

What Drives People to Purchase Virtual Gifts in Live Streaming? The Mediating Role of Flow

Completed Research Paper

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Abstract

Live streaming, a new form of social media, is growing explosively due to its real-time interaction and new monetization model. Considering its popularity and unique features, it is important to gain a theoretical understanding of live streaming. Yet limited attention has been paid to it. This research investigates what factors may affect people's consumption intention of virtual gifts in live streaming from contextual and personal dimensions. Based on flow theory, this study also explores the mediating role of flow and the moderating role of gender. The theoretical framework is tested using Structural Equation Modeling based on survey data collected in China. The study contributes to flow theory by highlighting the importance of flow in mediating the effects of interactivity, social presence, curiosity and social media dependence on consumption intention of virtual gifts. It also reveals gender differences in the influence of flow on consumption intention of virtual gifts.

Keywords: Live streaming, consumption intention, flow, social presence, curiosity

Introduction

The live streaming industry is growing rapidly all over the world. It reshapes the way people use social media: with a live streaming app, anyone can either watch or broadcast all kinds of live streams ranging from eating, gaming to singing anytime and anywhere. It offers a new approach that is more exciting and more interactive than conventional social media. Attracted by the real-time interaction and rich content, more and more people are joining this trend. Data from UBS Evidence Lab shows that in November 2016, 36% of U.S. Internet users reported that they had experience of watching live streaming (Minsker 2017). According to the information released by China Internet Network Information Center (CNNIC), by the end of 2016, live streaming users in China reached 344 million, taking up almost half of China's total Internet population. Besides, live streaming has generated huge revenues globally. The report by Research and Markets estimated that the global live streaming market

would grow from USD 30.29 billion in 2016 to USD 70.05 billion by 2021. According to the report by a Chinese market research company-iResearch, the market in China was valued USD 3 billion in 2016, with an 180% increase from 2015. Goldman Sachs estimated that China's live streaming market could reach USD 15 billion by 2020 (Cheng 2017).

It is noteworthy that live streaming in China is monetized in a new way, compared with that in western countries whose revenue relies mostly on advertising. Platforms in China offer virtual gifts that can be purchased by viewers via online payments and sent to the streamer during broadcasting. This new and innovative function embedded leads to the emergence of a new monetization model in live streaming. With this new practice, live streaming can be seen as a hybrid social platform which involves video content, real-time interaction and consumption. More interestingly, the consumption behavior in live streaming is different from that in online shopping as the purchase of virtual gifts is to express appreciation towards the streamer. Given the unique features, existing literature offers relatively little insights into this new type of social media. Prior studies mainly focus on understanding the usage of live streaming system using theories such as Uses and Gratification Theory (UGT). However, limited attention has been paid to the consumption of virtual gifts in live streaming. Also, previous works overlook the effects of viewers' holistic experience and their predispositions. Given the above research gap and the salience of viewers' consumption of virtual gifts in practice, it is vital to understand what drives viewers to buy virtual gifts in live streaming platforms. A better understanding on viewers' consumption behavior of virtual gifts in live streaming can demonstrate the potential of guiding streamers and platforms in both China and western countries to formulate appropriate strategies to monetize the traffic and make their success long-term sustainable.

Based on the above discussions, this research aims to develop a theoretical framework to investigate what drives people to purchase virtual gifts in live streaming. Although prior studies have enriched our knowledge on people's behavior in social media, they mainly focus on how technology factors in the context affect people's internal states and lead to behavioral responses (Labrecque 2014; Zhang et al. 2014). Personal factors such as participants' personal traits have not received much attention. According to the psychological choice model by Hansen (1976), both personal predisposition and contextual impact are important in one's choice. The study by Correa et al. (Correa et al. 2010) also argues that personal factors are crucial in people's engagement in social media and should not be overlooked. Therefore, this study combines contextual factors with personal factors in investigating viewers' behavioral intention in live streaming. Compare to TV live broadcasting or conventional social media such as Facebook, live streaming highlights real-time interaction and presence of the streamer and other viewers. We thus identify two contextual factors, namely interactivity and social presence that capture the key features of the live streaming environment. Besides, two personal factors of viewer traits are included, namely curiosity and social media dependence which capture one's enduring predispositions to stimuli across situations (Thatcher and Perrew 2002). In addition, previous works in psychology posit that users' holistic experiences with information technologies are important in shaping their behaviors towards the technology (Agarwal and Karahanna 2000; Koufaris 2002). This study uses flow theory to capture such holistic experiences. Drawing on flow theory, we contend that the impact of contextual factors and the personal factors on consumption intention of virtual gifts is mediated by flow which serves as a psychological state stimulating behavioral intention. We also consider the moderating role of gender in the relationship between flow and consumption intention of virtual gifts, given the significant influence of gender on behavior (Gefen and Straub 1997; Venkatesh et al. 2000). The theoretical framework was empirically tested via survey using partial least squares structural equation modeling (PLS-SEM).

