

Examining Gifting on Social Live Streaming Services: An Identity Investment Perspective

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Abstract

Social live streaming services (SLSS) is becoming popular worldwide for its real-time interaction and successful commercial model. Therefore, it is important to understand user's gifting behavior on SLSS. Yet it is not explored clearly. From an identity investment perspective, this research studies how class identity and relational identity would impact user's gifting choices (i.e., consuming amount and number). Based on the identity signaling theory, this study also explores the moderating role of social density elicited by real-time comments. The theoretical framework is tested on 232, 416 individual data collected on Douyu platform. This research contributes not only to the online gifting review literature by revealing different effects of user's multiple identities on gifting behavior, but also to identity signaling theory by identifying the moderating consequences of social density as rooted in social environments, which provides valuable implications on how to promote sales of virtual gifts on SLSS.

Keywords: Gifting, live streaming, identity, social density

Introduction

As a form of social media with streaming services, social live streaming services (SLSS) is popular nowadays for its high interactivity and entertainment. People can broadcast various content genres on SLSS, such as video games, talent shows and outside activities, while visitors can engage on SLSS through multiple ways (Li et al., 2018). Through co-viewing, SLSS enable viewers to build and participate in an impromptu community: a viewer can chat with others via comments or send gifts to his or her favorite streamer (Haimson and Tang, 2017). Twitch, one of the biggest live streaming websites worldwide, reported that there are more than 2 million unique broadcasters and more than 15 million unique daily visitors in an average month (Twitch.tv, 2017). With the wide popularity of SSSL, more platforms like YouTube Live, Periscope and Facebook Live are following up. However, it is noted that even faculties from Twitch admitted that China's live streaming market is "at another level", which grows rather aggressively in the world (Medium, 2018). According to the report from Forbes (Forbes, 2018), more than 200 million people watch on more than 200 live streaming websites in China, and it is estimated that China's live streaming revenue will hit \$4.4 billion in 2018, up 32%

from 2017. The leading live streaming website in China, Douyu, also grows rapidly and has recently been evaluated over \$2.95 billion (China Daily, 2018).

Unlike Twitch.tv where subscription is the dominant revenue stream, virtual gift is one of the most successful commercial models in China (Lu et al., 2018). Most Chinese live streaming websites support gifting service like Douyu, not only these companies can make revenues from sales of virtual gifts, but streamer who receive gifts can share a proportional income. Also, through gift-giving, viewers can provide emotional and monetary support to favorite streamers (Todd and Melancon, 2018). However, a previous study found that 20% viewers contributed 97% of all sent gifts (Tu et al., 2018). It means the majority of gifts were sent by only a small number of viewers, and the result is similar with the case of donation on Twitch (Hilvert-Bruce et al., 2018). Besides, most of givers would only send free gifts (gifts rewarded by the website without payment) instead of charged ones (Yang, & Dai, 2017). Therefore, it is necessary to understand what factors will influence viewer's gifting behavior on SLSS.

Although previous studies on online gifting pointed out the importance of one's needs for pursuing social status and relational support (Kim et al., 2012; Goode et al., 2014), none of them examined the influence of multiple identities on the online gifting behavior. In this paper, we propose that user's gifting behavior on SLSS can be influenced simultaneously by both class identity and relational identity, and it is worth to examine their separate and different effects. Besides, although many researchers begin to study gifting behavior on SLSS, theoretical studies are still needed in the area. In previous relevant literatures, some are qualitative studies that offer a sketchy look on various motivations for viewer engagement (Lu et al., 2018) or strategies used by streamer (Lee et al., 2018). Some scholars tend to examine exhaustively on lots of antecedents on viewer's gifting intention within a broad framework (Hilvert-Bruce et al., 2018; Li et al., 2018). Therefore, from a concentrated perspective, we mainly examine the impact of identity on different gift-giving behaviors, which can provide a simple but solid theoretical ground for the research problem.

