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Using Virtual Gifts on Live Streaming Platforms as a Sustainable Strategy to Stimulate Consumers' Green Purchase Intention

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Abstract: As the use of live-stream marketing by corporations to sell products is increasing, the sustainability of this marketing model has been a controversial topic in recent years. In this study, we propose that live-stream marketing can be used as a sustainable strategy to improve the relationship between customers and the companies endorsed by broadcasters. Based on signal theory and the framework of “affordance–psychological outcome–consumer behavior”, this study answers the question from the perspective of virtual gift visibility, and finds that social presence and self-esteem serve as mediators, and self-monitoring personality as a moderator, of the relationship between online visibility of virtual gifts and green purchasing. Our research model was tested using structural equation model analysis. Data were collected from 552 users of Chinese live streaming platforms in China, and it was found that online gift visibility of live-stream marketing can be used as a sustainable strategy to stimulate customers' purchase intention. Social presence is a full mediator of the relationship between the online visibility of virtual gifts and green purchases. Furthermore, self-monitoring personality moderates the relationships among the online visibility of virtual gifts, social presence, and green purchase intention. Our research not only extends the understanding of online gifts as a link between consumers and broadcasters, but also clarifies the process of how online gifts lead to green purchase intention.

Keywords: online visibility; social presence; self-esteem; self-monitoring personality; green purchase intention

1. Introduction

With the diffusion of Web 2.0 technologies, social commerce now uses social media tools to increase sales [1]; indeed, a number of companies both secure and retain customers with the aid of social media. Live streaming is a new form of social commerce, which works by establishing a temporary virtual community shared by broadcasters and regular viewers in real time [2]. These broadcasters are often opinion leaders who possess special skills and an attractive appearance or broad knowledge and rich experience, by which they are able to gain the attention of numerous fans [3]. During the broadcast, these fans can send “likes,” danmuku (i.e., short comments), and virtual gifts to their identified broadcasters. Gift giving can be regarded as a unique communication channel between focal users and other users on live video streaming platforms [4]. Virtual goods refer to digital goods in cyberspace, such as avatars, weapons, virtual equipment, currency, and tokens. Unlike musical, photo, and other digital products, virtual goods do not have the same reproducibility as digital products [5]. One of the most important attributes of virtual goods is the esthetic experience they offer users; for instance, the virtual clothes of an avatar in a game are esthetically pleasing [6]. These virtual goods are widely used

on various social networking sites and live streaming platforms to facilitate communication. Under the context of live stream, the arousal level of viewers can be stimulated by social competition and the co-presence of other users [2]. Fans continue to use live streaming platforms for three main reasons: (1) Because they have common viewing rituals and a sense of community, (2) because of the attraction and stickiness created by frequent interaction with broadcasters (“zhuho” in China) and other fans, and (3) because they identify with the broadcasters and groups [7]. In short, the competition of visibility and the immediacy of live broadcasting make loyal fans willing to give online gifts to their favorite broadcasters when watching live broadcasts [8]. In this study, we emphasize that the visibility of virtual gifts could affect fans’ social presence and self-esteem, thus affecting their purchase intentions.

Despite the great success of using live streaming pitches in practice, the existing literature does not appropriately answer the following question: Why are users willing to pay real money to purchase the goods that their broadcasters recommend? Under scenarios of live streaming, broadcasters conduct commercial integration and persuade customers to purchase products by taking advantage of their personal brand, users’ flow, product quality, price anchoring, and live streaming platform power [9]. On the one hand, prior research suggests that broadcasters of live streaming platforms could serve as opinion leaders to build users’ trust and engagement, and that they have a strong decisive influence on the buying attitude of fans [10]. On the other hand, the purchase paths of users have been greatly changed by live-stream marketing. Broadcasters serve as product pickers and bargaining assistants to ensure that their endorsed product is of good quality and of low price [11]. Therefore, these live streaming broadcasters not only guarantee the interaction and real-time feedback of the purchasing process, but also greatly improve the purchasing efficiency of customers. However, the doubts of extant research still remain regarding whether or not these influences are sustainable. To bridge this gap, based on the signal theory, this study focuses on the unique role of online gift visibility impact on users’ green purchasing. To be specific, this study selects an organic food company to explore whether fans with higher online visibility are more likely to adopt broadcasters’ recommendations. In this study, a green purchase is defined as the willingness of live-stream users to purchase environmentally friendly products according to the suggestions of broadcasters.

