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# The impact of perceived interactivity on purchase intention in interactive video: a CAB-based chain mediation model of empathy, immersion, and arousal

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**Introduction:** With the rising popularity of interactive video content in China, understanding how interactivity influences consumer behavior has become increasingly important.

**Methods:** This study employs the Cognitive-Affective-Behavioral (CAB) model to construct a chain mediation framework, wherein perceived interactivity influences purchase intention through affective (empathy and immersion) and psychological (arousal) pathways. A total of 429 valid survey responses were collected and analyzed using structural equation modeling.

**Results:** The findings indicate that perceived interactivity significantly enhances both empathy and immersion. These affective responses, in turn, increase arousal, which subsequently leads to stronger purchase intentions.

**Discussion:** This study extends the applicability of the CAB model to the domain of interactive media and provides actionable implications for enhancing content and interface design in interactive video platforms.

## KEYWORDS

interactive video, perceived interactivity, empathy, immersion, arousal, purchase intention, cab

## 1 Introduction

“Interactive video” refers to an audiovisual format that enables viewers to actively influence the progression of content through real-time choices or interactions (Parsloe, 1982; Schwier, 1987; Stenzler and Eckert, 1996; Hanapih et al., 2024). With the advancement of interactive technologies and media platforms, the development of interactive video has gained significant momentum. Representative examples include *Late Shift* (2016) and *Black Mirror: Bandersnatch* (2018), which have been released on platforms such as Netflix and Steam. In China, the interactive video market is also booming. *You Were Trapped* on October 25, 2019, *How Would You Escape This Day?* Has garnered over 14.9 million views and 838,000 likes on Bilibili (retrieved May 30, 2024). Another title, *Love Is All Around*, developed by a Chinese team, went viral on social media and topped the Steam bestseller list upon its release in 2023 (Xue, 2023). Given the growing popularity but uncertain profitability of interactive video, identifying the psychological triggers behind user payment remains a timely and insufficiently explored research direction.

A growing body of empirical research has examined how interactive video affects user experiences and behavioral responses, focusing on variables such as immersion, enjoyment,

perceived interactivity, and content quality. Gu et al. (2022) developed the MIVAPM model in the context of mobile advertising, finding that immersion, interactivity, and perceived quality significantly affect purchase intention. Similarly, Raney et al. found that entertainment-based video content outperformed interactive formats in driving favorable brand attitudes, whereas Vorderer et al. argued that increased interactivity may paradoxically reduce entertainment value (Raney et al., 2003; Vorderer et al., 2001). While existing studies have provided valuable insights into how interactivity, immersion, empathy, and arousal function independently, few have integrated these variables into a unified framework to explain their combined effect on audience behavior. To address this gap, the present study constructs and tests a chain mediation model linking these psychological mechanisms to audiences' purchase intention toward interactive video content itself.

This study draws upon the CAB, which suggests that individuals' behavioral responses—such as purchase intention—are shaped sequentially by cognitive evaluations and affective reactions (Bagozzi, 1982; Callender, 2015; Xu and Lin, 2018). Building on this framework, the current research examines immersion and empathy as key affective responses triggered by users' cognitive appraisals of perceived interactivity in the context of interactive video experiences. Prior research has indicated that interactivity can enhance users' sense of immersion (Mütterlein, 2018) and that interactive narratives are more effective than linear ones in eliciting empathy toward characters (Hand and Varan, 2009). Additionally, heightened interactivity has been linked to increased arousal (Chen, 2010), which in turn has been shown to positively influence consumer behaviors such as purchase intention, particularly in stimulating retail environments (Groeppel-Klein, 2005). Furthermore, arousal has been theorized to mediate the relationship between immersion, empathy, and persuasive outcomes (Wang and Tang, 2021).

Based on these insights, this study proposes that perceived interactivity positively influences immersion and empathy, which in turn increase arousal, ultimately leading to higher purchase intention. To test these hypotheses, an online survey was conducted, yielding 429 valid responses. Statistical analysis revealed a sequential mediation structure in which perceived interactivity influenced immersion and empathy, which subsequently increased arousal and ultimately led to higher purchase intention. These findings offer both theoretical contributions to CAB-based persuasion research and practical implications for the design and marketing strategies of interactive video content.

## 2 Literature review

### 2.1 Interactive video

In this study, we adopt a broader definition of interactive video as a media form that allows audiences to influence the viewing process, transforming them from passive viewers into active participants. Within this broad definition, several subtypes can be accommodated. Despite differences in medium, esthetic, and narrative logic, these three formats share common elements: they all integrate visual content with audience interaction and provide branching story structures. Interactive video, in a broad sense, should encompass narrowly defined interactive video, interactive films, and visual novels.