Moreover, it has been found that social visibility and the characteristics of audience can impact one's gifting behavior on social media (Shmargad and Watts, 2016). Therefore, user's gifting behavior on SLSS might also be influenced by social cues from the environment. We propose that a social cue incited from the comment system can influence gifting behavior on SLSS. Although comment system was studied in video websites (Chen, Gao, & Rau, 2015; Liu, Suh, & Wagner, 2016), no works have been done on live streaming platforms yet. Here, we use the social density (the scrolling speed of comments in a channel) as a moderator to study how it can make a difference on the viewer's gift-giving behavior. In summary, we seek to answer the following questions: (1) *which dimension of self-identity affects one's gifting behavior on SLSS?* (2) *What is the moderating effect of social density on the relationship between one's identities and gifting behavior?*

Based on these gaps, we crawl 232,416 consumption data from 48 representative channels on Douyu. Due to the great distinction in practical implications, we distinguish gifting behavior (dependent variable) as two types: one is giving number of free gifts (rewarded for user's daily sign-in or watching), and the other is giving amount of charged gifts (purchased by real cash). The empirical results show that a user's class identity is positively related to his or her giving amount of charged gifts, while negatively related to one's giving number of free gifts. And a user's relationship identity has no significant influence on one's giving amount of charge gifts, but has positive impact on one's giving number of free gifts. Furthermore, our results show significant moderating effects of social density on the relationships between both identities and gifting choices. The effects of both identities are more influential to user's gifting amount and number in the context with high social density than in context with low social density.

The remainder of the paper is recognized as follows: Section 2 provides relevant literature review, including online gifting behavior, different classification of social self-identity and the introduction of social density. Section 3 presents the research model and underlying hypotheses. Section 4 describes the data collection and results of model estimations. Section 5 discusses the findings and implications of the study, and further points out the model limitations and future research directions. In the end, we present the conclusion in Section 6.

Literature review

Online Gifting

Gift-giving is a behavior that giving an object to another without expectations for a known return (Klamer, 2003). Relatively few studies have examined online gifting in the context of social network services (Kim et al., 2018) and social virtual worlds (Kim et al., 2012; Goode et al., 2014). Among these, some identified relational support and reciprocity are important factors affecting gifting decision (Kim et al., 2018). While some attributed that gifting behavior is a symbol to signal one's distinctiveness and enhance one's self-image. Goode et al. (2014) found that players can obtain higher social status through gifting in online games, and Kim et al. (2012) proposed that gifting is a way to distinct oneself from others. However, none of studies have examined the role of identity that driven both relational and uniqueness needs in online context.

With the popularity of SLSS, studies of gifting behavior on SLSS have developed rapidly in recent years. However, most of studies examined broad antecedents of gifting intention, such as Li et al. (2018) found that contextual and personal factors can affect viewer's consumption intention; Wan et al. (2017) identified that both social and technical factors would influence viewers' donation intention on Chinese YY platform; Hilvert-Bruce et al. (2018) showed that social interaction and sense of community are positively related to viewers' donation intention on Twitch. Only limited scholars examined the real gifting behavior on SLSS, such as Yu et al. (2018) found that viewer engagement is positively related to gifting decision and amount. Therefore, there is a lack of research focusing on real gifting behavior rather than intention on SLSS, and the importance of identity should be paid more attention in the online gifting research.

An identity investment perspective: class identity and relational identity

Studies in marketing domain had recognized the importance of identity in understanding consumption behavior for a long time. Previous studies proposed that consumption behaviors are outcomes of identity investment: such as building, constructing and defending one's identity (Ahuvia, 2005; Berger and Ward, 2010; Arsel and Thompson, 2011). Kleine and Kernan (1993) argued that consumers would use possessions to enact specific identity, therefore, the purchase of products would be influenced by identity considerations. What's more, consumption may be influenced by multiple identities, since individuals can have multiple social identities that differ in situations (Forehand, Deshpande, & Reed, 2002).

In a social environment where exists social referents (such as virtual communities), people tend to construct their identities through relational or social identification (Zhang et al., 2014; Pan et al., 2017). Relational identity depicts one's identity based on role relationship with group members (Andersen and Chen, 2002; Sluss and Ashforth, 2007), and social identity derived from one's membership in a social category (e.g., social class) (Tajfel and Turner, 1986). In the gifting literature, gifts can maintain and develop identity (Schwartz, 1967). Because gifts can impose an identity on both the sender and the receiver, the gifting behavior can confirm the sender's self-identity once a gift is accepted. Therefore, gifting can serve as an instrument to maintain one's social ties and relational identity (Caplow 1982). Besides, an individual tends to describe oneself based on group affiliation, and is likely to build a long-term relationship with social groups he or she identifies with (Fisher and Wakefield, 1998). Since individual can be divided into different social class based on one's wealth, education and occupation, the identification of social class would affect one's behavioral responses (Manstead, 2018). Previous studies found that the improvement of the giver's social status is an important motive, and people tend to attain or maintain social status through conspicuous consumption (Wolfinger, 1990). Therefore, class identity and relational identity should all be highlighted in the study of gifting behavior on SLSS.

