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Completed Research Paper

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Abstract

Drawing upon the stimulus-organism-response (S-O-R) framework, this study developed a theoretical model to examine the impact mechanism of two gamification features on individuals' impulse purchase in the context of Double Eleven. An empirical survey was conducted and 716 valid questionnaires were collected from consumers using Taobao and Tmall platforms in China. Structural equation modelling method was used to examine the research model. The empirical results suggested that rewards giving and badges upgrading gamification features were positively associated with perceived enjoyment and social interaction reactions, which in turn had strong influences on consumers' impulse purchase. This study provides new insights in understanding online impulsive buying behaviors by incorporating the mechanism of gamification in the new research context of Double Eleven.

Keywords: Gamification, Impulse Purchase, S-O-R Framework, Double Eleven

Introduction

As the emergence of internet and communication information technologies in private and business life, electronic commerce (e-commerce) has gained widespread popularity across the world-wide market. According to the report of Chinese Ministry of Commerce, China has become the largest e-commerce transaction market all over the world—29,160 billion RMB in 2017 (ECCA, 2018). In the past decade, various online platforms have emerged in support of this emerging popularity in the Chinese market. Taobao (a C2C e-commerce marketplace) and Tmall (a B2C online marketplace) are recognized as two most leading platforms, which occupy more than 69.1% of Chinese online market share. Notably, a wide-scale online promotional activity of "Double Eleven" was initiated on November 11 in 2009, which leads to a global shopping carnival fashion. The booming of Double Eleven carnival demonstrates a huge explosive power and extraordinary impulse purchase behaviors. According to the statistics of Aliresearch in 2018, Taobao and Tmall's transaction volume (gross merchandise volume) reached 10 billion RMB (U.S. $1.488 billion) in just 2 minutes during Double Eleven. The Aliresearch also shows that, the total sales volume has increased to 213.5 billion RMB during the whole day, which approximately equals to three times of Walmart's annual sales in China and eight-fold of Black Friday's volume in the western market.

In particular, a gamified carnival called "Double Eleven Partners" is advocated by Taobao and Tmall for celebrating the tenth anniversary in 2018. The game is specially designed for social media and mobile social platforms where players predominantly invite acquaintances or strangers to join in and click "likes". Participants can carve up to 1 billion RMB red envelopes based on rewarding points and badges from others' liking amounts in Taobao and Tmall platforms. These gamification-based features (like rewards giving and badges upgrading) are recognized as effective means to promote individuals' impulse purchase intentions.

Previous literature has examined the role of gamification in various research contexts (Koivisto and Hamari, 2019; Hamari et al., 2014). The first stream of research focused on game elements design in the context of e-learning (Majuri et al., 2018; Attali and Arieli-Attali, 2015; De-Marcos et al., 2014; Simões et al., 2013). Scholars pointed out that gamified learning and teaching activities were positively associated with students' psychological and behavioral outcomes (e.g., affective reaction, continuance intention and performance). The second stream of studies concentrated on healthcare and exercise. It was found that gamification technologies could help increase individuals' hedonic perceptions and provide incentive-based interventions for health and wellbeing (Alahäivälä and Oinas-Kukkonen, 2016), such as healthy eating (Jones et al., 2014), childhood obesity (Cvijikj et al., 2014), healthcare pedagogy (Halan et al., 2010) and social exercise (Hamari and Koivisto, 2013). While the third stream of research payed attention to crowdsourcing. Specifically, platform game-like artifacts like points, badges, leaderboards and rewards were identified as significant antecedents of intrinsic motivation and participation behaviors (Feng et al., 2018; Choi et al., 2014). In the past few years, the significance of gamification has also arose the attention of scholars in the context of social networking and workplace (Hamari, 2013; Thom et al., 2012; Suh et al., 2017; Suh and Wagner, 2017). Gamification was defined as the use of game elements to provide affordance for gameful experiences in non-game contexts (Hamari, 2013; Deterding et al., 2011), and it has been widely applied in distinct contexts in the past decade. In empirical studies, Hamari (2013) examined the effects of gamification on consumers' retention, as well as social interaction within a trading service. Suh et al., (2017) investigated the positive relationship between gamification and user engagement in the employees' applications. In a recent study, Xi and Hamari (2019) posited the significance of achievement-related gamification in promoting individuals' reactions (emotional, cognitive and social) and subsequent behavioral intentions in the context of online social brand-related community.