Current studies regarding online gifts only consider the users’ meaning in the pursuit of online gifts [12], the self-motivation of online gift giving [13], and status seeking [14]. Based on signal theory, this study regards online visibility as an obvious signal and symbol that can be used to stimulate users on live streaming platforms. Our concept of visibility is tied to the amount of effort people expend to present themselves online. Users prefer to be seen by others while undertaking social activities because they are concerned about the observed feelings of said other users [15]. This study proposes that online visibility of virtual gift giving as a pivotal factor may influence the relationship between focal users with higher visibility and other ordinary viewers [16]. Extant research findings are inconsistent regarding the effect of online visibility. For example, Shmargad and Watts found that online visibility is detrimental to online gift giving because social surveillance increases the anxiety of users [17]. In contrast, Jankowski, Brodka, and Hamari proposed that online gifts have a pull effect on users’ participation through real-time initiatives and visual display [18]. To fill these research gaps, this study investigates the focal users of Chinese firms who use live streaming platforms to purchase organic products endorsed by their favorite broadcasters. In addition, this study tests the mediating effect of social presence and self-esteem, and validates the moderating effect of a self-monitoring personality.

2. Research Model and Research Hypotheses

2.1. Theoretical Basis and Research Model

Visibility refers to the availability of information that reflects the current status of a user in an online environment. High visibility means that focal users can instantly receive information transmitted by the media, and their behaviors can be observed by other users [19]. In an online social network context, online visibility means that focal users’ actions and interactions are visible to other users;

further, feedback from other users on focal users' previous behavior will change said focal users' online behavior [17]. In other words, when there is a networked connection between the users, the act of a focal user giving a virtual gift to another is visible to their mutual contacts. For instance, Huang, Hong, and Burtch found that increased online visibility could improve the amount of user-generated content and could affect consumers' sentiments [20]. Moreover, when other users' previous preferences and decisions change from invisible to visible to focal users, they serve as a signal and decision reference for their subsequent purchases [21].

Signal theory is used as one of the basic theories to explain why the online visibility of virtual gifts motivates users' green purchases [22]. A shared social network provides various explicit or implicit signals. Simply through observation, users can learn clues about participants in an online community and can better understand the rules for engaging in activities [23]. Hence, the importance of conspicuous attributes and brand prominence plays a pivotal role in evoking consumers' cognitive and behavioral responses [24,25]. Pezzulo et al. also found that signaling can be a "joint action optimization" mechanism, which explains how it simplifies coordination in online social interactions [26]. In this study, the symbolic value of the online gifts is related not only to focal users' need to satisfy their own and others' needs [21], but also to the esthetic sensation and visibility of online gifts [12]. Under the context of live streaming platforms, broadcasters receive focal users' virtual gifts and highlights over a public chat to attract everyone's attention, as a non-monetary reward [4]. In this way, these activities can be observed, which offers gift givers a superior social status over other viewers and stimulates identification with broadcasters and purchase intention.

The framework of "affordance–psychological outcome–consumer behavior" can be used to explain our rationale. The affordances implemented to a live stream platform lead to psychological outcomes (social presence and self-esteem), and these meaningful experiences further lead to behavioral outcomes (i.e., green purchase). In this study, the affordances refer to online visibility of virtual gift giving and the mechanics aid in inducing psychological outcome within the live stream platforms. This study selected live stream platforms operated by organic food firms to explore their users' green purchase intention. Previous studies had suggested that these live streaming broadcasters not only have a decisive influence on their fans' purchase attitude, but also greatly improve the purchasing efficiency of customers [7,10]. Therefore, this study proposes that online gift giving can generate a sense of social presence and can enhance the self-esteem of these focal users, subsequently closing the relationship with the broadcasters, which affects their actual purchase intention. The research model is shown in Figure 1.