Social density

Social density is the level of crowdedness in a given area, usually measured by the number of co-visitors per area size (Levav & Zhu, 2009). Since viewers in the same channel can interact with others

through comment system, it is supposed to trigger a sense of social presence for participants (Fang et al., 2018; Li et al., 2018). In a crowded room, comments would become an illegible waterfall of text which is hard for viewers to follow the conversation (Hamilton, Garretson, & Kerne, 2014). Therefore, social density on live stream should be measured by the average number of comments sent per minute in a channel. Although the impact of social density has received great attention in an offline context, studies focus on online social density are relatively insufficient (Messer, Leischnig & Distler, 2017).

Since consumption and its related symbolic needs should not be left out the social context, we have to consider the significant others in the gifting context. Based on the identity signaling theory, people often make divergent choices in order to delivery their desired identities to others (Berger and Heath, 2007; Berger et al., 2011). Therefore, the social cues from other audience can be important factors to influence one's consumption behavior. Shmargad and Watts (2016) found that the characteristics of audience on one's social network (i.e., size, type and variety) would directly affect the user's online gifting behavior, and it can also moderate the main effect of social visibility on gifting decisions. Moreover, previous findings have supported that the number of viewers is positively correlated with the spending amount of gifts in a channel (Zhu, Yang, & Dai, 2017). Therefore, we propose that social density provides a suitable perspective to indicate the significance of comment system as an important tool to enforce social influence.

Theory Development and Hypotheses

From a perspective of identity investment, this study considers two types of identities: class identity and relational identity. We propose that different identities would lead to different gifting choices. Moreover, based on the identity signaling theory, we explore the impact of social density as a social cue. We propose that the relationship between identity and gifting behavior can be moderated by social density. Figure 1 summarizes the research model, and hypotheses are presented in the following sections.

The impact of class identity on gift-giving

Social class can be conveyed by expressions of recognition and approval from others, or obtained through gift-giving (Goode et al., 2014; Park and Lee, 2011). Goode et al. (2014) found that gifting in the virtual world is positively related to future enhancements of one's social class, which provides evidence that gift-giving is motivated by the seeking of social class. Some scholars identify self-presentation as a key driver for the consumption of digital items on virtual websites (Kim, Chan & Kankanhalli, 2012), and this self-presentation motivation can be regarded as a need to distinct oneself and signal one's social class. It has been proven that an individual's need for uniqueness is positively related to one's desire for scarce and innovative products (Lynn and Harris, 1997). Since special effects of gifts with higher pricing would stay longer and are more noticeable, users with a higher class identity are likely to buy expensive gifts to show off and present oneself. Hence, we hypothesize as follows:

Hypothesis 1a: *Class identity is positively related to the giving amount of charged gifts.*

On the contrary, free gifts are popular products in the live streaming context (Zhu et al., 2017). Therefore, free gifts provide no value on uniqueness. Also, following the popular trend usually means one has no remarkable identity (Pronin et al., 2007), so giving free gifts would mean one has no respected social class. Besides, based on the identity signaling theory (Berger and Heath, 2007), giving free gifts would produce biased signal for users with a high class identity. Hence, we hypothesize as follows:

Hypothesis 1b: *Class identity is negatively related to the giving number of free gifts.*

The impact of relational identity on gift-giving

According to the definition of relational identity (Andersen and Chen, 2002), it should refer to the role of fans between a user and his or her favorite streamer in the context of SLSS. In the prior literature, fans identification is defined as the involvement and commitment of a consumer devoted to the organization (Sutton et al., 1997). It has been found that if an organization builds sustainable relationships with customers and forms their identification, then customers tend to have more supportive behaviors such as donate to the organization (Lee E M et al, 2012). Because charged gifts can better attract the intention from streamer, user with a high relational identity should be willing to buy expensive gifts to build a close tie with one's favorite streamer. The direct evidence is from Wan et al. (2017), who found that users with emotional attachment to the streamer own a higher donation intention. Hence, we hypothesize as follows:

Hypothesis 2a: Relational identity is positively related to the giving amount of charged gifts.