Although the role of gamification has been discussed in the previous literature, few studies have examined its influence on individuals' impulse purchase behaviors. To our knowledge, most of the extant literature in impulse purchase focused on the website, marketing and situation stimulus (Chan et al., 2017), whereas the context-specific (refers to Double Eleven) stimuli of gamification features that trigger online impulse purchase behavior remain largely underexplored (Xi and Hamari, 2019). Compared with traditional online promotions, a significant characteristic of "Double Eleven Partners" is the combination of gameful hedonic cues (enjoyment and joyfulness) and social cues (sharing and collecting likes in social media such as Wechat, QQ, Weibo, Facebook and Twitter). Given the popularity of gamified artifacts in Double Eleven, it is essential to uncover the specific gamification effects on individual's subsequent impulse purchase intention from an affective and social interaction perspective.

The remaining open research question drives the research motivations of this study. Drawing upon S-O-R framework, this study has two major research motivations. Firstly, this study aims to examine the influence of two gamification features in the context of Double Eleven, regarding rewards giving and badges upgrading, on individuals' affective and social reactions. Secondly, this study aims to investigate if individuals' affective and social reactions are positively associated with their impulse purchase responses (manifested in pure impulse purchase, planned impulse purchase, reminder impulse purchase and suggestion impulse purchase). The expected research findings can provide us a comprehensive understanding of gamification mechanism in the emerging context of Double Eleven.

The remainder of the paper is organized as follows. Section two thoroughly presents the theoretical background. The research model and hypotheses are proposed in Section three. Section four illustrates the research method, discusses statistical analysis outcomes of the research model. The last two sections summarize the major research findings and implications.

Theoretical Foundation

Online Impulse Purchase

Impulse purchase happens when consumers feel an urge to buy a certain product without thoughtful consideration. The urge to buy impulsively can make actual shopping outcomes deviated from the intended shopping goals, and it is often used to surrogate actual online impulse buying. According to Stern (1962), online impulse purchase can be classified into four types: pure impulse buying (PUB), reminder impulse buying (RIB), suggestion impulse buying (SIB) and planned impulse buying (PLB), with each typology focusing on a different impulse purchase behavior. PUB refers to the truly impulsive buying pattern based on novelty or impulsiveness. RIB represents the purchase triggered by remembered information or recalled advertisements with the product. SIB is interpreted as the functional purchase when seeing a product for the first time and visualizing a need with no previous knowledge. PLB reflects the desire of purchase behavior in mind but searching for and take advantage of price specials and coupon offers (Parboteeah et al., 2009; Madhavaram and Laverie, 2004; Stern, 1962).

Online impulse purchase has arose the attention of scholars in the context of e-commerce, m-commerce and social commerce (Chang & Chen, 2015; Chen et al., 2016; Lo et al., 2016; Kim et al., 2016; Wu et al., 2016; Chang, 2017; Huang et al., 2017; Leong et al., 2018). However, previous studies mostly focused on one specific impulse purchase behavior, such as PUB or PLB, and assumed that consumers usually make a novel and spontaneous online purchase based on emotional reactions. In the Double Eleven context, social reaction is essential since consumers can easily share information about the brands and particular products with families, friends and colleagues or even strangers when there are more social-related features during the buying process (Xi and Hamari, 2019; Xiang et al., 2016; Zhang et al., 2014). The above activities are largely manifested in suggestion impulse buying behaviors. Moreover, participants need to complete social interaction tasks when participating in the Double Eleven game, such as "Invite five friends who bought shoes/make-up last year" to win corresponding energy. So reminder impulse buying may occur with the advertisements recalling and the previous experience. Thus, we adopted Stern (1962)'s classification of impulse purchase, and included the four typologies of PUB, PLB, SIB and RIB in the model, in order to provide a comprehensive understanding of users' impulse purchase behaviors in the specific context of Double Eleven.