This study offers three major contributions to the literature. First, our research highlights the significant role of flow in mediating the effects of contextual factors (i.e. interactivity and social presence) and personal factors (i.e. curiosity and social media dependence) on consumption intention, and it also illustrates the varied strengths of the mediation effects. Second, by testing personal factors as antecedents for flow, this study emphasizes the importance of an individual's curiosity trait and social media dependence level on fostering flow. Next, it further contributes to flow theory by investigating gender differences in the influence of flow on people' behavioral intention. The empirical results provide support that the effect of flow is stronger for males than for females. Moreover, we extend prior

social media research by considering contextual factors together with personal factors. It sheds light on the new phenomenon by showing that both contextual factors and personal factors are crucial in the context of live streaming. Accordingly, practical suggestions can be provided to platforms and streamers to help them design strategies and enhance their competitiveness.

Live Streaming

One feature of live streaming is video-based real-time interaction. Viewers can post comments which are shown on the screen in real time and visible to the streamer and all other viewers watching the same live stream. The streamer can get real-time feedbacks from viewers and react immediately during the broadcasting. The interaction also happens among viewers as anyone can express his or her ideas towards other viewers through the real-time comments.

Another key feature of live streaming lies in the new monetization model. In U.S., the main monetization model of live streaming is advertising regardless that some platforms such as YouTube and Twitch allow viewers to appreciate streamers monetarily (Chen 2017). Whereas in China, it is the direct consumption of virtual gifts that contributes to the majority of revenues in the market. Virtual gifts are offered by live streaming platforms for viewers to tip and support streamers they like. Those gifts are actually pictographs such as flowers, hearts, Lamborghinis and yachts with the price ranging from RMB 0.10 (around USD 1.45 Cents) cents to RMB 10,000 (around USD 1,451). The gifts sent to a streamer are shown on the screen in real time, and both the streamer and other viewers can see what the gifts are, how many gifts are received, and whom the gifts are from. The virtual gifts received are cash-convertible, and the revenue generated is then split between the platform and the streamer. Research by Strategy Analytics shows that in 2016, the consumption on virtual gifts took up 97% of the market value in the Chinese market with the rest from advertising and others. This new monetization model which was once questioned by the U.S. investors turns out to be quite successful in China (Chen 2017). Figure 1 shows examples of live streaming.

