# Understanding the impact of social distance on users' broadcasting intention on live streaming platforms: A lens of the challenge-hindrance stress perspective

Fei Zhou[a,*], Liangyong Chen[a], Qiulai Su[b]

[a] College of Business Administration, National Huaqiao University, China
[b] Quanzhou Normal University, China

## ARTICLE INFO

## ABSTRACT

The present study addresses the popularity of 'social media influencer' (SMIs) by examining the effect of users' perceived social distance from SMIs on their broadcasting intention on social live streaming platforms. Drawing on motivational factors related to social distance and applying Cognitive Transactional Theory as a theoretical lens, our empirical analysis is based on 657 broadcasters on the market-leading social live streaming platforms in China. This study reached the following findings: Users' social distance from SMIs is positively related to their broadcast intention. Challenge stressors and hindrance stressors have different mediating effects between social distance and broadcast intention. Challenge stressors positively mediate the relationship between social distance and broadcast intention, and hindrance stressors negatively mediate the relationship between these two variables. Users' material values moderate the relationship between hindrance stressors and broadcast intention. These conclusions extend the understanding of the theoretical motivation behind the booming phenomenon of 'SMIs' and can help platform managers to motivate users' continued participation on these platforms.

## 1. Introduction

As a new internet trend, live video streaming with high interactivity to meet the needs of consumers by presenting all current real-time situations to end users through Internet media have gained great popularity (Zhao et al., 2018). Such platforms (Twitch, YouNow and Periscope) allow users to broadcast their screens or to synchronously present videos to viewers (Hamilton et al., 2014). Not only that, the dominant social media such as YouTube and Facebook also incorporated live-streaming services to attract more users' participation and engagement (Hilvert-Bruce et al., 2018). Live streaming platforms has many advantages, such as high interactivity, strong sense of involvement, satisfaction of snooping on privacy and novelty seeking, etc (Yu et al., 2018). Meanwhile, the live content has entertainment value and high stickiness, such as text-based chatrooms or the ability to display encouragement by sending likes or even virtual gifts (Bründl and Hess, 2016). Due to these incentives and identification, increasing numbers of internet users are immersed in live video watching and broadcasting (Hu et al., 2017).

As a representation of participatory community, live streaming platforms encourage users to engage in shared activities (Chen and Lin, 2018). Ordinary users and 'micro-celebrities' are the two main actors on live streaming platforms. Users who broadcast various contents on live streaming platforms and attract enormous numbers of fans are called 'micro-celebrities' (Marwick and boyd, 2011).

---

This new type of celebrity either has special skills or really attractive appearance, and it has gained a huge attention of fans on social media (Marwick, 2015). These new type of independent third party endorser who shape audience attitudes through blogs, tweets, and the use of other social media are also defined as social media influencers (Freberg et al., 2011, p.90). Chae (2018) contended that the concept of "SMIs" and "micro- celebrities" almost has same meaning to stress on attracting and maintaining many followers on social media. In this research, we consider the concept of "social media influencers" (SMIs) and "micro-celebrities" are different labels to depict the similarity persons, both are refer to whose success depends on self-branding and practices of micro-celebrity, has proven to be both inspirational and seemingly replicable (Khamis et al., 2017). These 'SMIs' may include unknown actors/actresses, experts of trivia and wealthy people who want to show off their luxury to attractive young women (Marwick, 2015). Some scholars consider the self-branding of these 'SMIs' is the crucial factor that shapes their followers' interest (Marwick, 2013). Compared with traditional celebrities, SMIs have much smaller number of followers and are not well recognized in real life, but they mostly endorse via social media and have online influence on fans (Senft, 2008; Marwick and boyd, 2011). That is to say, SMIs are individuals who use social media as a mechanism for creating their audience while celebrities pay much less attention on using social media (Marwick and boyd, 2011). However, limited studies have shed light on the formation and behavior of SMIs (Zhao et al., 2018; Hilvert-Bruce et al., 2018). Because this phenomenon is recent, broadcasts on live streaming platforms have not yet been quantitatively examined. We suggest that the role of 'SMIs' is different from that of ordinary users on live streaming platforms and that perceived social distance determines the effect of this difference.

Social distance is a key characteristic of dyadic relationships that captures the distance between people (Dickson and MacLachlan, 1990; Karakayali, 2009). A prevailing theoretical view of social distance focuses on affectivity, which centers on the feelings or emotions of individuals toward one another (Bogardus, 1947). Accordingly, in this study, we conceptualize social distance as affective distance, or the amount of sympathy a person feels for another person in a relationship. The first question of our study tries to answer is that does social distance perception motivate users to become SMIs on social live streaming platforms? This study argued that the perception of social distance from 'SMIs' motivates the users of live streaming platforms to accept the broadcasting task and to participate in the activity of live broadcasting.