It is been found by Jin (2018) that fan identification will induce para-social interaction with their favorable celebrity on social media, and Hu et al. (2017) found that fan identification can positively influence viewer engagement on SLSS. Since sending free gifts is a popular way to express one's relational support, and the gifting behavior is visible to all viewers in that channel, it can be served as a public broadcast of one's admiration to the streamer (Lu et al., 2018). Thus, users with a high relational identity are tend to send more gifts to their favorite streamers. Hence, we hypothesize as follows:

Hypothesis 2b: Relational identity is positively related to the giving number of free gifts.

The moderating effects of social density on gift-giving

In a channel with a high social density, it is more likely to observe other's gift-giving behavior. Therefore, a higher social density can intense the competition among users who want to win attention from their favorite streamers, and it is likely to inspire the conspicuous consumption from fans on SLSS. Zhu et al. (2017) discovered behavioral patterns of gift senders on Douyu, and found that it is more likely for a user to send gifts when gift-giving behavior is popular in that channel. Similar result was also discovered on Inke, where Tu et al. (2018) analyzed the consumption data and found that gifting behavior can be inspired by competitiveness among viewers. Hence, we hypothesize as follows:

Hypothesis 3a: The influence of relational identity on the giving amount of charged gifts will be stronger in high social density situation than in low social density situation.

Because a higher fans identification will enhance an individual's susceptibility to be influenced by other members in a group (Ashforth & Mael, 1989), the user with a high relational identity are supposed to send more gifts when social density is high in a channel. What's more, based on the social influence theory, both types of informational and normative social influence can lead to conformity (Deutsch and Gerard, 1955; Bearden, Netemeyer, & Teel, 1989). Therefore, conformity in channels with a high social density should be stronger, and the viewer is supposed to send more gifts to obey the social norm. Hence, we hypothesize as follows:

Hypothesis 3b: The influence of relational identity on the giving number of free gifts will be stronger in high social density situation than in low social density situation.

According to the identity signaling theory (Berger et al., 2011), people with a high social class tend to signal their class identity by conspicuous consumption, and this identity signaling process can be affected by the social environment. Since the visibility of users' consumption behavior will be magnified when the social density is high (Shmargad and Watts, 2016), the overall perceived benefit from the enhancement of social image by giving conspicuous gifts should be higher, either. Therefore, in the context with a high social density, an individual with a high class identity is more likely to consume expensive gifts in a channel. Conversely, free gifts is normally connected to low class identity. From the identity investment perspective, user with a high class identity should avoid to signal wrong identities (Pronin et al., 2007), especially when the size of audience is large. Therefore,

in the context with a high social density, user with a higher class identity should send more charged gifts instead of free gifts in a channel. Hence, we hypothesize as follows:

Hypothesis 4a: *The influence of class identity on the total giving amount of charged gifts will be stronger in high social density situation than in low social density situation.*

Hypothesis 4b: *The influence of class identity on the total giving amount of free gifts will be stronger in high social density situation than in low social density situation.*