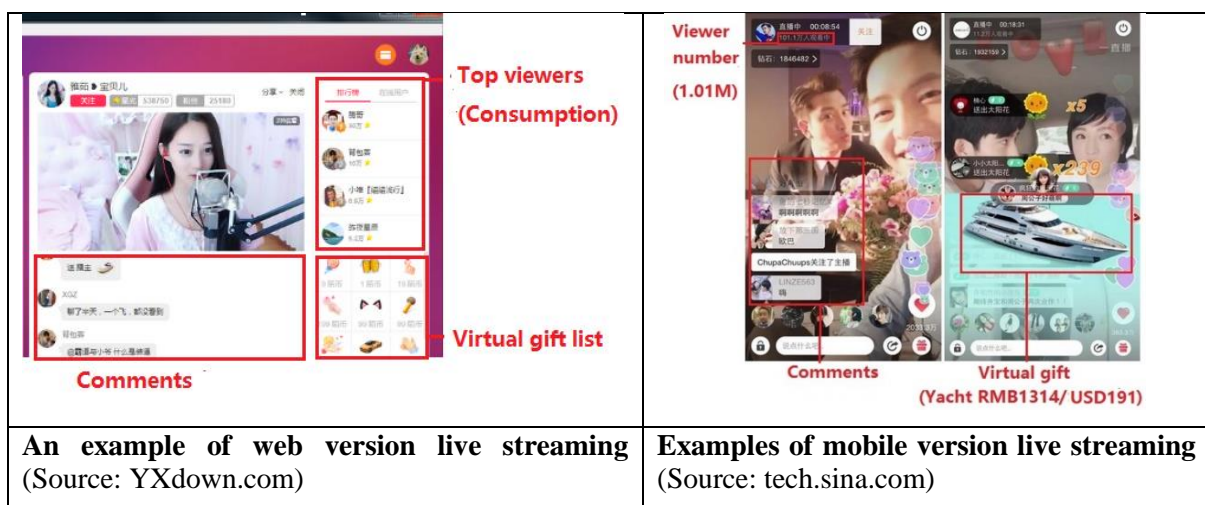


Figure 1. Examples of Live Streaming

Despite the remarkable development, the industry is also faced with the challenges to garner sustainable growth. The competition is becoming increasingly fierce as more social media platforms start providing live streaming services. A live streaming platform named Guangquan collapsed at the beginning of 2017 as it failed to keep up with its competitors. Moreover, iResearch shows that only 21.4% of the viewers in China purchased virtual gifts despite that they contribute to most of the revenue. Thus, live streaming platforms need to find out better ways to turn the traffic into revenues. It thus calls for a deep understanding of the factors leading to viewers' consumption intentions on virtual gifts, which can in turn provide insights to both streamers and platforms in China and in western countries.

Flow Theory

Flow has been studied as an important intrinsic motivation of hedonic information system usage (Obadă 2013). It provides insights for business to understand how to create an attractive online environment for customers to stay longer. Since live streaming is mostly used for entertaining purpose, we believe flow can explain the viewers' behavioral intentions.

Flow can be defined as the psychological state when people are experiencing intrinsic enjoyment with total involvement in the activity at hand (Csikszentmihalyi 1997). When a person experiences flow in an event, s/he is receiving enjoyment and highly concentrating on the event without awareness of time passing by. Flow reflects one's psychological needs for entertainment and joy. It is a continuous state rather than an either/or situation. Different people can have different levels of flow state in one event (Obadă 2013; Walker et al. 1998). The concept has already been frequently used in online contexts such as web navigation and online multiplayer games (Hoffman and Novak 1996; Huang et al. 2017). Extant research of flow in online environment not only emphasizes why people keep using certain media, but also investigates its association with other behavioral intentions such as purchase intention. For instance, Siekpe (2005) has tested the effects of flow on customers' intention to purchase laptops on a website. Korzaan (2003) has examined the relationship between university students' flow experience and their online shopping intention in e-commerce. However, the relationship between flow and purchase intention is mainly tested in conventional computer-mediated retailing context. It is worthwhile to further examine whether flow still stimulates consumption intention in the context of non-retailing scenario such as live streaming.

When comes to antecedents of flow, Finneran and Zhang (2003) has proposed that in online context both IT artifacts and people's traits are important factors lead to one's flow experience. However, few studies have identified the specific personal traits and investigated both IT artifacts and people's traits together. Thus, in this study, we examine the influences of both contextual factors and personal factors on flow in live streaming context.

Research Model and Hypotheses Development

We propose contextual and personal factors as important drivers that lead to consumption intention in live streaming. In terms of contextual factors, interactivity and social presence are key features of live streaming. According to prior research, they have considerable influences on consumer behavior in e-commerce (Gefen and Straub 2004; Jiang and Chan 2010; Obadă 2013; Ou et al. 2014). Since the consumption behavior in live streaming is different from that in conventional e-commerce context, whether these two factors still influence consumption intention in live streaming remains unclear. In terms of personal factors, curiosity and social media dependence are often considered as important traits influencing user behavior in social media (Can and Kaya 2016; Hill et al. 2016; Hoffman and Novak 1996; Obadă 2013). However, limited research has considered their roles in shaping online purchase. Therefore, in our framework, we explore how viewers' consumption intention of virtual gifts is affected by interactivity, social presence, curiosity and social media dependence. Moreover, the mechanism of how these factors contribute to consumption intention also requires further investigation. Based on flow theory, we expect that flow can be an important factor that mediates such relationships.

Interactivity and Consumption Intention of Virtual Gifts

Interactivity can be defined as a technology user's perception of the extent to which the technology offers flexibility and synchronicity of communication (Jiang and Chan 2010; Ou et al. 2014). In the context of shopping on website, technology feature like live chat makes buyers feel the flexibility to control product information and real-time communication with sellers (Jiang and Chan 2010).

Prior studies have divided interactivity into three dimensions (Ou et al. 2014). The first one is active control. It represents the extent to which a user can guide the communicated content and control the information flow during the interaction. Next is two-way communication, which indicates that the communication is a dialogue between two parties instead of one-way communication (Ou et al. 2014). The last one is synchronicity which emphasizes the real-time interaction (Ou et al. 2014). According to

Jiang and Chan (2009), interactivity can enhance buyers' purchase intention through strengthening buyers' web involvement which is similar to flow. It can be argued that buyers' consumption intention is enhanced because of increased trust developed from two-way synchronized communication between buyers and sellers (Ou et al. 2014). The direct influence of interactivity on online purchase intention should be further examined. In live streaming, interactivity is likely to enhance the communication quality and reduce the uncertainty of consumption. Therefore, we hypothesize:

H1: Interactivity is positively associated with the consumption intention of virtual gifts in live streaming.