According to Cavanaugh et al. (2000), job characteristics themselves determinate the extent of engagement of job. LePine et al. (2005) proposed the concept of the challenge-hindrance stress model, which provides a novel perspective to understand the mechanism by which people engage in specific organizational activities. The present research argued that broadcast willingness of users on live video streaming depends on how they view the match degree of task difficulties and their capability (Zhao et al., 2018). Facing the challenge, they could look on the bright side of the task and view challenge stressors as motivation, and they also view hindrance pressure as an excuses (González-Morales and Neves, 2015). In the current study, we aim to close the existing research gap by examining the driving factors behind the intention to broadcast on social live streaming platforms. This leads to our study's second research questions: What is the role of perceived stressors and material values in users' participation in the broadcasting process?

This study may have three contributions: First, from the novel perspective of social distance, the present study addresses the question how to motivate users' to be SMIs on live streaming platforms? Our conclusions suggest that the interpersonal 'tie strength' with 'SMIs' may be the pivotal antecedent of live streaming platform participation (Sheldon and Bryant, 2016). Second, the present study introduces the challenge-hindrance stress model (Cavanaugh et al., 2000) to explain the mediating effect between social distance and broadcasting intention and extends the explanation of the challenge-hindrance stress model for users' behavior. Third, this study considers the moderating effect of individual differences on material values, which extends the boundaries of research on users' challenge-hindrance stress in relation to broadcasting intention.

## 2. Theoretical background and hypotheses

Dyadic interpersonal social relationships involve affectivity (Hong et al., 2016). According to this approach, social distance may be related to affective distance or the amount of sympathy a person feels for another person within a social relationship (Bogardus, 1947). Social distance can also be conceptualized by interactive distance (tie strength) because social distance focuses on the nature of the relationship, whereas tie strength focuses on the frequency of interactions (Karakayali, 2009). We propose that the popularity of 'SMIs' can be explained by the theory of social distance.

Lazarus & Folkman (1984)'s Cognitive Transactional Theory is used as a theoretical framework to understand the mechanism by which people engage in a specific organization activity. Through the process of cognitive appraisal and coping, individuals' responses to stressors influence performance (Clarke, 2012). The challenge-hindrance stress model is introduced to explain the mediating effect between social distance and users' broadcasting intention on live streaming platforms. The research model of this study is shown in Fig. 1.

Although online communities are interactive in general, the major characteristic of live streaming platforms is that they take the
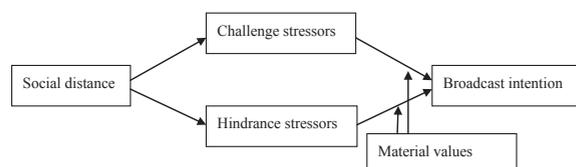


**Fig. 1.** Research framework.

form of humorous banter and light-hearted conversation in addition to play or video watching (Bründl and Hess, 2016). Thus, the fans are devoted; unlike fans of movie stars and top musicians, these fans receive considerable access to their favorite micro-celebrity (Marwick and boyd, 2011). In other words, fans feel that their social distance is close to the 'micro-celebrity' with whom they interact. Two individuals within a small social distance share many similar experiences, common interests, and know each other well (Johar, 2005). By contrast, in the context of large social distance with less affectivity, users tend to hesitate in interacting with those they do not know well (Kujath, 2011). Therefore, this article addresses the above question from the perspective of social distance and proposes the following hypothesis:

**H1.** Users' perceived social distance from 'micro-celebrity' is positively related to their broadcast intention.

Existing literatures have classified stress as challenging pressure and hindrance pressure, the former view stress as an opportunity to learn and personal growth, and the latter view stress as an obstacles to achieving and achieving individual goals (Cavanaugh et al., 2000; LePine et al., 2004). Empirical studies had supported this distinction, challenging stressors are positively linked to higher satisfaction and positive emotions (Webster et al., 2010), higher involvement (Podsakoff et al., 2007; Lin et al., 2014) and incremental learning (LePine et al., 2004). In this study, users become broadcasters who face subjective pressure, such as long live broadcast times and the insufficiency of their own talents, and objective pressure, such as unclear rules on live broadcast platforms and cumbersome procedures. At the same time, internet users can choose an appropriate micro-celebrity based on their interests and hobbies, which increases the social closeness and trust relationship between them and can effectively relieve the pressure of internet users becoming broadcasters. Previous research has indicated that the key to stress arises from the individual's cognitive assessment of contextual stimuli (Sulsky and Smith, 2007). If users recognize that they will achieve success after overcoming pressure, they will adopt a positive strategy to develop challenge stressors. In contrast, users who recognize that this pressure will not produce any interest will adopt a negative strategy to develop hindrance stressors (Cavanaugh et al., 2000). This study hypothesizes that closer social distance between users and SMIs helps to ease the pressure of users becoming broadcasters and reduces users' perception of hindrance stressors. This article proposes the following hypotheses:

**H2a.** Users' perceived social distance from 'SMIs' is positively related to their perceived challenge stressors

**H2b.** Users' perceived social distance from 'SMIs' is negatively related to their hindrance stressors

The theoretical lens of the challenge-hindrance stress model (Cavanaugh et al., 2000) is used to examine the stressors perceived during users' broadcasting progress. Some researchers have proposed that stressors can be differentiated by their effect on performance, including positive stressors (eustress) and negative stressors (distress) (Selye, 1976). Challenge stressors are positive related to a sense of achievement, which leads to high job performance (Prem et al., 2017). On the contrary, hindrance stressors offer less opportunity for such gains and are associated with negative work. Cognitive transactional theory (Lazarus and Folkman, 1984) emphasized that individuals' appraisal of the environment as potentially promoting opportunity or potentially constraining factors will change with variation in environmental and individual interactions (Sulsky and Smith, 2007). If employees make challenging assessments, they may experience positive or challenging stress; if employees make obstructive evaluations, they may experience negative or hindrance pressure (González-Morales and Neves, 2015). In this study, if internet users consider the various pressures faced by the live broadcast as challenging pressure, it is expected that they will obtain certain benefits and rewards in the future, reduce negative attitudes and strategies, and adopt more positive attitudes and strategies. Therefore, this article proposes the following hypotheses:

**H3a.** Users perceive challenge stressors as positively related to their broadcast intention.

**H3b.** Users perceive hindrance stressors as negatively related to their broadcast intention.

Values play a crucial role in the process of individuals' cognition and coping behavior, which determinates the goals and lifestyles people choose and the emotions they experience (Dittmar, 1992). We also consider the moderation effect of material value between stressors and broadcast intention. As Richins and Dawson (1992) proposed that materialism is an important variable to promote understanding of consumer behavior, because materialism is positive related to direct possession-related behavior. Material values have been defined as "an orientation which people view material and money are highly valued as goals in life" (Ward and Wackman, 1971). A more highly materialistic consumer is more likely to be acquisitive, to show off to others, and to be obsessed with self-indulgent purchasing behavior (Lertwannawit and Mandhachitara, 2012). Xu (2008) also found that materialism is positive related to public self-consciousness. Based on her research, self-discrepancy theory was used to underline the mechanism that drives consumers to use broadcasting on live streaming platforms. When individuals hold and cling to the belief that acquisition and involvement are important to their personal happiness and identity construction, they will adopt the right communication strategy that allows possessions to serve as a way to manage impressions (Hurst et al., 2013). Therefore, the following hypotheses were proposed:

**H4a.** The material values of users moderate the relationship between their perceived challenge stress and broadcast intention.

**H4b.** The material values of users moderate the relationship between their perceived hindrance stress and broadcast intention.

## 3. Methods

### 3.1. Data collection and sample characteristics

To test our proposed hypotheses empirically, an online survey of live video streaming platform broadcasters was conducted in China. This paper chosen Douyu TV and YY Live as research object, represent of video game-dominated and talent show-dominated platforms, respectively. Douyu TV is the most well-known Chinese live video game streaming platform and its daily active users reach more than 12 million in 2016. The characteristic of YYLive is that the creativity and special talent of user-generated content video and has attracted more than 140 million monthly active users. Eligible participants for our survey were only individuals who had broadcasted at least once on one of the two platforms.

The survey was conducted from March 1 to May 27, 2017. With the help of two platforms' managers, short messages function of live broadcast platform was used to communicate with users. Users of Douyu TV and YY Live on these two platforms were recruited according to their actual experiences (they must have attempted broadcasting at least once) and were required to finish website link of questionnaire. About 42,000 micro-celebrities in their rooms show talent and skill of different themes on live streaming platforms every day on Douyu TV and YY Live. About 500 other users in these rooms were randomly selected to send "private" messages on questionnaire on these two platforms. To encourage investigation, the number of items is limited and all respondents were compensated 5 RMB for virtual goods of platforms. One thousand questionnaires were issued, and the respondents will be reminded to fill out at least 3 times. 343 invalid questionnaires were excluded because their response time was too short or due to incomplete answers. Thus, we received 657 valid questionnaires. We did the T-test and found there is no significant difference in usage time and willingness to participate between two platforms. We also compared the first quarter with the last quarter of the questionnaire and the difference is still not significant. With regard to gender, 62.7% of the respondents were female, while 37.3% were male. Most of the respondents were aged 20 to 29 years old (56%), 18.3% were under 20 years old, 14.9% were 30 to 39 years old, and 10.8% were above 50 years old. In terms of occupation, most of the respondents were students (66.1%), service employees (12%), manufacturing employees (7%) and other (14.9%). Regarding the internet experience of the respondents, most had more than 5 years of internet experience (77.9%), 7.3% had 3 to 4 years of experience, 5.8% had 1 to 2 years of experience, and 9% had other experience.