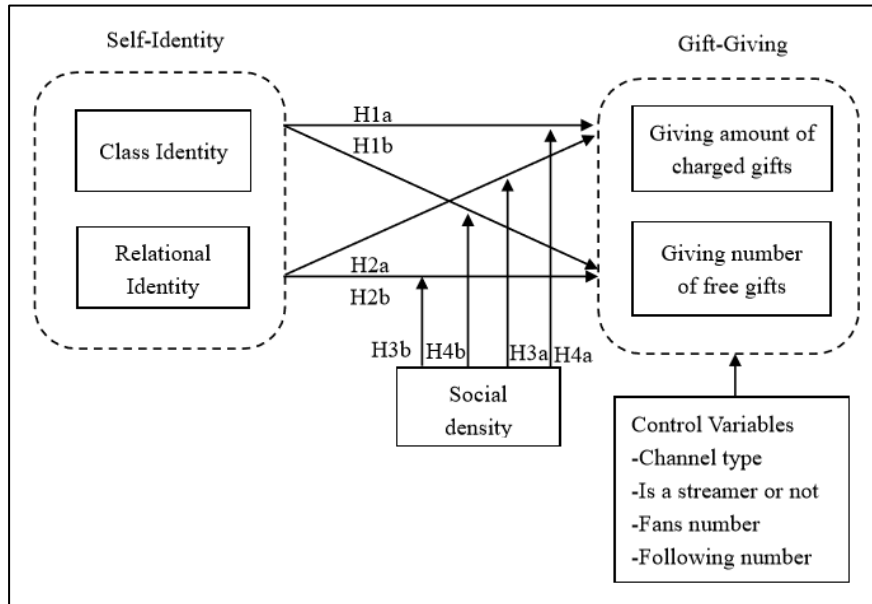


Figure 1. Research Model

Research Method

The research context

To examine hypotheses of the research model, we scrawled data on the most reputable live streaming platform in China – Douyu (www.douyu.com). By the end of 2018, there are more than 6,600 active streamers and more than 434 million active users in an average month on Douyu. Besides, there are several reasons why Douyu is particularly suitable to test our research model. First, Douyu platform is a typical live streaming website that supports gifts system. Douyu has a bountiful of virtual gifts: such as rocket, car and light stick. In general, the visual effect of a free gift (e.g., light stick) is negligible, while a charged gift (e.g., rocket, car) is more conspicuous and its effect will stay longer in a channel. Second, Douyu supports fan-badge and noble system for website users, which allows us to quantify independent variables (i.e., class identity and relational identity) in research. Third, Douyu allows user to establish their personal website, which provides rich information (e.g., social network, updated activities) for us to control more individual characteristics in the model.

Sample and data collection

Each streamer can create a live channel on Douyu, and each channel will reveal the genre type and the streamer profile at the top of the webpage (shown in Figure 2). Since different streaming genres would induce distinct patterns of gifting behavior (Zhu et al., 2015), we consider mainly two types of genres on Douyu: video games and talent shows. It is consistent with the most popular classification of streaming genres in relevant literature (Hu, Zhang & Wang, 2017). Therefore, according to each channel's broadcasting schedule during October, 2018, we select 48 channels that have broadcasted over 20 days in a month, including 23 channels on video games and 25 channels on talent shows. To ensure that our samples are representative, we cover three size of channels based on subscriptions: 1) subscriptions over 10,000, which represents newcomers 2) subscriptions over 100,000, those are up-rising stars 3) subscriptions over 1,000,000, which are the most renowned channels on Douyu.

Because users can comment and send gifts in the chat area, we scrawl all participated users in these 48 channels (including people who post comments or send gifts). In order to control individual features, we also scrawl data from each user's personal website on Douyu. Those control variables include one's following number and fans number on Douyu, as well as whether the user is a streamer or not. As a result, we collected 232, 416 individual consumption data in November, 2018. Figure 2 provides the screenshot of a live channel on Douyu.



Figure 2. An example of a live channel on Douyu.com

Variables

The dependent variable of this research is gifting behavior. Based on distinct commercial implications, we identify two types of gifting behavior: the giving amount of charged gifts and the giving number of free gifts (i.e., individual consumption data in a channel). Although giving free gifts is not directly related to consumption, it is one of the most popular ways for interaction. Besides, it can also improve the channel ranking as well as express one's support to the streamer.

The independent variables are user's class identity and relational identity. Since people with a higher social class would pay more attention on their class identity (Hu, 1944), we use the noble level as a proxy for a user's class identity. On Douyu platform, social class refers to the aristocracy system designed for the user who wants to distinguish themselves from others and desires to be recognized. The hierarchy of the aristocracy system is divided into seven types: wanderer, knight, viscount, earl, duke, king and emperor. The higher the noble rank, the more expensive the monthly membership fee. The noble levels are coded in our dataset on a scale from 0 to 7, where 0 denoting the user without a noble membership and 7 denoting the highest level (emperor). As for relational identity, we employ the level of a fan-badge as a proxy. On Douyu platform, each streamer has an exclusive title of fan-badge, and it can only be obtained through the giving of a charged gift named "Get a Card" to the targeted streamer. Once a user has obtained a fan-badge, it can be upgraded by giving more gifts (free or charged ones) to the corresponding streamer. However, since the badge system has an upper limit per day, a user with a high-level badge means one has persisted on gifting for a long time. Since relational identity is the personal identification towards a streamer (Zhang et al., 2014), it can be represented by one's fan-badge level that shows the commitment one has with the streamer.

The control variables in this paper include whether a user is a streamer or not, the following number and fans number of a user, number of updates in a user's profile website and channel type. The

channel type is coded in our dataset as a categorical variable, where 1 denotes video games and 2 denotes talent shows (e.g., singing and dancing). Table 1 provides the description of the variables in our study. Table 2 shows the descriptive statistics.