Social Presence and Consumption Intention of Virtual Gifts

Social presence refers to the intimacy of communicated parties, which includes both direct and indirect interactions (Gefen and Straub 2004; Ou et al. 2014). It is considered as an important element in building trust in online shopping with the absence of effective supervision on transaction process. In the context of online shopping, when the social presence of sellers is enabled by the platform, buyers feel less uncertain about the transaction as they feel the psychological warmth from sellers. A high level of social presence gives buyers a feeling of social and human touch even when there is no actual human contact (Gefen and Straub 2004). In the live streaming context, the video-based real-time interaction enables computer-mediated face-to-face communication between the streamer and viewers, which can provide higher level of social presence than conventional live chat. Higher level of social presence established by the streamer indicates that the streamer is more intimate, and thus reduces viewers' uncertainty. Besides, live streaming also displays the comments posted by viewers in real time. A viewer is likely to feel that other people also exist in the same space. In that case, the viewer's concern of monetarily supporting the streamer may be reduced. In addition, as the consumption of virtual gifts can be recognized by other viewers, viewers who makes more monetary contribution to the live stream is likely to gain social compliance and respect from other viewers and the streamer. This may also encourage viewer to buy virtual gifts for the steamer. It is worth testing whether social presence can influence consumption intention in live streaming. Thus, we hypothesize:

H2: Social presence is positively associated with consumption intention of virtual gifts in live streaming.

Curiosity and Consumption Intention of Virtual Gifts

Curiosity can be defined as one's willingness to embrace novel, unpredictable and uncertain things, and it reflects one's demand to acquire new information (Kashdan et al. 2009; Loewenstein 1994). Curiosity plays a considerable role in shaping consumer behavior. In past research conducted in retailing context, curiosity elicited by mystery stimuli from marketers can encourage people to stay longer in front of an advertisement or search for more product information (Menon and Soman 2002). Although curiosity is often considered as a temporary motivational state of a customer, the research about the association between curiosity as customers' personal trait and purchase intention is underdeveloped (Hill et al. 2016). In our study we focus on the influence of trait curiosity. This is because the streamer delivers the same stimuli towards all viewers but those who possess curiosity as their autotelic trait are more likely to actively respond with further actions. When a streamer claims that there will be more interesting content if receiving more virtual gifts, viewers who possess high level of curiosity are likely to purchase virtual gift for the streamer so as to see what will happen next. Therefore, we hypothesize:

H3: Curiosity is positively associated with consumption intention of virtual gifts in live streaming.

Social Media Dependence and Consumption Intention of Virtual Gifts

Social media dependence refers to the psychological dependence on social media, representing one's addictive usage of social media (Can and Kaya 2016; Choi and Lim 2016). With the increasing popularity of social media adoption, the concern of social media dependence and its impact has drawn increasingly research attention (Andreassen 2015; Griffiths et al. 2014). Most of those studies are conducted from the perspective to reduce negative consequences of social media dependence. Few studies have looked at the association between social media dependence and consumer behavior (Can and Kaya 2016). In this study, we introduce this concept because it is common that people spend hours

in live streaming. Social media dependence indicates one's reinforced habits in social media related activities. Can and Kaya's study (Can and Kaya 2016) suggests that the level of psychological dependence on social media is positively associated with consumers' attitudes towards social media advertisements and their purchase intention. Live streaming has become a new trend in social media, thus, we hypothesize:

H4: Social media dependence is positively associated with consumption intention of virtual gifts in live streaming.

Interactivity and Flow

Interactivity can be an important factor to create an online environment that leads to flow state (Obadã 2013). In web navigation context, a website with higher level of interactivity allows users to further involve in playing around the web content (Chen et al. 2000); in online retailing context, interactivity from live chat encourages users to actively manage and concentrate on the information exchange (Skadberg and Kimmel 2004). In live streaming context, the video-based real-time interaction is able to create an environment with high level of interactivity for viewers and may make people immersed in this environment. Hence, we hypothesize:

H5: Interactivity is positively associated with flow in live streaming.

Social Presence and Flow

As mentioned above, social presence brings technology users the 'human touch' and makes them feel close to the communicating party (Khalifa and Shen 2004). Based on extant studies, social presence may enhance one's flow experience in an online community or web environment (Hoffman and Novak 1996; Khalifa and Shen 2004; Obadã 2013; Skadberg and Kimmel 2004). In the live streaming context, viewers feel that both the streamer and other viewers are approachable in a live stream room. Moreover, viewers in one live stream room may organize like a community (e.g. fans group of the streamer) and feel close to each other. These experiences in turn can enhance viewers' engagement and make them more immersed in the environment. Hence, in live streaming, social presence is likely to play a significant role in enhancing viewers' flow state. Therefore, we hypothesize:

H6: Social presence is positively associated with flow in live streaming.