Interactive video, in its narrower sense, refers to video-based content where users can perform actions such as play, pause, or make

choices that affect narrative progression. It prioritizes user proactivity and is designed to create personalized, game-like experiences (Meixner and Kosch, 2012). This form was originally conceptualized as a computer-video hybrid used in educational and training settings, enabling viewers to control content flow, receive real-time feedback, and engage with high-fidelity simulations (Parsloe, 1982). Hammoud defines interactive video as an enhanced version of raw video that allows viewers to interact and navigate in engaging ways. He further notes that an interactive video presentation focuses on enriched video but can also include other media. This supports a broader conceptualization of interactive video (Hammoud, 2006).

Interactive film closely resembles interactive video in enabling real-time viewer choices, but is distinguished by its use of cinematic language—especially live-action FMV—and narrative branching that leads to multiple story outcomes (Perron et al., 2008; Vosmeer and Schouten, 2014), as exemplified by *Black Mirror: Bandersnatch*. It retains filmic esthetics while embedding choice-based structures that turn viewers into co-narrators. Given its interactive structure, audiovisual format, and viewer-controlled narrative logic, interactive film can be reasonably categorized as a subset of the broader interactive video domain.

Visual novel is a typically presented with text, anime-style visuals, and sound. Through selecting dialog or actions, players shape character development and story outcomes (Camingue et al., 2021). Certain visually oriented segments—those emphasizing audiovisual immersion and interactivity—can reasonably be incorporated into the broader scope of interactive video research.

### 2.2 Cognitive–affective–behavioral intention model (CAB)

The cognitive–affective–behavioral (CAB) model is a conceptual framework that describes how individuals form attitudes or behavioral tendencies through a sequential process of cognitive appraisal, emotional reaction, and behavioral response (Callender, 2015; Xu and Lin, 2018). CAB provides a descriptive and predictive lens for understanding how beliefs and perceptions shape emotional experiences, which subsequently influence behavioral intentions and actions (Hussin and Wahid, 2023). The CAB framework was originally conceptualized by Bagozzi (1982), who empirically demonstrated that individuals' cognitive appraisals give rise to affective states, which subsequently shape behavioral intentions and actual actions. Drawing on the cognitive–affective–behavioral (CAB) framework, Kowalczyk et al. (2021) empirically showed that AR characteristics—especially interactivity—trigger cognitive (e.g., media usefulness), affective, and behavioral responses, with purchase intention as the key outcome variable.

### 2.3 Perceived interactivity and purchase intention

Interactivity is defined as “the extent to which users can participate in modifying the form and content of a mediated environment in real-time” (Steuer, 1992). With the rise of new media, more scholars have begun to consider various aspects of interactivity, leading to research differences in this concept (Kioussis, 2002). For instance, from a technical perspective, interactivity in

interactive videos can be more specific: due to different player actions and choices, the actual presentation can be varied widely (Perron et al., 2008). Operations include screen clicking, option selection, voice control, perspective switching, etc., allowing audiences to push the plots to develop in different directions, leading to diverse endings (Kong et al., 2022). From an audience perspective, Newhagen first proposed in 1995 that interactivity can be perceived and that the level of interactivity depends on the audience's perception (Newhagen et al., 1995). Interactivity is a psychological state experienced by users when they interact with interactive objects (Wu and Wu, 2006). Regardless of the number of interactive functions provided, participants' perception of interactivity may be influenced by the number of interactive functions they perceive and their actual use experience of these functions (Jee and Lee, 2002). Because the study primarily focuses on the audience, the interactivity they experience should be defined as perceived interactivity within this context.

Purchase intention is defined as the likelihood or propensity of consumers to purchase a specific product or service (Younus, 2015). It is an important indicator in marketing that reflects consumers' attitudes and expected behaviors toward a product (Changal, 2005; Jia et al., 2022). Prior research has shown that perceived interactivity can positively influence consumer purchase intention across various digital platforms. Changal (2005) found that perceived interactivity significantly predicts purchase intention, particularly through its effect on website and brand attitudes. Jia et al. (2022) reported a weak direct effect of virtual interactivity but highlighted its stronger indirect impact via brand image and expected value. Ott et al. (2016) demonstrated that message interactivity enhances perceived informativeness, which in turn increases purchase intention. Liao et al. (2019) further confirmed that interactivity indirectly affects purchase intention through trust, especially when brand loyalty is high. Together, these studies suggest that interactivity shapes purchase intention both directly and through cognitive or relational mediators. Thus, the following hypotheses are proposed:

*H1: In the interactive video experience, perceived interactivity is correlated to with purchase intention.*

## 2.4 Perceived interactivity and empathy

Empathy refers to the ability to perceive the world from another person's perspective and to emotionally respond to that perspective, including the capacity to care for others (Davis, 1983). Empathy helps in understanding people in reality, and it also aids in understanding fictional characters (Werner and Lüdtke, 2021). In interactive videos, the audiences can show empathy toward fictional or non-fictional characters within the video. Several studies have demonstrated that perceived interactivity can enhance users' empathy toward narrative characters, whether in interactive narratives (Hand and Varan, 2009), 360-degree videos (Pimentel et al., 2021), or interactive television films (Vorderer et al., 2001). Hence, perceived interactivity can influence audience empathy when using interactivity media, thus, the following hypotheses are proposed:

*H2: In the interactive video experience, perceived interactivity is correlated to empath.*

## 2.5 Perceived interactivity and immersion

Immersion is defined as a psychological state characterized by the feeling of being surrounded and included in something (Witmer and Singer, 1998; Jennett et al., 2008). These three aspects are frequently debated topics. Albæk et al. (2011) responded to some scholars' views that immersion and interactivity are incompatible by comparing experiments where they have found that immersion and interactivity can coexist, and that interactivity does not negatively affect immersion. Existing research across domains has consistently demonstrated that perceived interactivity contributes to a heightened sense of immersion—for example, in virtual reality settings (Mütterlein, 2018), in live stream commerce (Joo and Yang, 2023), and in interactive digital narratives, where perceived interactivity was found to significantly increase both immersion and identification (Scherpenisse and Sankaran, 2025). Thus, the following hypotheses are proposed:

*H3: In the interactive video experience, perceived interactivity is correlated to immersion.*

## 2.6 Perceived interactivity and arousal

Arousal is an important component of emotions (Bradley and Lang, 1994). It is a concept originating from neuroscience, broadly defined as brain activation or awakening (Jones, 2003). In this study, arousal specifically refers to the level of mental excitement and stimulation experienced by participants (Jong-Kuk et al., 2011). A study has found that interactivity in video games affects participants' overall emotional management effects. It compared the states of players in high-interactivity video games with those in low-interactivity video games, finding that in high-interactivity video games, players experienced more arousal, engagement, and enjoyment (Chen, 2010). As measurement technology has matured, researchers have employed techniques such as pupil observation, heart rate measurement, and eye tracking to measure participants' states while watching interactive videos compared to flat videos, discovering that participants watching interactive videos were more emotionally engaged and experienced higher arousal (Juvrud et al., 2022). Thus, the following hypothesis is proposed:

*H4: In the interactive video experience, perceived interactivity has a positive effect on arousal.*

## 2.7 Immersion, empathy, and arousal

Some scholars have focused on the relationship between immersion, empathy, and arousal, proving that immersion and empathy both have a positive and significant impact on arousal (Wang and Tang, 2021). Another study has found that the immersive experience of watching films enhances audiences' arousal resulting from the increased level of three elements: inclusion, surround effect, and vividness; this arousal eventually leads to a deeper perception of events in the film (Visch et al., 2010). Besides, research on intimate relationships has found that individuals with higher levels of empathy better regulate their emotions, reflected in their physiological arousal (e.g., skin conductance and heart rate intervals) when interacting with

their partners: they usually maintain a moderate level of empathy that enhances relationship satisfaction (Perrone-McGovern et al., 2014). Thus, the following hypotheses are proposed:

*H5: In the interactive video experience, empathy is correlated to arousal.*

*H6: In the interactive video experience, immersion is correlated to arousal.*

## 2.8 Arousal and purchase intention

A recent study examined how presence and arousal serve as mediators, enhancing consumers' presence through verbal communication. When consumers' presence is enhanced, their presence further impacts their arousal. Once stimulated and emotionally excited, consumers are more likely to have a higher purchase intention and a greater likelihood of taking purchasing actions (Huang et al., 2024). Another study primarily investigated Visual Merchandising (VMD) by comparing different scenarios (multi-cue scenarios and low-cue scenarios) in terms of arousal levels. High-cue scenarios bring about higher arousal, which also affects consumers' Purchase Intention (Kim and Lennon, 2013).

*H7: In the interactive video experience, arousal positively affects purchase intention.*

## 2.9 Empathy and purchase intention

In exploring the relationship between empathy and purchase intention, some scholars have found that empathy can positively predict consumers' purchase intention. This effect is mediated by consumers' moral beliefs, as those with higher levels of empathy tend to develop stronger moral beliefs (Dissanayake, 2022). Another study on purchasing witnessed that in a fair trade promotional context, consumers with high empathy had a stronger purchase intention than those with low empathy (Zerbini et al., 2019). Thus, the following hypotheses (hereafter referred to H1 and H2) are proposed:

*H8: In the interactive video experience, empathy has a positive impact on purchase intention.*

## 2.10 Immersion and purchase intention

Via the comparison between VR (Virtual Reality) environments with 2D (2-dimension) environments, immersion demonstrates its huge influence on purchase intention. In highly immersive environments, clients are more likely to evoke a desire to purchase and even impulsive buying behavior (Selcuk, 2021). Additionally, some scholars studied the impact of immersive experiences in mobile short videos on purchase intention, finding a significant positive effect (Hewei, 2022). Thus, the following hypothesis is proposed:

*H9: In the interactive video experience, immersion has a positive impact on purchase intention.*

## 2.11 Mediators of perceived interactivity and purchase intention

Empathy is a key emotional mechanism linking interactive experiences to consumer behavior. The interactive features of narrative media enhance audiences' capacity for empathy by encouraging deeper emotional engagement with characters (Hand and Varan, 2009). This enhanced empathic capacity has been shown to positively influence consumers' purchase intention (Dissanayake, 2022). Li and He (2025) further confirmed that empathy mediates the relationship between perceived interactivity and in-game purchase intention, offering direct support for its intermediary role. Thus, the following hypothesis is proposed:

*H10: Empathy mediates the relationship between perceived interactivity and purchase intention.*

Several studies have modeled immersion as a key mediator linking perceived interactivity to purchase-related outcomes. In live commerce, interactivity enhances users' immersion, which drives both engagement and purchase intention (Joo and Yang, 2023). Hewei (2022) found that interactivity in short video apps increases immersion, which boosts perceived value and leads to stronger purchase intentions. In a conceptual model, Sanaei (2024) argued that immersive features in AR shopping apps mediate the effect of interactivity on satisfaction and behavioral responses. Thus, the following hypothesis is proposed:

*H11: Immersion mediates the relationship between perceived interactivity and purchase intention.*

Arousal has been widely theorized as a psychological mechanism mediating the effects of interactive stimuli on behavioral outcomes. Li et al. (2022) provided direct evidence for this mechanism in a livestream shopping context, showing that perceived interactivity (e.g., time-limited offers, real-time feedback) increases emotional arousal, which subsequently enhances purchase intention. Wen et al. (2025) also confirmed the mediating role of arousal, demonstrating that interactive environmental cues significantly elevate emotional arousal, which partially mediates the effect of perceived interactivity on impulsive buying behavior. Moreover, found that affective interactions, including narrative resonance and emotional engagement, promote purchase intention through arousal, supporting its mediating function even when interactivity is expressed in emotional rather than technical forms. Together, these studies substantiate arousal as a consistent and meaningful mediator between perceived interactivity and purchase-related outcomes. Thus, the following hypothesis is proposed:

*H12: Arousal mediates the relationship between perceived interactivity and purchase intention.*

The conceptual framework of this study refers to Figure 1.

## 3 Research methodology

### 3.1 Ethical statement

Shih Hsin University's College of Journalism and Communications has conducted and approved the ethical review for this research. This



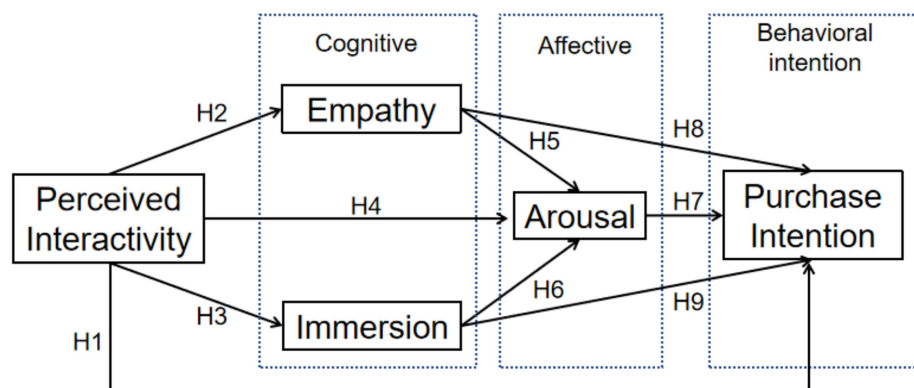


FIGURE 1  
Conceptual research framework.

study was approved by the full name of the ethics committee. Confirming that all experiments were performed in accordance with relevant guidelines and regulations. On behalf of all authors, the corresponding author states that there is no conflict of interest. This study adhered to standard practices in social research. First, before the study launched, participants were informed about the purpose of the study beforehand they participated, and informed consent from participants was obtained online, with the questionnaire stating that continuing to answer would be considered as consent. Second, the questionnaire responses were kept confidential. As for the content of the questionnaire, it did not include sensitive information or suggestive elements. And all responses were anonymized to ensure that results could not be linked to specific individuals. The researcher's institution was aware of and approved this study, and no other ethical issues were identified. There were no commercial interests involved in this study, and all collected information will be stored until January 2028, after which it will be deleted.

### 3.2 Sample and data collection

The target population of this study consists of Chinese users who have prior experience with interactive videos. To ensure the validity of responses, a screening item was presented before the formal questionnaire, asking participants whether they had engaged with interactive video content. To provide clarity, the question listed representative examples from different types of interactive videos, such as *Black Mirror: Bandersnatch*, *The Invisible Guardian*, *You Were Trapped on October 25, 2019*, *How Would You Escape This Day?*, and *Love Is All Around*. Only participants who indicated prior experience with at least one of these or similar interactive videos were included in the final dataset; questionnaires from respondents without such experience were excluded from analysis. A pre-test was conducted before distributing the formal questionnaire to ensure its reliability and validity. The survey employs random sampling method, with the questionnaire link publicly available on social media platforms such as WeChat and Tencent QQ from January 8, 2024, to May 1, 2024. Respondents accessed and completed the questionnaire through the link. A total of 589 questionnaires were collected; 160 responses indicating no

prior experience with interactive video were excluded, resulting in 429 valid responses. After 19 samples were excluded from respondents who had not experienced interactive videos and one was invalid, the study collected 429 valid questionnaires from 429 respondents (61.8% male, 38.2% female) completing the survey about interactive videos.