Table 1. Variable Description

Type	Variable	Description
Independent Variables	Class identity (CI)	We use noble grades (categorical variables) to measure a user's social status. The noble grades range from 0 (the lowest) to 7 (the highest).
	Relational identity (RI)	We use the level of a fan badge to measure a user's relationship with the streamer. For users without a fan badge, the value is assigned to 0.
Control Variables	Is a streamer or not (Streamer)	We use a dummy variable for whether a user is a streamer or not; yes and not are expressed as 1 and 0, respectively.
	Following number (Follow)	A user's following number on one's personal website.
	Fans number (Fans)	A user's fans number on one's personal website.
	Number of updates (Updates)	The number of updated posts from a user on his or her personal website.
	Channel type (Channel)	We use a categorical variable for channel type; video games and talent show are expressed as 1 and 2, respectively.
Moderator	Social density (SD)	The number of comments in a channel per minute.
Dependent Variables	Giving amount of charged gifts (GACG)	The total spending amount of charged gifts from a user in one channel.
	Giving number of free gifts (GNFG)	The total giving number of free gifts from a user in one channel.

Model Estimation

To test our hypotheses regarding the user's class identity, relational identity and moderating effect of social density on the gifting behavior, we employ the following empirical model. Because of the large variance in the dependent variable, moderator variable and the control variables, the model was adjusted to a natural logarithmic linear regression model, which is shown as follows:

$$\begin{aligned}
 &Ln(GACG_i) = \\
 &\alpha_0 + \alpha_1 CI_i + \alpha_2 RI_i + \alpha_3 Streamer_i + \alpha_4 Ln(Follow_i) + \alpha_5 Ln(Fans_i) + \alpha_6 Ln(Updates_i) \\
 &+ \alpha_7 Channel_i + \alpha_8 Ln(SD_i) + \alpha_9 Ln(SD_i) * CI_i + \alpha_{10} Ln(SD_i) * RI_i + \varepsilon_i
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 &Ln(GNFG_i) = \\
 &\alpha_0 + \alpha_1 CI_i + \alpha_2 RI_i + \alpha_3 Streamer_i + \alpha_4 Ln(Follow_i) + \alpha_5 Ln(Fans_i) + \alpha_6 Ln(Updates_i) \\
 &+ \alpha_7 Channel_i + \alpha_8 Ln(SD_i) + \alpha_9 Ln(SD_i) * CI_i + \alpha_{10} Ln(SD_i) * RI_i + \varepsilon_i
 \end{aligned} \tag{2}$$

Let $i=1 \dots N$ index the user. Where ε_i is the error term associated with observation i , and α_1 to α_{12} are the parameters to be estimated. The model equation (1) is when the dependent variable is the giving amount of charged gifts, and model equation (2) is when the dependent variable is the giving number of free gifts. The variable $Ln(SD) * CI$ and $Ln(SD) * RI$ are the interaction terms to model the moderating effect of social density on both identities.

Table 2. Descriptive statistics (N=232,416)

Variables	Mean	Std. deviation	Minimum	Maximum
GACG	2.24	351.69	0.00	148000.00
CNFG	6.88	17.43	0.00	2414.00
Class identity	0.11	0.42	0.00	7.00
Relational identity	2.56	3.97	0.00	30.00
Social density	378.10	507.27	3.00	1683.00
Channel type	1.19	0.39	1.00	2.00
Is a streamer or not	0.13	0.34	0.00	1.00
Fans number	196.00	18620.92	0.00	6217742.00
Following number	67.55	245.28	0.00	6022.00
Number of updates	2.73	62.86	0.00	16145.00

Results

We present our model hierarchically, we first add only control variables in the model 1, and then introduce independent variables and the interaction terms in model 2 and model 3. The adjusted R^2 in both model (1) and (2) are reasonable and among 10%-30%. Because the VIF (variance inflation factor) statistics for variables in both model (1) and (2) are smaller than 3.0, we exclude the problem of multicollinearity. Moreover, we use the robust regression model in the software of Stata, which means the significance test has applied the White's heteroscedasticity-robust standard errors. Thus, the estimation results are robust regardless of the problem of heteroscedasticity. Table 3 and Table 4 present the results of the robust linear regression.