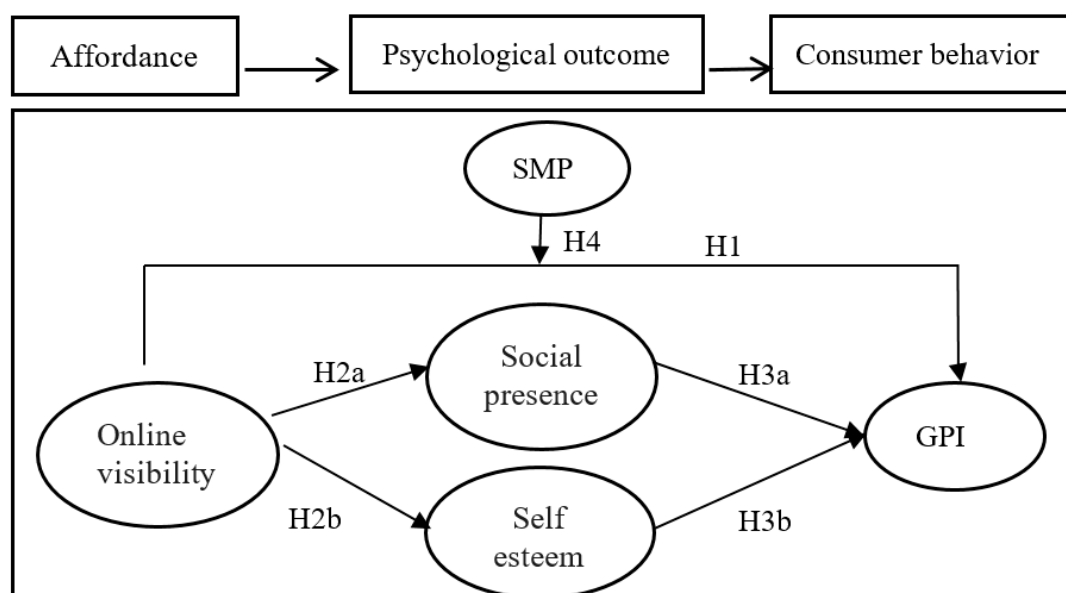


Figure 1. The research model. SMP, self-monitoring personality; GPI, green purchase intention.

2.2. Online Visibility of Virtual Gifts and Green Purchases

This paper argues that the online visibility of virtual gifts affects consumers' green purchases for two reasons: First, an online gift is designed by a live broadcasting platform based on the needs of consumers to participate in online interactions, with the purpose of encouraging users to become deeply involved [27]. In the environment of live broadcasting, the online visibility of the virtual gift giving behavior of other users causes focal users to mimic that behavior and attempt to outdo others' gift giving. As in online games, users buy virtual equipment (such as skins, weapons, and adornments) to show off their esthetic taste and to outperform other users on live streaming platforms [2]. Broadcasters provide positive feedback to users that generously give online gifts. Increased attention from other users to these gift givers further stimulates focal users by evoking a flow experience and creating eye-catching social interactions, as well as a sense that they have outperformed the competition [24]. Therefore, focal users are motivated to make purchase decisions and to even indulge in community activity engagement on live broadcasting platforms [28].

Second, due to the immediacy of live broadcasting, video platforms create an appropriate virtual atmosphere for purchase intention through real-time information dissemination [29]. These so-called web atmospherics refer to the meaningful scene design of a live broadcasting environment, which has a positive influence on consumers' emotions and consciousness, and which prompts them to make purchases [30]. In contrast to traditional offline shopping, these web atmospherics cause consumers to increase their green buying behaviors as there is more stimulation and fewer distractions in such environments [31]. As an important part of web atmospherics, the real-time nature of live streaming increases the amount of information overload. Huang believes that the load of website information has a significant impact on consumers' emotions and dominance [32]. Jahanshahi and Jia found that purchasing green products can be seen as a means of expressing consumers' uniqueness, which increases their enjoyment and their self-expressive benefits [33], thus encouraging consumers to make green purchases. In this study, we explore the effect of gift visibility on focal users' green purchase intention when broadcasters advocate purchasing green products. We hold the belief that live streaming creates a collective atmosphere to encourage users to become deeply involved and be easily convinced by the broadcasters' persuasion. Therefore, this study proposes the following hypothesis:

Hypothesis 1 (H1). *The online visibility of online gifts is positively related to consumers' green purchases.*

2.3. The Mediating Effect of Social Presence

Consumers feel that a vivid website can be used easily when they employ vivid pictures, interesting text, and specific social meanings with text and pictures [34]. Extant research shows that consumers buy "eye-catching" products not only for their design, but also for meeting their social expression [35]. The online visibility of virtual gifts is measured by the degree to which the purchase process of consumers can be observed by others, which is key for conspicuous consumption [36]. As gift giving involves a wide array of virtual products, from the simplest cards to gold coins, luxury cars, and yachts, these life-like forms provide social cues for the site. Under the pressure of time, the online visibility of virtual gift giving makes it easy for consumers to perceive that they are being socially compared to others using the website. By interacting with other users, consumers can perceive their social presence [37]. Online visibility can affect users' familiarity with brands, thereby reducing psychological distance from retail brands. Shen and Khalifa claimed that users can interact at any time, such that they can develop an instant and immediate perception regarding other online users' presence and competition [38]. The perception that users can develop a social presence and can interact with other users affects consumers' emotions and behavior. Beuckels and Hudders also found that a virtual shopping environment could enhance consumers' perception of interactive images, resulting in higher perceptions of the exclusivity and quality of a product [39]. In the context of live streaming, users can engage in frequent communication and interactions, which leads to the generation of their social perception. Broadcasters and other users provide positive feedback, such as compliments, to focal consumers that purchase

online gifts. This outperformance signal is instantly transmitted to other online users, which elevates their emotions and increases the likelihood that they will form a green purchase intention. Therefore, this paper proposes that social presence acts as a mediator of the relationship between the online visibility of virtual gifts and green purchase intention. The following hypotheses are proposed:

Hypothesis 2a (H2a). *The online visibility of online gifts is positively related to consumers' social presence.*

Hypothesis 3a (H3a). *Social presence is positively related to consumers' green purchase intention.*

2.4. The Mediating Effect of Self-Esteem

Self-esteem is an individual's overall evaluation of himself [40]. Kernis and Waschull found that self-esteem is both greatly and easily influenced by the external environment [41]. Previous studies have shown that social network site (SNS) usage can shape users' self-esteem by facilitating social comparisons [42]. A SNS community starts to develop from the "self-organized" group to the empowered "other-organized" group, such as setting up a group manager, an administrator, a reward mechanism, a supervision mechanism, the threshold of community entry, etc. [43]. Under the context of live streaming platforms, self-esteem is a kind of self-perception concerning whether members are competent or are outcompeting other users of the platform [4]. Gift giving empowers focal users that give virtual gifts to broadcasters, resulting in a sense of superiority over other users [44]. When users use a service that provides good identification and reward, they are more likely to develop a better sense of self-esteem from the live streaming platform [5]. In this study, we propose that gift giving brings users positive emotions, allowing them to immerse themselves in the virtual atmosphere created by these live streaming services, and encouraging them to engage in a higher level of loyalty to broadcasters' suggestions. In this study, broadcasters are required to sell organic food, and the impact of their advocating of their own green purchases on focal users' green purchase intention is investigated. The following hypotheses are proposed:

Hypothesis 2b (H2b). *The online visibility of online gifts is positively related to consumers' self-esteem.*

Hypothesis 3b (H3b). *Users' self-esteem is positively related to consumers' green purchase intention.*

2.5. The Moderating Effect of Self-Monitoring Personality

The concept of self-monitoring originates from personality psychology, which primarily reflects differences in individuals' propensity and ability to monitor and control their self-presentation, particular behaviors, and nonverbal emotional presentation [45,46]. High self-monitoring individuals are attentive to the social and situational appropriateness of their behavior and attempt to present desirable and favorable perceptions [47]. Therefore, an individual with a high self-monitoring personality can control and adapt their self-presentation to situations. High self-monitoring people are more sensitive to social situations, observing other people's behavior and regulating their own accordingly. Low self-monitoring people do not care much about the behavior of others and do not pay much attention to the suitability of their own behavior and environment, but rather use their own internal attitudes, values, and beliefs as action guides [48]. In contrast to an offline context, individuals in a new social network are more likely to reveal images they want to present, which will affect their further behavior [49]. The role of a self-monitoring personality has more obvious effects in online social networks than in a real context. Empirically, Phua, Jin, and Kim found that attention to social comparison moderates the relationship between SNS use and online bridging [50]. In the context of live streaming, there are more obvious differences in individuals' perceptions of the online visibility of virtual gifts between individuals with high and low self-monitoring personalities. Hence, we infer that high self-monitoring people are more likely to be stimulated to make green purchases in live streaming platforms. Therefore, the following hypothesis is proposed:

Hypothesis 4 (H4). *A self-monitoring personality moderates the relationship between the online visibility of online gifts and green purchases.*

3. Research Methods

3.1. Variables and Measures

To ensure the reliability and validity of the questionnaire, all items used for measuring this study's variables were selected from scales published in high-impact journals. As we collected data from China, the questionnaire was administered in a two-way translation fashion. According to the suggestions of Brislin [51], the questionnaire was first translated from English to Mandarin and then back to English independently by three professors. The authors consulted with three other professors to ensure the accuracy of the translation. The measurement of virtual gift visibility was based on the scale designed by Dong and Wang [52], which includes four representative items such as “Live streaming provides fans with detailed and noticeable pictures of online gifts.” The scale of social presence adopted the measurement items proposed by Gefen and Straub [34]. Self-esteem was measured based on the work of Ellemers, Kortekaas, and Ouwerkerk [53], with four items. The measurements of green purchase intention were from Kim and Choi [54], which include five items. Self-monitoring personality was measured based on eight items designed by Snyder and Gangestad [55]. The detailed measurement items are attached in the Appendix A.