### 3.3 Questionnaire design

The questionnaire used a 5-point Likert scale, ranging from 1 (lowest) to 5 (highest). It comprised 16 question items that were divided into 5 main sections: empathy, immersion, perceived interactivity, arousal, and purchase intention. Additionally, the questionnaire also collected participants' basic information (e.g., gender, date of birth, education level). The 5 items were derived from Knowles and Linn (2004), encompassing empathy and immersion sections.

Among these, there are three empathy questions ( $M = 3.47$ ,  $SD = 1.05$ ,  $\alpha = 0.826$ ), e.g., "During the experience, I can understand the characters' thoughts"; and two Immersion questions ( $M = 3.4$ ,  $SD = 1.12$ ,  $\alpha = 0.762$ ), e.g., "My mind often focuses on the experience."

In terms of perceived interactivity questions ( $M = 3.48$ ,  $SD = 0.96$ ,  $\alpha = 0.892$ ): This study adopted the scale developed by Weber et al. (2014) as the basis, and selected seven questions, including examples such as, "During the experience, the state of the characters changes based on my actions," and "I can control the narrative or plot of the story." During actual measurement, one item, "During the experience, the interactive methods (e.g., selecting options, moving the screen) are easy for me to understand," was removed due to its overall low average variance extracted (AVE) value and lack of discriminant validity. The remaining six items were used to measure perceived interactivity.

For arousal questions ( $M = 3.64$ ,  $SD = 1.07$ ,  $\alpha = 0.764$ ), two arousal items were adapted from the scale developed by Hsieh (2017) and also followed the phrasing used by Wang and Tang (2021), e.g., "During the experience, I feel mentally stimulated."

Finally, the last three questions related to purchase intention ( $M = 3.5$ ,  $SD = 1.1$ ,  $\alpha = 0.847$ ), directly asked respondents about their willingness to purchase interactive videos, e.g., "If the price is appropriate, I am willing to purchase the interactive video." The detailed content of the survey items can be found in Table 1.

TABLE 1 Results of the internal reliability and convergent validity tests.

Factor	Question	Factor loading	Mean	SD	CR	AVE	KMO
Empathy	During the experience, I can understand the character’s thoughts.	0.718	3.45	1.194	0.826	0.614	0.961
	During the experience, I can easily see things from the character’s perspective.	0.775	3.46	1.231			
	During the experience, I can feel the emotions generated by the character.	0.740	3.49	1.234			
Immersion	During the experience, I stay focused.	0.752	3.39	1.249	0.762	0.616	
	My mind is often immersed in the experience.	0.730	3.42	1.235			
Perceived interactivity	During the experience, my actions (such as clicking the screen, voice, and text input) receive the correct feedback.	0.763	3.57	1.171	0.893	0.546	
	During the experience, the interactive video responds quickly to my actions.	0.716	3.55	1.211			
	During the experience, the character’s state changes based on my actions.	0.797	3.55	1.184			
	I can control the narrative or plot of the story.	0.694	3.44	1.186			
	I can control the narrative or plot of the story.	0.694	3.41	1.213			
	I can control the pace of the experience.	0.756	3.37	1.182			
Arousal	During the experience, I feel my senses are stimulated.	0.742	3.60	1.211	0.764	0.619	
	During the experience, I feel mentally active.	0.760	3.68	1.177			
Purchase intention	If the price is reasonable, I would pay for the interactive video	0.746	3.51	1.271	0.847	0.649	
	If the price is reasonable, I would pay for other interactive videos.	0.710	3.47	1.248			
	If the price is reasonable, I would purchase the full version to experience it repeatedly and unlock different storylines.	0.702	3.51	1.254			

SD, standard deviation; CR, composite reliability; AVE, average variance extracted; KMO, Kaiser-Meyer-Olkin measure of sampling adequacy.

TABLE 2 Fornell-Larcker criterion.

	Empathy	Immersion	Perceived interactivity	Arousal	Purchase intention
Empathy	0.783				
Immersion	0.772	0.785			
Perceived Interactivity	0.714**	0.674**	0.761		
Arousal	0.626**	0.601**	0.692**	0.787	
Purchase Intention	0.622*	0.602*	0.628	0.762**	0.806

Gray-shaded cells represent the square root of AVE. \* $p < 0.05$ , \*\* $p < 0.01$ .

## 3.4 Results

### 3.4.1 Data analysis

Data analysis of this study was conducted via IBM SPSS Statistics (Version 27), a comprehensive statistical software package designed for social science research. Moreover, the study employed the Bootstrap method proposed by Efron (1979), for mediation effect analysis. Specifically, Bootstrap is a resampling-based statistical method that estimates standard errors and confidence intervals of parameters through repeated sampling, applicable to various data distributions. Importantly, it can handle complex models involving multiple mediating variables. This allows researchers to evaluate multiple mediation effects simultaneously, without having to test each mediation effect individually, thereby providing a more comprehensive analysis (Steffener, 2021). The Bootstrap method can reduce bias and estimate more accurate confidence intervals (Chi et al., 2022).