S-O-R Theoretical framework

Originated in social psychology (Mehrabian and Russell, 1974; Woodworth, 1929), the S-O-R framework is developed from the classical stimulus-response (S-R) theory. The S-O-R theoretical framework consists of three basic elements: stimulus (external triggers that arouse consumers' reactions), organism (consumers' affective, cognitive or normative evaluations of the external triggers), and response (consumers' behavioral outcomes of reactions). Although the S-O-R Framework has been largely applied to explain individuals' online impulse purchase behaviors in the previous literature (Liu et al., 2013), to our knowledge, few studies have explored how specific features of gamification are most beneficial to promote consumers' organism reactions and subsequent behaviors. Unlike traditional incentive systems that are used to arouse individuals' extrinsic motivations, gamification mechanisms focus on designing interesting and vivid elements that attempt to stimulate individuals' intrinsic motivations and social connections (Hamari and Koivisto, 2015; Morschheuser et al. 2016; Feng et al., 2018; Suh and Wagner, 2017). In the context of Double Eleven, gamification features in the social commerce activities are significant triggers of users' perceived enjoyment and social reactions in the online impulse purchase, which further influence their subsequent impulse purchase behaviors. Accordingly, this study considers gamification features as significant stimuli, and introduces the two reactions as prominent organisms in the research model.

Research Model and Hypotheses

Drawing on S-O-R as an overarching theoretical framework, this study develops a model to explain consumers' impulse purchase in the particular context of Double Eleven. Specifically, rewards giving

and badges upgrading are introduced in the research model to represent the achievement-related gamification features based on Xi and Hamari (2019)'s framework. Moreover, this study proposes that perceived enjoyment (affective reaction) and social interaction (social reaction) will mediate the effects of rewards giving and badges upgrading on consumers' impulse purchase in Double Eleven. In particular, this study included gender, age, experience, income and expenditure as control variables in the research model. The proposed theoretical model is presented in Figure 1.
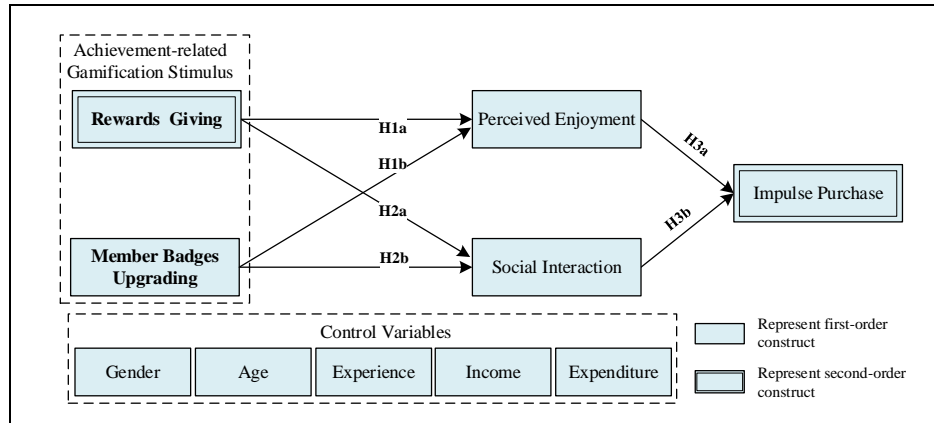
Figure 1. Research Model

Gamification Features and Perceived Enjoyment

Perceived enjoyment is identified as a significant affective reaction, and it is defined as the degree of pleasure which individuals obtain via browsing products and making purchases (Xu et al., 2014; Davis et al., 1992). According to the traditional S-O-R model, individuals' affective reactions are aroused by stimuli (Chen and Yao, 2018; Liu et al., 2013). In the context of Double Eleven, gamification features (rewards giving, badges upgrading) are important stimuli that can influence consumers' perceived enjoyment (Hassan and Hamari, 2019). Rewards giving is a multi-dimensional construct that includes two dimensions: tangible rewards and intangible rewards. Tangible rewards represents visible and tangible items, such as red envelopes (money) and coupons (Seaborn and Fels, 2015), while intangible rewards refer to the relatively less observable and virtual items received from individuals' acquaintances in the social environment, such as the "likes" and certain points of "energy" in the Double Eleven game (Yoon et al., 2015). Badges upgrading stands for visual icons or signifying achievements that bring reputation and recognition to consumers (Seaborn and Fels, 2015).