Table 3. Parameter estimates when DV=lnGACG (N=232,416)

Variables	Model 1 (control)	Model 2 (independent)	Model 3 (total)
Constant	0.246***(0.005)	0.219***(0.005)	-0.567***(0.008)
Channel	-0.055***(0.003)	-0.060***(0.003)	0.100***(0.003)
Streamer	0.004(0.004)	0.022***(0.004)	0.016***(0.003)
Ln(Fans)	0.037***(0.002)	-0.007***(0.001)	0.005***(0.001)
Ln(Follow)	-0.026***(0.001)	-0.021***(0.001)	-0.009***(0.001)
Ln(Updates)	0.024***(0.002)	-0.000(0.002)	-0.005***(0.002)
CI		0.333***(0.008)	0.327***(0.008)
RI		0.010***(0.0004)	-0.0001(0.0004)
Ln(SD)			0.111***(0.001)
Ln(SD)*CI			0.065***(0.004)
Ln(SD)*RI			0.004***(0.0004)
Adjusted R-squared	1.03%	8.01%	14.96%
F	261.73***	498.15***	1227.45***

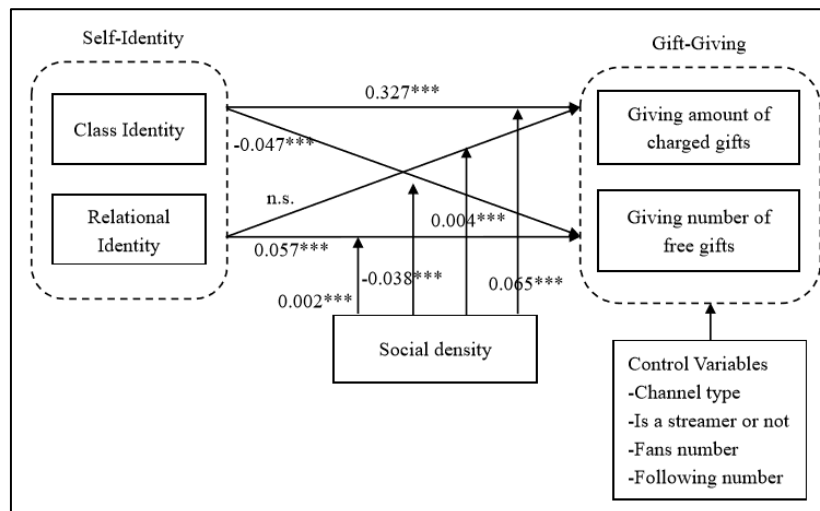
***p<0.001, **p<0.01, *p<0.05 (Robust standard errors in parentheses)

Table 4. Parameter estimates when DV=lnGNFG (N=232,416)

Variables	Model 1 (control)	Model 2 (independent)	Model 3 (total)
Constant	0.613***(0.004)	0.322***(0.004)	-0.163***(0.007)
Channel	-0.219***(0.002)	-0.090***(0.002)	-0.001(0.003)
Streamer	-0.011**(0.003)	0.018***(0.003)	0.016***(0.003)
Ln(Fans)	-0.011***(0.001)	-0.011***(0.001)	-0.006***(0.001)
Ln(Follow)	-0.006***(0.001)	-0.005***(0.001)	0.004***(0.001)
Ln(Updates)	-0.004*(0.002)	-0.022***(0.002)	-0.026***(0.002)
CI		-0.026***(0.004)	-0.047***(0.004)
RI		0.062***(0.0004)	0.057***(0.0004)
Ln(SD)			0.070***(0.001)
Ln(SD)*CI			-0.038***(0.002)
Ln(SD)*RI			0.002***(0.0003)
Adjusted R-squared	2.58%	23.03%	25.29%
F	1756.66***	5631.27***	4962.25***

***p<0.001, **p<0.01, *p<0.05 (Robust standard errors in parentheses)

Hypothesis 1a posits that class identity has positive impact on giving amount of charged gifts, while hypothesis 1b posits it has negative impact on giving number of free gifts. Results show that both H1a and H1b are supported with significant at $p<0.001$. Hypothesis 2a/b posits that relational identity has positive impacts on both gifting behaviors, results show that H2b is supported ($\alpha_2 = 0.057$, $p<0.001$) while H2a is not. Therefore, user's relational identity is positively related to the giving number of free gifts but is not significant on the giving amount of charged gifts.

**Figure 3. Hypothesis testing results**

Moreover, according to interaction terms ($p<0.001$), H3a/b and H4a/b are all significant ($p<0.001$) and supported. The results indicate that social density positively moderates the main effects of both identities. The effect of the class identity on gifting amount and number under a high social density context is strong than in the environment with a low social density. And the effect of relational identity shows similar results.