### 3.4.2 Reliability and validity

Cronbach's Alpha is a crucial indicator for assessing the internal consistency of scales or questionnaires (Tavakol and Dennick, 2011). For the five latent variables, all had  $\alpha$  values greater than 0.7, with Empathy, Perceived Interactivity, and Purchase Intention each exceeding 0.8. Validity was measured by calculating factor loadings, composite reliability (CR), and AVE (Hair Jr et al., 2010). Evaluation of item reliability showed that out of the 16 items extracted through Principal Component Analysis, 14 had Factor Loadings greater than 0.7, with only 2 items occupying lower loadings of 0.694. As part of construct validity, convergent validity measures the consistency level between latent variables (Cho et al., 2019). The AVE for all three metrics exceeded 0.5, and CR values were above 0.7, which supports their content validity and thus negates the need for item deletion. Reviewing the remaining items, all AVE and CR values surpassed the thresholds, providing evidence of the convergent validity. The results indicated satisfactory internal reliability and convergent validity. The Kaiser-Meyer-Olkin (KMO) test was used to assess the adequacy of the data for factor analysis, measuring sampling adequacy for each variable and the model as a whole (Shrestha, 2021). The KMO value for these items was 0.961, well above 0.8, indicating that the study data were highly suitable for extracting information (see Table 1 for details).

According to the Fornell-Larcker Criterion, a latent variable is considered to have discriminant validity if the square root of its AVE exceeds the highest absolute value of the correlation coefficients between factors (Hilkenmeier et al., 2020). Given the logic, the results of data analysis using this method showed that Empathy: 0.783 > 0.772;

Immersion: 0.785 > 0.772; Interactivity: 0.761 > 0.714; Arousal: 0.787 > 0.762; Purchase Intention: 0.806 > 0.762. These data support the good discriminant validity among these items (see Table 2 for details).

### 3.4.3 Path analysis

The researcher analyzed each path particularly, and obtained the results that showed Perceived Interactivity  $\rightarrow$  Purchase Intention ( $B = 0.719$ ,  $p < 0.01$ ) had a significant positive impact, supporting H1; Perceived Interactivity  $\rightarrow$  Empathy ( $B = 0.781$ ,  $p < 0.01$ ) had a significant positive impact, supporting H2; Perceived Interactivity  $\rightarrow$  Immersion ( $B = 0.292$ ,  $p < 0.01$ ) had a significant positive impact, supporting H3; and Perceived Interactivity  $\rightarrow$  Arousal ( $B = 0.516$ ,  $p < 0.01$ ) had a significant positive impact, supporting H4. Subsequently, Empathy  $\rightarrow$  Arousal ( $B = 0.185$ ,  $p < 0.01$ ) showed a significant positive effect, supporting H5; and Immersion  $\rightarrow$  Arousal ( $B = 0.144$ ,  $p < 0.01$ ) also yielded a significant positive effect, supporting H6. Moreover, Arousal  $\rightarrow$  Purchase Intention ( $B = 0.579$ ,  $p < 0.01$ ) had a strong significant effect, supporting H7. Finally, both Empathy  $\rightarrow$  Purchase Intention ( $B = 0.139$ ,  $p < 0.05$ ) and Immersion  $\rightarrow$  Purchase Intention ( $B = 0.116$ ,  $p < 0.05$ ) were statistically significant, supporting H8 and H9, respectively. Another important reference indicator is  $R^2$  (coefficient of determination). An  $R^2 > 0.5$  indicates that the model has a moderately high explanatory power (Colin Cameron and Windmeijer, 1997; Nagelkerke, 1991; Ozili, 2022). It is noteworthy that the path "Empathy, Immersion, Arousal  $\rightarrow$  Purchase Intention" had an adjusted  $R^2$  of 0.620, indicating strong explanatory power. This suggests that Arousal, Empathy, and Immersion are crucial predictors of purchase intention in the context of perceived interactivity (see Table 3 for details).

Analyzing the mediation effect: the researcher noticed the indirect effect of "Perceived Interactivity  $\rightarrow$  Empathy  $\rightarrow$  Purchase Intention" ( $ab1: 0.108$ ;  $p = 0.043$ ) was significant, while "Perceived Interactivity  $\rightarrow$  Immersion  $\rightarrow$  Purchase Intention" ( $ab2: 0.091$ ;  $p = 0.038$ ) was also significant. The indirect path "Perceived Interactivity  $\rightarrow$  Arousal  $\rightarrow$  Purchase Intention" ( $ab3: 0.448$ ;  $p = 0.036$ ) was highly significant. The total indirect effect was thus significant, and the direct effect ( $c': 0.719$ ;  $p < 0.01$ ) remained significant as well. Therefore, H10, H11, and H12 were all supported.