3.2. Data Collection and the Sample

The questionnaires were distributed and collected with the help of the online survey agency “SO JUMP.” in China. This agency has been used by thousands of academic scholars around the globe. In this study, we focused on the live streaming platforms that sell organic products. With the rise of live broadcast economy in China, substantial enterprises have started to hire popular broadcasters (zhuho in Chinese) to sell their products. We followed one Chinese organic food company that uses live streaming platforms and collected data during their after-sales investigation with focal users from June to August 2019. It is worth noting that focal users give gifts to broadcasters for supporting their worship or encouraging broadcasters' knowledge sharing. The virtual gifts are designed to facilitate interaction between customers and their identified broadcasters. To ensure that each questionnaire was completed by a real live broadcast user, the user was required to provide their nickname on the live broadcast platform. Each valid user was given 5 yuan (CNY) as a token of appreciation. This study issued 1000 questionnaires and collected 552 completed questionnaires, a 55.2% valid response rate. The sample demographics are provided in Table 1.

Table 1. Demographic profile of the respondents ($N = 552$).

Characteristics	Number	N (%)
Male	256	46.4%
Female	296	53.6%
Under 18 years old	93	16.8%
18–23 years old	197	35.7%
24–30 years old	169	30.6%
31–50 years old	64	11.6%
Above 50 years old	29	5.3%
Educational attainment		
High school or lower	96	17.4%
Bachelor	363	65.8%

Table 1. Cont.

Characteristics	Number	N (%)
Graduate or above	93	16.8%
Incidence of online gift giving on the live streaming platform		
1–2 times	254	46.0%
3–5 times	178	32.2%
6–10 times	72	13.0%
10 times	48	8.7%
Value of gift giving on the live streaming platform		
Below 100 CNY	173	31.3%
101–500 CNY	192	34.8%
501–1000 CNY	121	21.9%
Over 1000 CNY	66	12.0%

4. Results

4.1. Correlation Analysis and Common Method Bias Test

Since our data were self-reported by live stream users, there may be have problems of common method bias (CMV). Firstly, we conducted procedural control to ensure our participants were eligible to answer the questionnaire. Secondly, this paper used Harman's single-factor test to check for this problem. If CMV is a problem, a common factor may explain most of the variation of the variables. We included all used variables into the exploratory factor analysis (EFA) model except for socio-demographics items. The result of EFA shows that the eigenvalues of five factors are higher than 1, and the explanatory degree of the variables is 72.12%. The first factor explains only 33.34% of the variation. Therefore, it was concluded that CMV is not a serious in this study. The results of the correlation analysis are provided in Table 2 and indicate that the correlation coefficients are good.

Table 2. Pearson correlations between the study variables.

Variable	1	2	3	4	5
Online visibility	0.683				
Self-esteem	0.357 **	0.791			
Green purchase intention	0.465 **	0.431 **	0.907		
Social presence	0.443 **	0.378 **	0.382 **	0.789	
Self-monitoring personality	0.514 **	0.372 **	0.368 **	0.353 **	0.774
Mean value	4.283	3.961	3.974	3.710	3.217
Standard deviation	0.821	0.863	0.926	0.847	0.861

Notes: ** $p < 0.01$; values on the diagonal are the root mean square (RMS) of average variance estimator (AVE).

4.2. Reliability and Validity Analysis

This study used SPSS 23.0 and AMOS 7.0 developed by IBM (Armonk, NY, USA) to test the reliability and validity of the scale. In terms of reliability, Cronbach's α (CA) was used to evaluate the internal consistency of the variables. The results suggest that the value of each variable is higher than the recommended value of 0.7. The value for online visibility is 0.843, social presence is 0.830, self-esteem is 0.792, green purchase intention is 0.827, and self-monitoring personality is 0.881. In addition, we conducted the confirmatory factor analysis (CFA) and calculated the factor loading of items. Based on CFA, composite reliability (CR) was calculated and the results show the CR value of each variable is higher than the recommended level of 0.7 (online visibility is 0.776, social presence is 0.891, self-esteem

is 0.869, green purchase intention is 0.881, and self-monitoring personality is 0.917), indicating that the reliability of the study is good.

To ensure the validity of the scale, the measurement scales were all derived from previous classic scales, and three experts in this field were invited to polish the measurement indicators. The wording and expressions used in the questionnaire were appropriately revised for our context; therefore, the content validity of this measurement scale is good. The factor loading coefficients of all variables are higher than 0.5, indicating good convergence validity. The results for the comparison of the correlation coefficient and mean root mean square (RMS) of the variables indicate that discrimination validity is good. The fitting degree of the measurement model in this study is $\chi^2/df = 2.742$, CFI = 0.901, GFI = 0.903, IFI = 0.917, TLI = 0.911, and RMSEA = 0.072, indicating that the structural validity of this study is good. Thus, the reliability and validity of this study are good. The validity of the scale is shown in Table 3.

Table 3. Reliability and validity test of the variables ($N = 552$).