The relationship between rewards giving and perceived enjoyment has been examined within the extant literature. For example, Choi et al., (2014) reported that rewards giving in the crowding system can increase an individual's perceived enjoyment. Jones et al., (2014) revealed that rewards giving-related gamification features are more likely to be spent on hedonic characters for increasing healthy eating in schools. Besides rewards giving, badges upgrading is also recognized as a significant gamification feature that affects individuals' affective reactions in various research contexts. Empirical results suggest that a higher consequence of hedonic (e.g., fun, pleasurable, enjoyable) feeling is guaranteed when a level-up mechanism is provided in accordance with individuals' task behaviors across a range of domains, such as e-learning (Denny, 2013; Dom Ñguez et al., 2013), mobile commerce (Fitz-Walter et al., 2011), and social commerce (Xi and Hamari, 2019). Thus, consumers are more likely to generate a hedonic attitude towards the Double Eleven purchase when experiencing the rewards and badges upgrading mechanisms. Therefore, we propose the following hypotheses:

H1a. Rewards giving is positively related to perceived enjoyment.

H1b. Badges upgrading is positively related to perceived enjoyment.

Gamification Features and Social Interaction

Social interaction represents the extent to which users perceive the interpersonal relationship with others in the social platform, and it comprises of the strength of the relationships, the amount of time spent and communication frequency (Chiu et al., 2006). Hamari and Koivisto (2013) argued that rewards giving and other game-like features can encourage more social behaviors. In a learning platform, Simões et al. (2013) reported that rewards giving could help promote individuals' communication, collaboration, sharing and socialization with peers, friends, parents and educators. Considering that the special Double Eleven carnival is a gamified purchase service, the rewards giving activity is beneficial to facilitate individuals' social interactions with others (Rodrigues et al., 2016).

The positive relationships between badges upgrading and social reactions are empirically tested (Koivisto and Hamari, 2014). Badges are identified as a significant reputation and social indicator persisting in a user's profile (Hamari, 2013; Denny, 2013), and badges with a level-up mechanism are recognized as a notable means leading to social reactions (Xi and Hamari, 2019). Scholars have indicated the important role of badges upgrading in fostering consumers' social interaction in the social commerce context. For instance, Hamari (2013) underlined that badges upgrading is a promising method that motivates individuals to actively participate in social interactions. In a photo-sharing activity, Montola et al., (2009) found that badges are beneficial to enable friendly social competitions and comparisons. Accordingly, this study introduces rewards giving and badges upgrading as two significant precursors of social interactions in the context of Double Eleven. The following hypotheses are proposed:

H2a. Rewards giving is positively related to social interaction.

H2b. Badges upgrading is positively related to social interaction.

Perceived Enjoyment, Social Interaction and Impulse Purchase

Drawing upon S-O-R model, perceived enjoyment was identified as a notable affective reaction of consumers' impulse purchase in the extant literature (Parboteeah et al., 2009). Specifically, Chang and Chen (2015) revealed that a higher hedonic perception (i.e., enjoyment) is beneficial to promote an online bidding impulsively. Floh and Madlberger (2013) proposed that enjoyment has a positive effect on impulse buying for online shoppers. Considering that gamification mechanisms are hedonic and pleasure-oriented (Hassan and Hamari, 2019), consumers' impulse purchase will be significantly enhanced when they perceive a higher enjoyment in the Double Eleven game.

Moreover, social interaction is recognized as another psychological reaction that determines an individual's impulse purchase (Sharma et al., 2018; Xiang et al., 2016; Ngai et al., 2015). In the offline TV shopping context, social interaction with the hosts can play an important role in online impulse buying (Park and Lennon, 2006). This type of interaction can be seen as the interaction with strangers in virtual reality (Zhang et al., 2014; Horton and Wohl, 1956), which is also known as observational learning-based social interaction (Chen and Xie, 2011). In the situation of online transactions, the effect of social interaction on impulse purchase behavior is even stronger because the learning can easily be observed and the interaction is more likely to occur among acquaintances compared with the TV shopping environment (Xiang et al., 2016). For instance, Zhang et al. (2014) pointed out that individuals who make social interactions with other consumers are more impulsive on group shopping websites. The above analysis leads to the following hypotheses:

H3a. Perceived enjoyment is positively related to impulse purchase.