Curiosity and Flow

Prior studies of flow emphasize curiosity as motivational state or consequence and they have perceived such curiosity as an essential element of flow state (Obadã 2013). For example, Siekpe (Siekpe 2005) suggests that curiosity can be one motivation leading to flow state. Although Finneran and Zhang (Finneran and Zhang 2003) has suggested that explorative behavior as personal traits that reflects one's inclination to flow state should be taken into consideration, few studies have tested the relationship between curiosity as personal trait and flow state. In this study, we intend to investigate the influence of curiosity as a personal trait and we hypothesize:

H7: Curiosity is positively associated with flow in live streaming.

Social Media Dependence and Flow

Social media dependence reflects one's habit of heavy social media usage (Wang et al. 2015). It indicates one's psychological reliance on social media activity which may lead to one's immersion in a social media environment. Therefore, viewers with higher level of social media dependence are more likely to immerse themselves into live streaming. Thus, we hypothesize:

H8 Social media dependence is positively associated with flow in live streaming.

Flow and Consumption Intention of Virtual Gifts

Flow is seen as an important factor influencing people's attitude and behavior towards purchasing in e-marketplace, including the unplanned purchase (Koufaris 2002). Although live streaming is different from e-commerce platforms which are designed for online shopping and transactions, we still expect that flow can play a critical role in affecting viewer behavior in live streaming. First, when viewers reach flow state, they are highly focused on the information provided in live streaming and tend to screen out irrelevant thoughts and perceptions (Novak et al. 2000). In that case, a variety of virtual gifts displayed on the live streaming platform are easier to attract their attention, which in turn induces their purchase intention. In addition, flow is found to have a positive influence on exploratory behavior (Ghani and Deshpande 1994). When viewers experience flow in live streaming, the high level of involvement and enjoyment can stimulate them to engage in more exploratory behaviors such as trying different services and functions provided in live streaming, leading to the increased possibilities of purchasing virtual gifts. Moreover, flow experienced by viewers leads to their favorable attitudes towards the streamer which may in turn motivate them to reward the streamer with virtual gifts. Thus, we propose:

H9: Flow is positively associated with consumption intention of virtual gifts in live streaming.

The Moderating Role of Gender

The existing literature has documented the remarkable influence of gender on human behavior in a wide variety of domains. Research in information systems also finds that gender plays a significant role in affecting technology adoption and usage (Gefen and Straub 1997; Venkatesh et al. 2000). Males show a greater extent of individualistic-motivational orientation than females (Carlson 1971). Compared with females who pay more attention to others' feelings and society harmony, males appear to be more independent and self-focused (Carlson 1971; Venkatesh et al. 2000). It indicates that males are more likely to enjoy an activity for their own benefits. Prior research shows that the impact of flow on web usage intention turns out to be stronger for males than for females (Sánchez-Franco 2007). Accordingly, when making consumption decision in live streaming, males can be more inclined to weight the personal feelings of intrinsic enjoyment experienced, making the influence of flow more salient for their purchase behavior. Thus, we expect that in live streaming, the influence of flow on consumption intention can be more salient for males.

H10: The influence of flow on consumption intention of virtual gifts in live streaming is more significant for males than for females.

Data Collection and Analysis

Measurement Development and Data Collection

To test the proposed research model, data was collected using survey. A questionnaire was developed in English with measurement items adopted from previous studies. Specifically, the items of interactivity were adopted from Ou et al. (Ou et al. 2014), social presence from Cyr et al. (Cyr et al. 2009), curiosity from Kashdan et al. (Kashdan et al. 2009), social media dependence from Wang et al. (Wang et al. 2015), flow from Huang et al. (Huang et al. 2017), and consumption intention from Pavlou (Pavlou 2003). All the items were measured using 7-point Likert scale (1 represents strongly disagree and 7 represents strongly agree). The questionnaire was translated into Chinese. To check the accuracy of translation, the Chinese questionnaire was further translated back to English by a different person. Then the Chinese questionnaire was sent to eight experienced live streaming viewers for clarity checking. Several changes were made to the Chinese questionnaire to improve its accuracy and clarity.

Data was collected from the Chinese live streaming viewers with online survey distributed via a survey company. In total 609 people completed the survey. However, only the participants who had watched live streaming before were appropriate for this study. After removing the responses from participants who had no live streaming watching experience, 212 questionnaires were valid for analysis. Of the 212 participants, 55.66% were females and 44.34% were males. 15.57% of the participants were between

18 and 25 years old, 39.62% were between 26 and 30, 25.00% were between 31 and 35, 10.85% were between 36 and 40, 5.66% were in the 41-45 age group, and 3.30% were above 45 years old.