Variable	Item	Factor Loading	α -Value
Online visibility (OV)	OV1	0.723	0.843
	OV2	0.731	
	OV3	0.612	
	OV4	0.658	
Self-monitoring personality (SMP)	SMP1	0.716	0.881
	SMP2	0.788	
	SMP3	0.827	
	SMP4	0.821	
	SMP5	0.788	
	SMP6	0.735	
	SMP7	0.754	
	SMP8	0.649	
Social presence (SP)	SP1	0.712	0.830
	SP2	0.732	
	SP3	0.846	
	SP4	0.863	
	SP5	0.779	
Self-esteem (SE)	SE1	0.772	0.792
	SE2	0.815	
	SE3	0.811	
	SE4	0.764	
Green purchase intention (GPI)	GPI1	0.884	0.827
	GPI2	0.742	
	GPI3	0.711	
	GPI4	0.768	
	GPI5	0.754	
CFA fitting index	$\chi^2/df = 2.742$, CFI = 0.901, GFI = 0.903, IFI = 0.917, TLI = 0.911, RMSEA = 0.072		

4.3. Structural Equation Model Analysis

Structural equation model (SEM) was adopted to test our research hypotheses by using AMOS Ver. 22. The overall fitting index of the model is as follows: $\chi^2/df = 2.207$, GFI = 0.896, RMSEA = 0.072, TLI = 0.904, IFI = 0.906, and CFI = 0.901. It can be seen that the model fit is generally good, and the path coefficients in the model are shown in Table 4. Firstly, the results show that the online visibility of virtual gifts has a significant direct impact on green purchase intention ($\beta = 0.332$, $p < 0.05$). That is to say, H1 is supported. Secondly, the online visibility is positively related to social presence ($\beta = 0.293$, $p < 0.05$) and self-esteem ($\beta = 0.462$, $p < 0.001$), indicating H2a and H2b are supported. H3a

and H3b suggest that social presence and self-esteem both have a significantly positive influence on green purchase intention. The coefficients of social presence and self-esteem impact on green purchase intention are 0.224 ($p < 0.05$) and 0.263 ($p < 0.01$), respectively. Finally, the interaction of online visibility by self-monitoring personality also significantly impacts green purchase intention and the coefficient is 0.178 ($p < 0.05$). This suggests support for the moderating effect of self-monitoring personality on the relationships between the online visibility of virtual gifts and green purchases; thus, H4 is supported. The results of the structural equation model were shown as Figure 2.

Table 4. Path coefficients and hypotheses testing.

Path	Relationship between Variables	Path Coefficient	S.E.	CR	p-Value	Support or Not
H1	Online visibility → Green purchase	0.332 **	0.121	1.913	0.004	Yes
H2a	Online visibility → Social presence	0.293 *	0.213	1.791	0.036	Yes
H2b	Online visibility → Self-esteem	0.462 ***	0.137	3.430	0.000	Yes
H3a	Social presence → Green purchase	0.224 *	0.201	1.768	0.024	Yes
H3b	Self-esteem → Green purchase	0.263 **	0.269	3.142	0.006	Yes
H4	Online visibility interacts with SMP → Green purchase	0.178 *	0.079	2.066	0.047	Yes

Notes: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. SMP, self-monitoring personality; S.E., standard error; CR, composite reliability.

To check the mediation effect of social presence and self-esteem, the bootstrap method was adopted. By using AMOS, the results of 5000 iterations showed that the indirect effects of the online visibility of virtual gifts on the dependent variable through social presence are significant ($\beta = 0.066$), and that the 95% confidence interval does not include 0 ($L = -0.2614$, $U = -0.0241$). The indirect effects of the online visibility of virtual gifts on the dependent variable through self-esteem are significant ($\beta = 0.122$), but the 95% confidence interval includes 0 ($L = -0.1914$, $U = 0.0218$). This suggests that social presence fully mediates the relationship between the online visibility of virtual gifts and green purchases, while self-esteem is a partial mediator.