H3b. Social interaction is positively related to impulse purchase.

Research Methodology

Research setting and data collection

We collected data from the target population (consumers using Taobao and Tmall platforms). An online questionnaire survey was conducted via an electronic questionnaire website (www.sojump.com).

Individuals who have participated in the "Double Eleven Partners" game were selected as the respondents of our survey. The respondents were offered incentives in the form of a monetary award of 2 RMB. Totally 994 questionnaires were returned back from November 11 to November 19 in 2018. After the filtration of 224 samples without game experiences during the Double Eleven and 54 invalid samples with incomplete or inaccurate data, we finally got 716 valid datasets for analysis. Table 1 describes the demographics of the overall sample, which is basically consistent with the actual online purchase users in China (CNNIC, 2018). Notably, we found that the number of females is larger than males, suggesting that females may be more motivated to participate in the Double Eleven game.

Table 1. Sample Characteristics

Items	Types	N	%	Items	Types	N	%
Age	<18 18-23 24-30 >30	11 472 174 59	1.6 65.9 24.3 8.2	Years of Experience	1-2 3-4 5-6 >7	120 274 222 100	16.7 38.3 31.0 14.0
Income per month (rmb)	<1500 1500-3000 3000-5000 5000-8000 >8000	266 275 93 40 42	37.1 38.4 13.0 5.6 5.9	Expenditure in Double eleven (rmb)	<500 500-2000 2000-4000 4000-6000 >6000	73 295 223 85 40	10.2 41.2 31.1 11.9 5.6
Gender	Male Female	207 509	28.9 71.1				

Note: N represents numbers, % represents percentage

Instruments

The instrument was adapted from previous literature, and each construct was measured with three or four items. The references for the items are illustrated in Table 2. Seven-point Likert scale was used to design the instrument, ranging from 1 (strongly disagree) to 7 (strongly agree) (Likert, 1932). Several items were adjusted based on the Double Eleven environment to guarantee expression accuracy. The English questionnaire was then translated into Chinese by two Ph.D students. A pilot test was conducted in our university to examine the content and construct validity of the instrument. We invited 71 students and professors who have played games and purchased in Double Eleven to complete the questionnaires. Based on the feedback from the respondents and the factor analysis results, we adjusted the items of suggestion impulse buying and badges upgrading respectively to better reflect the measured constructs.

Structural equation modeling analysis

Structural equation modelling (SEM) approach was used to examine the research model (Gefen et al., 2000). In particular, SmartPLS v3.2.1 was selected as a primary tool for statistical analysis since our model includes both formative and reflective constructs (Chin et al., 2003). Following a two-step analysis procedure, we first examined the measurement model and then analyzed the structural model.

Measurement model analysis

The measurement model was examined to assess the reliability, convergent validity, and discriminant validity of the constructs. As illustrated in Table 2, the item loadings of each construct have exceeded 0.7, the Cronbach's alpha for each construct is highly above 0.7 and the composite reliability is greater than the benchmark of 0.7, indicating a good internal consistency and reliability of the items (Chin et al., 2003). In addition, the average variance extracted (AVE) from each construct is higher than 0.5, demonstrating an adequate convergent validity of the measurement model (Chin et al., 2003).