Assessment of Measurement Model

Before assessing the structural model, the measurement model was assessed for validity and reliability. As interactivity is a reflective-formative higher-order construct, we applied the two-stage approach suggested by Hair et al. (Hair et al. 2016). Specifically, the repeated indicator approach was used in the first stage to model the paths from the first-order constructs (i.e. active control, two-way communication and synchronicity) to the second-order construct (i.e. interactivity) to obtain latent variable scores of first-order constructs. In the second stage, the latent variable scores of first-order constructs were used to formatively measure the second-order construct. Because the potential collinearity between first-order constructs may threaten the validity of formative measures, the correlations between active control, two-way communication and synchronicity were measured using variance inflation factors (VIF) (Ou et al. 2014). All the VIF values were below the threshold 3.3 (Cenfetelli and Basselier 2009), suggesting that there is no collinearity issue for the formative measures.

In addition, the item loadings were checked. After removing one item of curiosity, one item of social media dependence and five items of social media dependence, the loadings of all the items left were higher than the required 0.70 (Hair et al. 2016). Based on the adjusted measurement model, reliability and validity of first-order constructs were checked. Reliability were tested using Cronbach’s Alpha and composite reliability (CR). As shown in Table 1, the Cronbach’s Alpha and CR values of all constructs were higher than required 0.70 (Hair et al. 2016), thus the reliability of measurement model was supported. The convergent and discriminant validity were tested using Average Variance Extracted (AVE) and Fornell-Larcker criterion. All AVE values (as shown in Table 1) were higher than the acceptable threshold 0.5. The results shown in Table 2 met the Fornell-Larcker criterion. Therefore, the validity of the measurement model was also confirmed.

Table 1. Cronbach’s Alpha, Corporate Reliability and Average Variance Extracted

	Cronbach’s Alpha	CR	AVE
Active Control (I_AC)	0.740	0.885	0.793
Two-Way Communication (I_TC)	0.780	0.901	0.820
Synchronicity (I_SY)	0.719	0.877	0.781
Social Presence (SP)	0.837	0.891	0.672
Social Media Dependence (SMD)	0.799	0.857	0.600
Curiosity (C)	0.925	0.938	0.627
Flow (F)	0.864	0.917	0.787
Consumption Intention (CI)	0.898	0.936	0.830

Table 2. Fornell-Larcker Criterion

	I*	I_AC	I_TC	I_SY	SP	C	SMD	F	CI
I*	--								
I_AC	0.822	0.891							
I_TC	0.790	0.451	0.905						
I_SY	0.856	0.606	0.487	0.884					
SP	0.695	0.572	0.515	0.626	0.820				
CI	0.462	0.391	0.333	0.414	0.477	0.792			
SMD	0.047	0.046	0.013	0.057	0.107	0.097	0.775		

F	0.585	0.386	0.515	0.533	0.594	0.461	0.291	0.887	
CI	0.529	0.384	0.417	0.496	0.612	0.517	0.323	0.647	0.911

Note: Correlations among formative constructs of second-order construct are highlighted in gray. * marks the second-order construct that is formatively measured. All other constructs are reflectively measured first-order constructs. I=Interactivity, I_AC=Active Control, I_TC=Two-Way Communication, I_SY=Synchronicity, SP=Social Presence, SMD=Social Media Dependence, C=Curiosity, F=Flow, CI=Consumption Intention of Virtual Gifts

Procedural and statistical remedies were employed to handle common method bias which is common in behavioral research (Podsakoff et al. 2003). During the questionnaire design, the order of questions was counter balanced, and the demographic questions were placed at the end of the questionnaire. Such design can reduce respondents' evaluation apprehension, avoid boredom or diminish the effects of other transient moods (Lindell and Whitney 2001). Statistically, Harman's single-factor test was used to test the common method variance. The results revealed that the number of emerged factors from the unrotated solution was more than one, and the first factor accounted for less than 50% of the variance. Such results show that common method variance was not a significant issue in this study.