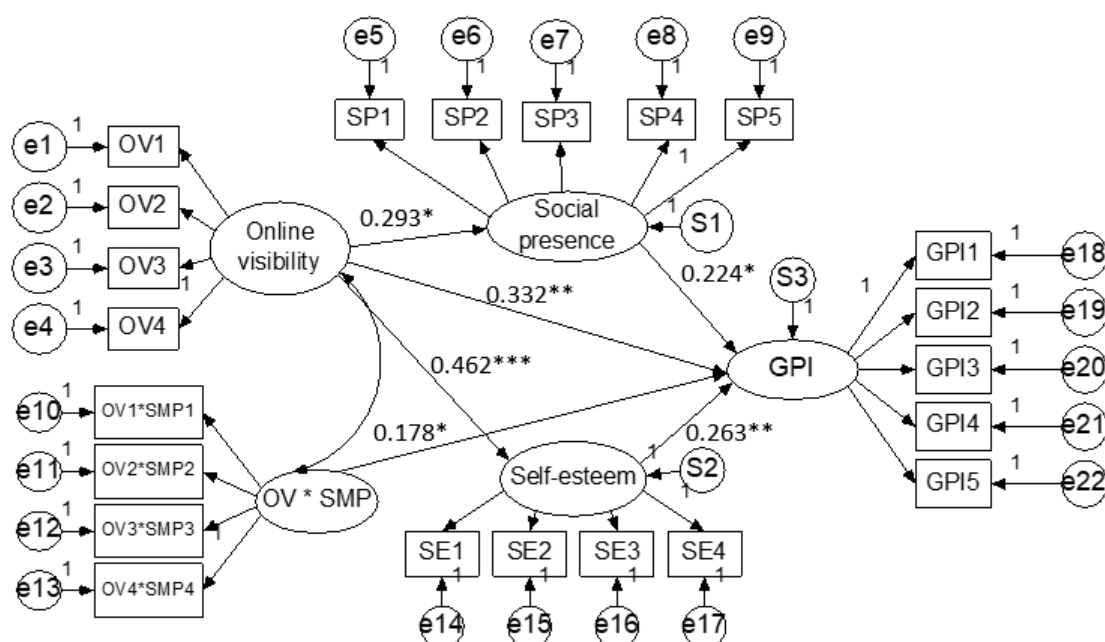


Figure 2. The results of the structural equation model (SEM). *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

5. Discussion and Conclusions

5.1. Discussion

Prior studies have highlighted that the social features of social commerce, such as social interactivity and product recommendations, can generate swift connections between platforms and focal users [56], as well as that peer-member characteristics (such as similarity, benevolence, and expertise) have a positive impact on users' perceived utilitarian and social values, thus enhancing their purchase intentions [57]. In this study, we considered that the role of a virtual gift provides a unique perspective to understand live-stream marketing in social commerce. Online gifts represent an emotional connection between customers and broadcasters, which has become a hot topic in recent years [58]. Extant research had found that virtual goods could increase users' status competitions, online purchase, and environmental consciousness [59]. In the context of live streaming platforms, this study first explored the question of whether fans giving virtual gifts to broadcasters can bring further actual purchase support. To answer this question, we proposed that live-stream marketing could be used as a sustainable strategy to improve the relationship between customers and the companies endorsed by broadcasters. Based on signal theory, this study answered the question from the perspective of virtual gift visibility, and found that social presence and self-esteem serve as mediators, and self-monitoring personality as a moderator, of the relationship between online visibility and green purchasing. Specifically, the results led to the following conclusions.

First, this paper validated that a positive relationship exists between the online visibility of virtual gifts and consumers' green purchase intention. That is, in the online environment created by online live broadcast platforms, the higher the visibility of virtual gifts, the easier it is for consumers to form a green purchase intention. This finding extends and enriches the research conclusions of Hu et al. [7], which state that fans identify with these broadcasters and groups, and during these processes, online gifts serve as pivotal media and transmission mechanisms.

Second, social presence was confirmed to be a full mediator of the relationship between the online visibility of virtual gifts and green purchases. As Reysen et al. [60] concluded, ordinal fans prefer using social cues to ingratiate themselves with the group. In this study, social presence was regarded as a type of social perception; the greater the visibility of an online gift, the more the consumers will perceive the presence of cyberspace, the broadcasters, and the other users in the online streaming platforms. This perception of presence makes consumers' real-time interactive behavior more authentic and leads to an increase in green purchase decisions. Through this sense of social presence, consumers are constantly stimulated to provide feedback on the visibility of virtual gifts, thus triggering their green purchase behavior.

Finally, this paper verified that a self-monitoring personality moderates the relationship between the online visibility of virtual gifts and green purchase intention. A person with a self-monitoring personality shows great differences in social cue appraisal and self-presentation regulation. Allen, Weeks, and Moffitt found that high self-monitoring individuals respond more productively to external stressors [61]. In our study, high self-monitoring fans perceived that live broadcasters really exist and chose to give them online gifts to outperform the competition (other fans). While low self-monitoring fans do not constantly pay attention to their competition, their attitudes do not suffer as much, which leads to a low level of continuous behaviors.

5.2. Implications for Theory

With the development of digital economy, the study of virtual gifts is becoming an emerging hot issue. In the context of online live streaming platforms, this study addressed the question of whether people who give virtual gifts are willing to purchase more online. Generally, this study contributes to the literature via the following three points.

