

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