Assessment of Structural Model

Research hypotheses were tested using SmartPLS 3.0. Two models were examined. Model 1 examined the relationships between interactivity, social presence, curiosity, social media dependence and consumption intentions without mediator. Building on Model 1, Model 2 added flow as the mediator and included all paths in the model. As can be seen from Model 1 in Table 3, the relationships between interactivity, social presence, curiosity, social media dependence and consumption intention of virtual gifts were all significant when there was no mediator, thus H1-H4 were all supported. In terms of the full model (Model 2 in Table 3), the direct effect of interactivity on consumption intention was not significant, whereas the direct effects of social presence, curiosity and social media dependence on consumption intention were all significant and positive. In addition, the path coefficients of interactivity, social presence, curiosity and social media dependence on flow were all significant, supporting H5-H8. The relationship between flow and consumption intention was also significant ($\beta=0.289, p<0.001$), supporting H9. Moreover, gender significantly moderated the relationship between flow and consumption intention, hence, H10 was also supported. To enhance the understanding on gender's moderating effect, the interaction of gender and flow on consumption intention was plotted. Figure 2 shows that, comparing males (mean - standard deviation) to females (mean + standard deviation), consumption intention increases more rapidly when flow increases. That is, flow has a greater impact on consumption intention for males than for females, and when viewers experience high level of flow, males have higher consumption intention than females.

Table 3. Hypotheses Testing (Path Analysis Results)

	Model 1: Excluding Flow	Model 2: Full Model
H1: I -> CI	0.178*	0.077 ^{ns}
H2: SP -> CI	0.346***	0.263**
H3: C -> CI	0.246**	0.245*
H4: SMD -> CI	0.256***	0.155**
H5: I -> F		0.321***
H6: SP -> F		0.293***
H7: C -> F		0.153**
H8: SMD -> F		0.233***
H9: F -> CI		0.289***

H10: F*G -> CI		-0.090*
Explained Variance R²		
CI	51.9%	56.2%
F		51.8%

Note: ***p<0.001 **p<0.01 *p<0.1, ns: not significant. I=Interactivity, SP=Social Presence, C=Curiosity, SMD=Social Media Dependence, F=Flow, G=Gender, CI=Consumption Intention of Virtual Gifts

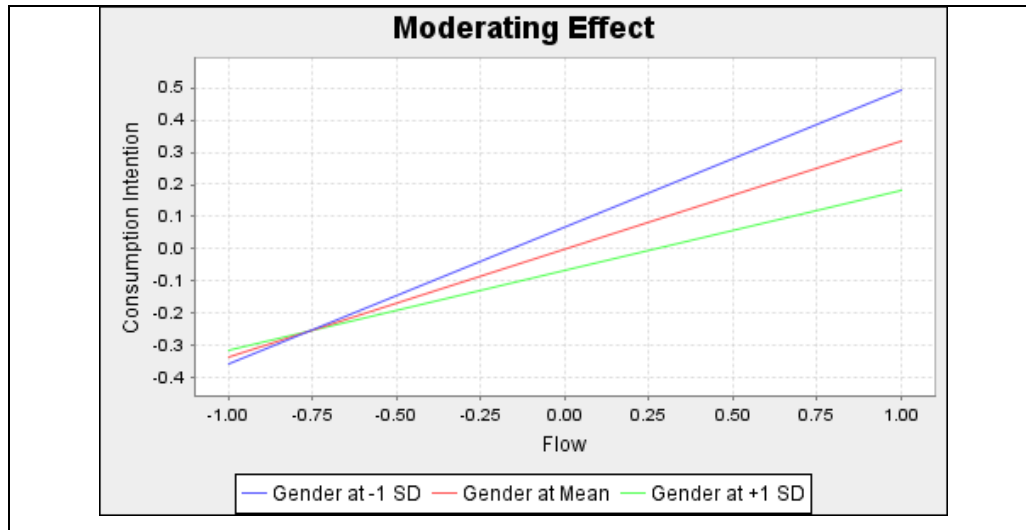


Figure 2. Moderating Effect of Gender

Regarding the mediation effect, when adding flow as the mediator, indirect effects of interactivity, social presence, curiosity and social media dependence on consumption intention via flow were all significant ($\beta=0.093$, $p<0.1$; $\beta=0.085$, $p<0.1$; $\beta=0.044$, $p<0.1$; $\beta=0.067$, $p<0.01$). As shown in Table 4, the Sobel’s test supported the significance of indirect effects. When adding flow in the model, the direct effect of interactivity on consumption intention turned from significant to insignificant. However, such turn was insufficient to prove full mediation, and we thus calculated the variance accounted for (VAF) to evaluate the strength of mediation (Armstrong et al. 2015). Results showed that 54.6% of the total effect of interactivity on consumption intention was explained by the mediator flow. Also, 24.3% of the total effect of social presence and 30.2% of the total effect of social media dependence on consumption intention were explained via flow. As the VAF values ranged between 20% and 80%, flow was found to partially mediate the effects of interactivity, social presence and social media dependence on consumption intention of virtual gifts. 18.0% of total effect of curiosity on consumption intention was explained by flow, indicating a weak mediation effect.