Firstly, this study took live-stream marketing as a sustainable strategy to realize corporate growth. According to signal theory, this paper regarded the visibility of a virtual gift as a cue and symbol to

remind and facilitate fans' subsequent interactions and actual purchases. Although a previous study found that conspicuous donation behavior can be explained by seeking social status [62], we extended this theory to the context of online live streaming platforms. We found that customers who give virtual gifts to broadcasters show a closeness feeling [63] and generate more actual purchase intentions.

Secondly, this study verified the mediating effect of social presence and self-esteem on the relationship between online visibility and green purchase intention. It was confirmed that the vividness and immediacy of the online context could be an effective vehicle to stimulate users' actual behavior. Social presence helps users to immerse themselves in the atmosphere shared on live streaming platforms, as well as to follow the suggestions and implicit persuasions of broadcasters.

Thirdly, this study extended the boundary effect of the online visibility on users' continuous behavior. Consistent with Scott et al.'s [64] findings, low self-monitoring individuals are less effective at regulating their behavior to respond to external stressors. This study underlined the effect of self-monitoring personality as a moderator regarding the process of online gift giving users' green purchases on live streaming platforms.

5.3. Implications for Practice

This paper highlighted the following three implications for management. First, the online visibility of virtual gifts on a live streaming platform is important and can be used as a toolkit to enhance users' perceptions of their social presence and self-esteem, thus increasing the likelihood of green purchase intention. According to our conclusion, virtual gift giving on live streaming platforms should be designed to be more ritualistic. For instance, online gifts designed with special elements (e.g., images, stories, and scenarios) of the platform [65] can be used to remind consumers of that specific platform when they want to engage with a live streaming platform. On the other hand, by using sticky topics or announcements, platforms can ensure that consumers keep paying attention to users who give online gifts and can entice them to emulate the purchasing habits of the other consumers with whom they interact.

Second, creating a virtual atmosphere of copresence in online communities will affect consumers' purchasing decisions [66]. Consumers are able to "like" and comment on live broadcasting, which enhances the interactions among fans, broadcasters, and platforms. Broadcasters of live streaming platforms can also use instant messages and feedback emoticons in the broadcast room so that fans can develop strong and authentic perceptions.

Finally, platforms could adopt different strategies for different fans. High self-monitoring fans are susceptible to external symbols. If platforms want to control negative behavior, they should reduce and lessen the application of symbols and cues that lead to this type of behavior.

5.4. Limitations and Future Research

This study has several limitations. First, this paper explored the effect visibility of virtual gifts on live streaming platforms on green purchases. However, under a live broadcast environment, there are many factors that affect consumers' purchases, such as the charm of the broadcasters and the quality of the live broadcast. However, due to resource limitations, this study was not able to effectively control for these factors. Second, this study used self-reported cross-sectional data to validate our research model. To better address our research questions, future research should use a longitudinal analysis. Third, we used samples from live stream platforms who sell organic product to test their green purchase intention. These samples are constrained by the special context and limitations of activity. Therefore, future research could consider these aspects.

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Appendix A

Measure Items

Online visibility scale:

1. Live streaming provides fans with detailed and eye-catching pictures of online gifts.
2. Live streaming shopping makes online gifts' attributes visible to fans.
3. Live streaming shopping makes information about how to use online gifts visible to fans.
4. Live streaming shopping helps fans visualize online gifts like they do in the real world.

Social presence:

1. There is a sense of human contact in the live streaming platform.
2. There is a sense of personalization in the live streaming platform.
3. There is a sense of sociability in the live streaming platform.
4. There is a sense of human warmth in the live streaming platform.
5. There is a sense of human sensitivity in the live streaming platform.

Self-esteem:

1. I think my community has little to be proud of.
2. I feel good about my group.
3. I have little respect for my group.
4. I would rather not mention that I belong to this group.

Self-monitoring personality:

1. I can make impromptu speeches, even on topics about which I have almost no information.
2. I guess I put on a show to impress or entertain others.
3. I would probably make a good actor.
4. In different situations and with different people, I often act like a very different person.
5. I am not always the person I appear to be.
6. I have considered being an entertainer.
7. I can look anyone in the eye and tell a lie with a straight face (if to the right end).
8. I may deceive people by being friendly when I really dislike them.

Green purchase intention:

1. I make a special effort to buy recyclable products that my favorite broadcasters recommend.
2. I have switched products for ecological reasons because my favorite broadcasters recommended to.
3. When I have a choice between two equal products, I follow the suggestions of my favorite broadcasters to purchase the one less harmful to other people and the environment.
4. I follow the suggestions of my favorite broadcasters to make a special effort to buy household chemicals such as detergents and cleaning solutions that are environmentally friendly.
5. I follow the suggestions of my favorite broadcasters to avoid buying a product if it has potentially harmful environmental effects.

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