Table 2. Descriptive Statistics and Reliability Coefficients for Constructs

Construct	Items	Loading	Alpha	CR	AVE	Scales Sources
Tangible Rewards (TR)	TR1 TR2 TR3	0.860*** 0.891*** 0.874***	0.847	0.908	0.766	Adapted from Kuo & Tsung (2016)
Intangible Rewards (IR)	IR1 IR2 IR3	0.921*** 0.928*** 0.911***	0.909	0.943	0.847	Adapted from Feng et al., 2018; Kuo & Tsung, 2016
Badges Upgrading (BU)	BU1 BU2 BU3	0.937*** 0.935*** 0.927***	0.926	0.953	0.870	Adapted from Kuo & Tsung, 2016
Perceived Enjoyment (PE)	PE1 PE2 PE3	0.936*** 0.942*** 0.921***	0.926	0.953	0.871	Adapted from Xu et al., 2014; Davis et al., 1992
Social Interaction (SI)	SI1 SI2 SI3 SI4	0.857*** 0.915*** 0.905*** 0.922***	0.922	0.945	0.811	Adapted from Chiu et al., 2006
Pure Impulse Buying(PUB)	PUB1 PUB2 PUB3	0.731*** 0.924*** 0.912***	0.822	0.894	0.740	Adapted from Xiang et al., 2016; Stern, 1962
Reminder Impulse Buying (RIB)	RIB1 RIB2 RIB3	0.829*** 0.857*** 0.881***	0.817	0.891	0.732	Adapted from Stern, 1962
Suggestion Impulse Buying (SIB)	SIB1 SIB2 SIB3	0.926*** 0.899*** 0.804***	0.849	0.910	0.771	Adapted from Stern, 1962
Planned Impulse Buying (PLB)	PLB1 PLB2 PLB3 PLB4	0.916*** 0.912*** 0.932*** 0.851***	0.924	0.947	0.816	Adapted from Liu et al., 2013; Stern, 1962

Note: T test are significant at: *P<0.05, **P < 0.01, ***P < 0.001.

Discriminant validity was evaluated by testing if the matrix with an equal-diagonal element (square root of AVE) hold the value maximization (Lin et al., 2017; Chin et al., 2003). Table 3 illustrates that the square root of AVE for each construct (the value in the diagonal line) is larger than its correlation with other constructs, indicating a good discriminant validity (Chin et al., 2003).

Since the model contains two second-order constructs (rewards giving and impulse buying), we created the higher second-order variables using factor scores of the first-order constructs (Bock et al., 2005; Chin et al., 2003). According to the causal relationship (Mackenzie et al., 2011), we treated rewards giving as a second-order formative construct since the two dimensions of TR and IR are not interchangeable and do not co-vary with each other. Moreover, we considered impulse buying as a second-order reflective construct since a change in the construct would be expected to generate a change in its four dimensions (PUB, RIB, SIB, PLB) (Mackenzie et al., 2011).

Considering that formative second-order constructs may lead to a potential multicollinearity among the first-order indicators, we further conducted a correlation analysis between the first-order indicators using variance inflation factors (VIF), as suggested in the previous literature (Wetzels et al. 2009; Shao

and Pan, 2019). As noted in Table 4, the VIF value for each first-order indicator is far below the threshold of 3.3, indicating that multicollinearity is not a serious issue in our study (Hair et al., 2016).

Table 3. Correlations of Latent Variables

|	TR	IR	BU	PE	SI	PUB	RIB	SIB	PLB
TR	0.920								
IR	0.704	0.875							
BU	0.753	0.653	0.933						
PE	0.508	0.461	0.486	0.933					
SI	0.499	0.515	0.539	0.397	0.900				
PUB	0.354	0.380	0.411	0.511	0.414	0.860			
RIB	0.477	0.449	0.530	0.519	0.369	0.410	0.856		
SIB	0.412	0.370	0.421	0.509	0.213	0.357	0.644	0.878	
PLB	0.367	0.340	0.431	0.564	0.398	0.730	0.473	0.399	0.903

Table 4. Path Weights and VIF for Formative Indicators

Formative indicators for Rewards Giving	Path Weights	VIF
Tangible Rewards	0.512***	1.982
Intangible Rewards	0.571***	1.982