Table 4. Mediation Test

Mediating effect	Variables	Path Coefficient	Standard Error	p-value for Sobel's test for mediation	VAF
I-F-CI	I-F	0.321***	0.092	0.013	54.6%
	F-CI	0.289***	0.082		
	I-CI	0.077 ^{ns}	0.096		
SP-F-CI	SP-F	0.293***	0.088	0.016	24.3%
	F-CI	0.289***	0.082		
	SP-CI	0.263**	0.080		
C-F-CI	C-F	0.153**	0.059	0.037	18.0%

	F-CI	0.289***	0.082		
	C-CI	0.202*	0.086		
SMD-F-CI	SMD-F	0.233***	0.051	0.005	30.2%
	F-CI	0.289***	0.082		
	SMD-CI	0.155**	0.058		
Note: ***p<0.001 **p<0.01 *p<0.1, ns: not significant.					

Discussion

This study aims at investigating the effects of contextual and personal factors on the viewer’s consumption intention of virtual gifts in live streaming, exploring the mediating role of flow in such effects, and testing the moderating role of gender. We find that contextual factors (i.e. interactivity and social presence) are positively associated with consumption intention in live streaming. This is consistent with many studies on online consumption in other contexts such as e-commerce (Ou et al. 2014). Moreover, personal factors (i.e. trait curiosity and social media dependence) are also found to be positively associated with consumption intention in live streaming. While many previous studies have confirmed the impacts of situational curiosity on behaviors and found conflicting results regarding trait curiosity’s effects (Ho and Dempsey 2010; Menon and Soman 2002), this study illustrates that trait curiosity is also influential on consumer behavior. The results also extend previous research on the mediating role of flow. Previous studies have found flow to have mediation effects in working and human-computer interaction contexts (Donahue et al. 2012; Ghani and Deshpande 1994). In this study, we find that in live streaming, contextual and personal factors lead to consumption intention of virtual gifts through the facilitation of flow, and these mediating effects have different strengths. In addition, gender is found to significantly moderate the relationship between flow and consumption intention of virtual gifts. The finding is in line with the Sánchez-Franco (Sánchez-Franco 2007)’s study which suggests that the influence of flow on user behavior is stronger for males than females.

Conclusion and Future Research

Given the salience of the new monetization model in live streaming, this study attempts to find out factors that can explain viewer’s consumption intention of virtual gifts in this new context. We develop a theoretical framework in which flow mediates the link between contextual factors (i.e. interactivity and social presence) and personal factors (i.e. curiosity and social media dependence) and consumption intention. Analyses based on respondents who had experience of watching live streaming largely support the hypothesized relationships in the framework.

The study extends the existing literature in several ways. It first contributes to flow theory by investigating to what extent flow mediates the effects of contextual factors and personal factors on consumption intention. Moreover, by introducing personal factors, we uncover a positive and significant link between an individual’s traits and flow state. It thus provides a new perspective on the antecedents of flow. Furthermore, this study not only highlights the important role of flow in driving consumption intention in live streaming, but also tests the moderation effects of gender. It reveals gender differences in flow’s influence on consumption intention of virtual gifts. In addition, contextual factors and personal factors are rarely studied together in prior research. By comprehensively constructing the relationships from both contextual and personal dimensions, this study yields insights into factors contributing to people’s behavioral intention in the new context.

The findings of this study also have important practical implications. Practical suggestions can be provided to both streamers and live streaming platforms. We first recommend that to enhance flow experienced by viewers, platforms should increase interactivity. For example, platforms can offer incentives for viewers (e.g. user credits) to stimulate interactions and provide rewards for streamers who respond to viewers actively and quickly. Platforms and streamers should also create an environment that facilitates the development of affection and warmth among viewers to make them absorbed in live streaming and induce their consumption intention. Furthermore, platforms and

streamers should be aware of the differences of viewers in terms of their personal characteristics. They should pay more attention to viewers who are more willing to try new things and who tend to be more additive to social media. For instance, they can promote new virtual gifts to such viewers. Gender differences should also be taken into account. Platforms and streamers may wish to emphasize the experience of enjoyment and pleasure in live streaming for male viewers. For example, they can make effort in crafting more entertaining stream content if their majority viewers are males, as influence of flow appears to be more salient for males to purchase virtual gifts.

This study can be possibly extended in the following ways. First, our study is conducted in the Chinese context. Given that live streaming is also becoming popular in other countries, future research can test this framework in other cultural contexts. Second, this study has not considered the differences of streamers. Future research can thus extend our study by considering the streamer characteristics. Third, live streaming types have not been differentiated in this study and are worth further exploration.

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