Analyzing the chain mediation effect: the path "Perceived Interactivity  $\rightarrow$  empathy  $\rightarrow$  Purchase Intention" was also significant (Effect = 0.098; BootLLCI ~ BootULCI = 0.006 ~ 0.188,  $p = 0.033$ ), as was the path "Perceived Interactivity  $\rightarrow$  immersion  $\rightarrow$  Purchase Intention" (Effect = 0.083; BootLLCI ~ BootULCI = 0.009 ~ 0.162,  $p = 0.035$ ), suggesting partial mediation. Moreover, the indirect

TABLE 3 Regression analysis and test of moderating effect ( $n = 429$ ).

	Empathy			Immersion			Arousal			Purchase intention			Purchase intention		
	<i>B</i>	SE	<i>p</i>	<i>B</i>	SE	<i>p</i>	<i>B</i>	SE	<i>p</i>	<i>B</i>	SE	<i>p</i>	<i>B</i>	SE	<i>p</i>
Perceived Interactivity	0.781**	0.037	0.000	0.292**	0.049	0.000	0.516**	0.056	0.000	0.719**	0.043	0.000	0.072	0.056	0.199
Empathy							0.185**	0.059	0.002				0.139*	0.055	0.011
Immersion							0.144**	0.053	0.007				0.116*	0.049	0.017
Arousal													0.579**	0.044	0.000
$R^2$	0.509			0.628			0.523			0.394			0.623		
Adjusted $R^2$	0.508			0.626			0.519			0.392			0.620		
$F$	$F(2,426) = 257.098$ $p = 0.000$			$F(2,426) = 257.098$ $p = 0.000$			$F(3,425) = 155.060$ $p = 0.000$			$F(2,426) = 156.403$ $p = 0.000$			$F(4,424) = 175.417$ $p = 0.000$		

\* $p < 0.05$ , \*\* $p < 0.01$ .

TABLE 4 Results of mediation model.

Independent and dependent variables	Mediation variables	<i>a</i>	<i>b</i>	Indirect effect	<i>C</i>	<i>C'</i>
IV: Perceived Interactivity	Empathy (ab1)	0.781**	0.139*	0.108 (0.043)*	0.072	0.719**
DV: Purchase Intention	Immersion (ab2)	0.784**	0.116*	0.091 (0.038)*		
	Arousal (ab3)	0.774**	0.579**	0.448 (0.036)**		

\* $p < 0.05$ , \*\* $p < 0.01$ .

paths “Perceived Interactivity → empathy → arousal” (Effect = 0.123; BootLLCI ~ BootULCI = 0.003 ~ 0.223,  $p = 0.012$ ) and “Perceived Interactivity → immersion → arousal” (Effect = 0.093; BootLLCI ~ BootULCI = 0.002 ~ 0.178,  $p = 0.036$ ) were both significant, indicating that empathy and immersion, respectively, mediated the relationship between perceived interactivity and arousal. Notably, “empathy → arousal → Purchase Intention” (Effect = 0.094; BootLLCI ~ BootULCI = 0.024 ~ 0.168,  $p = 0.011$ ) and “immersion → arousal → Purchase Intention” (Effect = 0.075; BootLLCI ~ BootULCI = 0.002 ~ 0.147,  $p = 0.041$ ) were also significant, supporting the mediation role of arousal. The chain mediation paths “Perceived Interactivity → empathy → arousal → Purchase Intention” and “Perceived Interactivity → immersion → arousal → Purchase Intention” were further supported, with BootLLCI ~ BootULCI intervals of 0.018 ~ 0.127 (Effect = 0.070,  $p = 0.012$ ) and 0.001 ~ 0.103 (Effect = 0.053,  $p = 0.04$ ), respectively. These findings confirm that arousal not only mediates the relationship between empathy, immersion, and purchase intention, but also forms a sequential pathway with perceived interactivity, reinforcing its central role in the model (see Tables 4, 5 for details).

## 4 Discussion

### 4.1 Conclusion

This study aimed to explore the psychological mechanisms underlying users’ purchase intention toward interactive video content, based on the cognitive-affective-behavioral (CAB) framework. The findings reveal that perceived interactivity

significantly enhances immersion, empathy, and arousal; these psychological responses each exert a positive influence on purchase intention. Among them, arousal is the most influential predictor, while empathy demonstrates a stronger impact than immersion both through direct effects and through its contribution to arousal. The results support a sequential mediation structure, in which perceived interactivity initiates emotional engagement—especially empathy and immersion—which increases arousal and subsequently leads to higher behavioral intention.

These findings extend previous research on interactive experiences by integrating cognitive appraisal (perceived interactivity), emotional engagement (empathy and immersion), and physiological activation (arousal) into a unified explanatory model of media-induced consumer behavior. Moreover, the study highlights the differentiated roles of affective responses, suggesting that specific emotional mechanisms vary in their capacity to drive persuasive outcomes. In doing so, this research offers a more nuanced understanding of how interactive video elicits psychological reactions that culminate in users’ behavioral responses.