Note: T test are significant at: *$P<0.05$, **$P < 0.01$, ***$P < 0.001$

Structural model analysis for the full sample

We then analyzed the structural model to examine the path relationship and explanatory power of the research model. Bootstrapping procedure method was used to calculate the statistical significance of the parameter estimates, which is beneficial to derive valid standard errors or t-values (Temme et al., 2006). The analysis result is described in Figure 2.
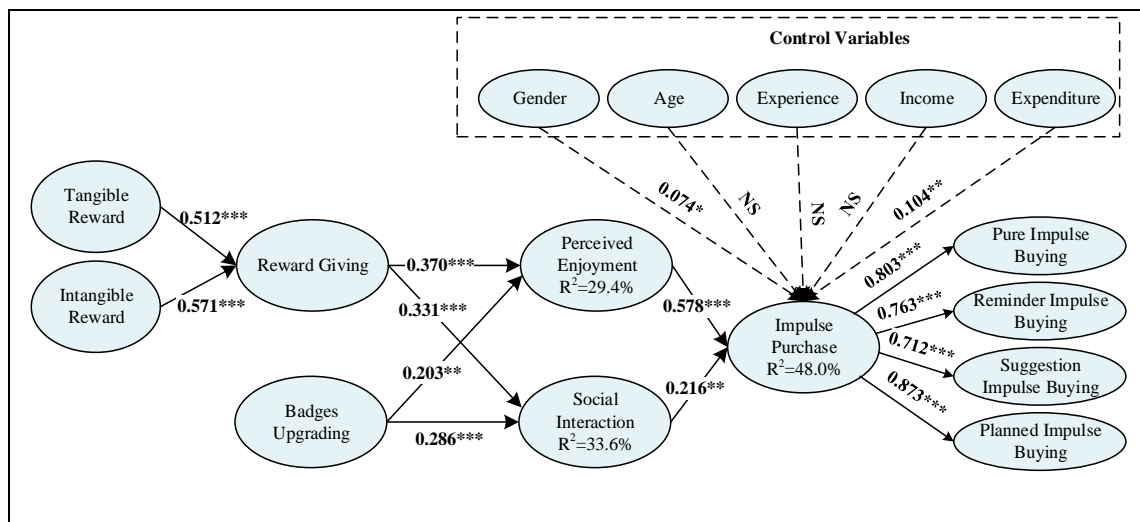
Figure 2. Structural model analysis

As shown in Figure 2, rewards giving and badges upgrading are positively associated with perceived enjoyment (β1 = 0.370, p < 0.001; β2 = 0.203, p < 0.001), thus H1a and H1b are supported. While rewards giving and badges upgrading also have significant influences on social interaction (β1 = 0.331,

$p < 0.001$; $\beta2 = 0.286$, $p < 0.001$), thus supports H2a and H2b. The results demonstrate that both tangible rewards and intangible rewards contribute significantly to perceived enjoyment and social interaction. Moreover, perceived enjoyment and social interaction are positively associated with impulse purchase ($\beta1 = 0.578$, $p < 0.001$; $\beta2 = 0.216$, $p < 0.001$). Therefore, H3a and H3b are supported.

Regarding the explanatory power of the research model, the R^2 suggests that the research model explains 29.4% of variance in perceived enjoyment, 33.6% of variance in social interaction, and 48.0% of variance in impulse purchase. It indicates that the four exogenous variables can explain a large variance of the endogenous variable, demonstrating a good explanatory power of the theoretical model.

Mediation Test

In order to examine if perceived enjoyment and social interaction mediate the relationship between gamification features and impulse purchase, this study followed Sobel (1986)'s procedure to test if the relationship between independent variables (IV) and dependent variables (DV) are reduced (partial mediation) or completely diminished (full mediation) after adding mediation variables (MV) into the structural model. As noted in Table 5, all mediation path relationships have passed the significance examination. We then used the Bootstrapping method with bias-corrected confidence estimates to test the mediating effects. The 95% confidence interval of the indirect effects was obtained with 5000 bootstrapping re-samples (Preacher and Hayes, 2008). Thus, the mediating effects of perceived enjoyment and social interaction are further confirmed.