Discussion and Implications

Discussion

The gifting behavior in the live streaming context can be driven by different motives and needs. Among which needs for recognition and needs for relational support are rather prominent, and both needs can be derived different self-identities. In the live streaming context, attitudes and interests shared by streamer will attract similar viewers to join the channel (Hamilton, Garretson, & Kerne, 2014). Although the relational identity has been studied on SLSS to explore the viewer's different engagement behaviors (Wan et al, 2017; Hu et al., 2017; Lu et al., 2018), none of research have examine the impact of relational identity on gifting behavior. Similarly, although class identity plays an important role on user's consumption behavior, it still lacks the examination in the online gifting context. Therefore, our research fill the gaps in previous studies on identity and consumption behavior.

In this paper, we investigate the effects of user's class identity, relation identity and social density of the social environments on one's gifting behavior. We hypothesize that, in the context of SLSS, a user's class identity and relation identity positively affect user's giving amount of charged gifts, but class identity is negatively related to user's giving number of free gifts. Moreover, social density will moderate the relationship between the user identity and consumption. Using objective consumption data collected from a live streaming website, we built an empirical model to test our hypothesis. The result suggests that user with a higher relational identity would show emotional supports to favorite streamer, while they will not consume more charged gifts unless the channel is in a high social density. It may be the reason that user with a high relational identity will visit the channel regularly, so they have already build a close relationship with the streamer. Therefore, they have no need to struggle for attention from the streamer when the size of audience is small. Moreover, we also found that user's class identity significantly influence one's consumption of charged gifts no matter with the conditions of social density. A user with a high class identity always tend to maintain one's self-image and distinguish oneself from others in the social environment.

Theoretical and Practical Implications

Our research reveals several theoretical implications. Firstly, current studies that use objective data from a real live streaming platform are limited. Since gifting behavior is highly related to the context, it should be regarded as impulse buying and can only be captured by real-time data. Second, we propose an integrated perspective from self-identity to study the gifting behavior on SLSS, which identifies two types of the most prominent identities that impact the gifting choices. Thirdly, we explore the role of social density incited by the comment system, and we find that it can moderate the relationship between identity and gifting behavior. The finding contributes to the identity investment related theories (e.g., identity signaling theory) by examining the impact of social cues from others on the consumption behavior. Our research collect the real-time consumption data from Douyu, and we further distinguish the difference between the buying number of free gifts and the buying amount of charged gifts. Therefore, our research contributes not only to the studies on online gifting behavior, but also imply useful practical implications to the platform operator.

The findings from this study highlight several important practical implications for business operator on SLSS. Firstly, the gifting behavior on SLSS is the outcome of different needs driven by multiple identities. That user have both self-presentation motives and motivation to establish social support, which would bring about different consumption behavior. Therefore, based on the value of symbol consumption, operator can redesign the symbolic meaning of virtual gifts, such as combine emotional value and social value of gifts to promote the sales. Another implication is that because social density was identified as a significant factor that would positively influence a user's gifts consumption, it is important for the platform operator to encourage users actively engage in a channel.

Limitations and future research directions

The results of our study should be interpreted carefully with the regard of limitations. First, the results are based only on the data collected from Douyu website, it is not generalized for online gifting

behavior in other countries or cultures. Therefore, more research must be done to test the validity of our findings in other live streaming platforms. Secondly, there is a difference between the objective social class and the subjective social class (Jackman and Jackman, 1973). However, we can only measure the objective class identity from the noble levels in the study. Further research can combine the online and offline data, which can better verify the robustness of the results. Thirdly, we only explore the role of social density in the context of live streaming, while future study can explore the influence of more social cues from the environment.

Conclusion

This study analyzes the role of self-identity and social density on one's gifting behavior in the context of SLSS. Our results suggest that class identity and relational identity would induce different influences on one's gifting choices. In addition, we find that social density moderates the relationship between user's identities and the gifting behavior. Our study contributes to the existing theories of identity and online gifting relationships by analyzing the moderation effect of social density. Besides the theoretical contributions, this paper also provide practical implications to the business operator for SLSS. Our results indicate that the SLSS can design the symbolic meanings combined with different needs driven by multiple identities. Also, since a high social density will induce more gifting amount and number, the operator should also encourage users to actively engage in a channel. Overall, this paper offers valuable guidelines for online live streaming practitioners to improve their sales performance.

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