### 4.2 Theoretical implications

This study confirms that perceived interactivity, immersion, empathy, and arousal each exert significant influence on users’ purchase intention, consistent with prior research (Gu et al., 2022; Li et al., 2022; Hewei, 2022; Joo and Yang, 2023; Hand and Varan, 2009; Dissanayake, 2022; Li and He, 2025; Wen et al., 2025). Unlike previous studies that examined these variables in isolation or in specific domains, the present study integrates them into a unified model and verifies their combined relevance



TABLE 5 Results of chain mediation model.

Path	Effect	Boot SE	Boot LLCI	Boot ULCI	z	p
Perceived Interactivity → Empathy → Purchase Intention	0.098	0.046	0.006	0.188	2.132	0.033
Perceived Interactivity → Immersion → Purchase Intention	0.083	0.039	0.009	0.162	2.115	0.035
Perceived Interactivity → Arousal → Purchase Intention	0.274	0.041	0.195	0.359	6.647	0.000
Empathy → Arousal → Purchase Intention	0.094	0.037	0.024	0.168	2.532	0.011
Immersion → Arousal → Purchase Intention	0.075	0.036	0.002	0.147	2.047	0.041
Perceived Interactivity → Empathy → Arousal → Purchase Intention	0.07	0.028	0.018	0.127	2.512	0.012
Perceived Interactivity → Immersion → Arousal → Purchase Intention	0.053	0.026	0.001	0.103	2.054	0.04

Gray-shaded cells represent chain mediation, while others represent parallel mediation.

in the context of interactive video. This study further validates three mediation pathways—empathy, immersion, and arousal—in the link between perceived interactivity and purchase intention, as suggested by prior studies (Li and He, 2025; Sanaei, 2024; Wen et al., 2025). By incorporating all three into one model, it demonstrates their complementary roles within a unified explanatory framework.

More importantly, the findings reveal two significant chain mediation paths. In doing so, it extends the work of Joo and Yang (2023), who proposed a similar path involving immersion and gratification, by introducing empathy as a parallel affective mechanism and clarifying the role of arousal as a dynamic transition state rather than a mere outcome. Moreover, this research supports and refines the proposition by Kowalczyk et al. (2021) that contextual variables such as interactivity can be embedded into the traditional CAB framework. By positioning perceived interactivity at the cognitive entry point and demonstrating its downstream effects through layered emotional and physiological reactions, the study enhances the model's explanatory power and applicability to interactive media. These findings contribute to theory by advancing a more comprehensive and processual understanding of how user experiences evolve across cognitive, affective, and behavioral stages in interactive video environments.

4.3 Practical contributions

By employing purchase intention as a behavioral outcome, this study offers actionable implications for producers of interactive video content seeking to convert user engagement into consumer behavior. First, among all predictors tested, arousal demonstrated the strongest direct effect on purchase intention. This underscores the importance of designing emotionally stimulating content that activates physiological excitement—such as high-stakes scenarios, moral dilemmas, or emotionally charged plot twists. Emotional intensity, rather than narrative realism alone, appears to be a decisive driver of consumer motivation.

Second, the results reveal that both empathy and immersion significantly predict arousal, with empathy exerting a slightly stronger influence. This suggests that enhancing viewers' emotional alignment with characters—through compelling backstories, moral depth, or relatable struggles—can more effectively prime audiences for arousal and, subsequently, purchasing behavior. While immersive environments still matter, they function best when they serve emotional narrative goals.

Third, although perceived interactivity does not directly affect purchase intention, it acts as the initial cognitive trigger that activates subsequent affective and physiological responses. Therefore, interaction design should be purposefully aligned with emotional narrative arcs. Instead of merely adding more choices or branching paths, producers should create interaction points that heighten empathy or immersion—such as decisions with ethical weight or emotionally revealing character interactions—to initiate deeper psychological engagement.

4.4 Limitations and future directions

While this study to some extent contributes to academic and practical aspects of interactive video design and purchase intention, it also has limitations. Given the rapid advancement of film and television technology, the questionnaire has certain constraints. Particularly, the measurement of variables like immersion and arousal could benefit from more advanced detection techniques, such as eye-tracking and heart rate monitoring, to achieve more accurate predictive results.

Future research may adopt longitudinal or experimental methods to examine how emotional and physiological responses—especially arousal—develop over time and influence delayed or sustained purchase behaviors. Incorporating a wider range of emotional variables, such as fear, joy, or nostalgia, would allow for a more nuanced understanding of how different affective states interact with empathy and arousal in shaping consumer response. It is also worth exploring whether the effects observed vary across content genres. Interactive narratives in suspense

or romance may elicit distinct emotional pathways, suggesting the need for genre-specific models. This study focused on Chinese audiences. Extending the research to other cultural contexts would help test the model's cross-cultural validity and reveal how cultural norms shape responses to interactivity and emotional design.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Ethics statement

The studies involving humans were approved by Shih Hsin University's College of Journalism and Communications. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

## Author contributions

YL: Writing – original draft. MS: Writing – review & editing.

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