Table 5. Mediation Test Results

Path			Sobel test	Boot β	Boot SE	Confidence interval (95%)		Mediation effect
IV	M	DV (second-order)				Lower	Upper	
RG	PE	Impulse Purchase	6.015***	0.251	0.028	0.201	0.309	Full
BU	PE	Impulse Purchase	3.172**	0.204	0.025	0.159	0.254	Partial
RG	SI	Impulse Purchase	4.747***	0.116	0.021	0.077	0.162	Full
BU	SI	Impulse Purchase	4.211***	0.095	0.018	0.062	0.134	Partial

Note: *$P < 0.05$, **$P < 0.01$, ***$P<0.001$; IV represents independent variable; M represents mediator; DV represents dependent variable

Theoretical and Practical Implications

For theoretical implications, this study makes three major contributions. Firstly, we adopt the S-O-R framework in the Double Eleven context, and examine the gamification-related stimuli that promote consumers' reactions and impulse purchase. Despite previous studies have investigated the significant stimuli of individuals' impulse purchase from different perspectives (Huang, 2017; Chen and Yao, 2018; Chang, 2017; Xiang et al., 2016), the specific effects of gamification-related stimuli on impulse purchase remain largely unexplored. This study uncovers the gamification stimuli in the Double Eleven online purchase, and the research findings can enrich our understanding of impulse purchase behaviors from a gamification theoretical perspective. Secondly, this study enriches the construct of achievement-related gamification in the context of Double Eleven. Xi and Hamari (2019) consider the achievement-related gamification as an overall construct while ignoring its specific attributes in different contexts. By dividing the achievement-related gamification into two dimensions (rewards giving and badges upgrading), we empirically examine their separate influences on consumers' reactions and subsequent impulse purchase behaviors. Thirdly, this study uncovers the mediating mechanism between the two achievement-related gamification features and impulse purchase behaviors in the Double Eleven carnival. In particular, we find that perceived enjoyment and social interaction fully mediate the relationship between rewards giving and impulse purchase, while partially mediate the association between badges upgrading and impulse purchase. The empirical results can compensate for the previous findings primarily focusing on cognitive effects (Xi and Hamari, 2019; Denny, 2013; Dom Ñguez et

al., 2013; Alahäivälä and Oinas-Kukkonen, 2016; Jones et al., 2014; Cvijikj et al., 2014), and enhance our understanding of impulse purchase in the emerging context of Double Eleven.

The research findings also provide several important practical implications for the business developers and operators of online purchase platforms. Firstly, platform developers need recognize the importance of gamification features, such as rewards giving and badges upgrading, in stimulating impulse purchase and design their promotional activities accordingly. Specifically, the developers can embed rewards giving and badges upgrading features and other gamification elements (e.g. avatars, story, personalization, leaderboard) in the online platforms, in order to stimulate consumers' impulse purchase behaviors. Secondly, business operators should recognize that general promotion with high public recognition (like Double Eleven) can help enhance enjoyable purchase experiences and induce impulse purchase. Accordingly, the operators can deepen the scenarios with public sentiment to stimulate consumers' affective reactions. Last but not least, the platform administrators should be aware of the significant impact of gamification mechanisms on social interaction. Game-based mechanisms can offsets the deficiency of the traditional e-commerce promotion to enhance social interactions and reciprocal benefit perceptions. For example, Taobao and Tmall have promoted active sharing and social recommendations in the platforms by establishing gamification mechanisms.

Conclusions and Future Research Directions

Drawing upon S-O-R framework, this study develops a theoretical model to examine the impact mechanism of gamification-related stimulus on consumers' impulse purchase in the context of Double Eleven. Our empirical results show that two achievement-related gamification features (rewards giving and badges upgrading) are beneficial to increase consumers' perceived enjoyment (affective reaction) and social interaction (social reaction), which in turn significantly affect impulse purchase. Although this study provides several theoretical and practical contributions, there are still several limitations that leave open future research directions. Firstly, the survey is conducted based on two Chinese platforms (Taobao and Tmall) in the context of Double Eleven. Future research can collect data from other platforms or scenarios, to generalize the research findings of this study. Secondly, this study considers impulse purchase behavior as an overall second-order construct. Future studies can examine the specific influences of gamification on the four typologies of impulse purchase (PUB, RIB, SIB, PLB), to obtain more interesting research findings. Thirdly, this study majorly focuses on the achievement-related gamification features in the context of Double Eleven. It will be an intriguing study to investigate other gamification elements associated with online impulse purchase. Last but not least, future works can employ a more rigorous neurophysiological design to assess the actual impulse purchase behavior, such as measuring the blood flow, muscle activation and brain activity, to avoid the potential common method bias.

Acknowledgements

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