### 3.2. Measures

The scale of questionnaire was constructed based on prior research. The scale of social distance was adapted from Bogardus (1947), who used 7 items to measure social relations with different degrees of closeness. His scale was a cumulative scale, which we modified into a Likert-type scale and changed the expression of the items according to the research situation, the questions of representatives such as "I would want the 'social media influencers' to be my close friend". In our study, the Cronbach's alpha coefficient was 0.888. The scale of challenge and hindrance stressors adopted the research items of Cavanaugh et al. (2000), 5 items of challenge stressors and representing items are "My supervisor and I always share thoughts, opinions, and feelings toward work and life". Hindrance stressors were measured with 5 items, and representing items are "The inability to clearly understand what is expected of me on live streaming platforms", "The amount of red tape I need to go through to get my broadcast done", with a reliability of 0.930 and 0.918 respectively. The measurement of material value came from Richins and Dawson (1992) and included 10 items, and representing items are "I prefer to spend time shopping instead of doing other things", "The only job I want is one that earns a lot of money". In Richins and Dawson (1992), the Cronbach's alpha coefficient of material value was 0.87. In this study, the Cronbach's alpha coefficient was 0.926. Broadcast intention came from the research of Chen and Lin (2018) and their Cronbach's alpha coefficient was 0.836. The representation of questions is "I would like to broadcast something and to be a 'micro-celebrity'", with a reliability of 0.917. All variables were measured using a 7-point Likert scale.

Given that the collected data originated from the same subject, there may be theoretical variation in common method bias (CMV). This study used Harman's single-factor test to test the CMV of the data and put all measurement items of the study construct into SPSS 23.0 statistical analysis software for exploratory factor analysis (EFA). We found that the first factor explained variance at a rate of 28.563%, which was lower than the reference standard of 50%, indicating that a single factor did not account for most of the variance and that the CMV of the data method was largely controlled.

## 4. Results

### 4.1. Correlation analysis

A descriptive statistical analysis and correlation matrix analysis of the important research variables are presented in this paper. The results of correlation analysis are shown in Table 1. The coefficients are in the range of 0.3–0.8, and correlated at the 0.01 level (bilateral), indicating that correlation between the variables is significant.

### 4.2. Reliability and validity

The Cronbach's $\alpha$ coefficient (CA) and composite reliability value (CR) was used to evaluate the internal consistency of the variables. As mentioned above, the Cronbach's $\alpha$ of each variable in our study is greater than 0.7. The composite reliability value (CR) for each variable in this study was also above the recommended level of 0.7, which suggests that the reliability of this study is good.

ARTICLE IN PRESS

F. Zhou, et al.                                                                                    Telematics and Informatics xxx (xxxx) xxx–xxx

**Table 1**
Descriptive statistics and Pearson correlation analysis.

| Variables | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1 social distance | 0.733 | | | | |
| 2 challenge stressors | 0.499** | 0.829 | | | |
| 3 hindrance stressors | − 0.267** | − 0.445** | 0.869 | | |
| 4 material values | 0.731** | 0.523** | − 0.357** | 0.709 | |
| 5 broadcast intention | 0.774** | 0.560** | − 0.344 | 0.753** | 0.728 |
| M | 3.379 | 3.268 | 3.113 | 3.356 | 3.275 |
| SD | 0.919 | 1.059 | 1.191 | 0.948 | 1.228 |

*Note:* "**"means P < 0.01; "*": P < 0.05; the figure of diagonal mean root mean square (RMS).

The CA value of each variable and the CR value are shown in Table 2.

In terms of validity, the scale of this study comes from prior research, so it has good content validity. The load coefficients of all items in this study are greater than 0.5, and the average variance extracted (AVE) value of each variable in this study is also greater than the suggested value of 0.5, suggesting that the scale of this study has high convergent validity. Moreover, this study compared the root mean square (RMS) and correlation coefficients to test the discriminant validity of each variable. Table 1 shows that the RMS of each variable was significantly greater than the correlation coefficient. In sum, the reliability and validity of this study are good.

### 4.3. Hierarchical regression analysis

This study selected hierarchical regression analysis to empirically test the hypotheses. First, we centralized the construct of challenge stressors, hindrance stressors and materialist values and constructed interactive items of challenge stressors, hindrance stressors, and materialist values. A number of regression equations were subsequently constructed for concrete analysis. The regression results are shown in Table 3. Model 4 shows that social distance is positive related to willingness to broadcast on the Internet. Thus, Hypothesis 1 (H1) got supported. From model 1, we can see that social distance has a significant positive impact on challenging stressors; thus, Hypothesis 2a (H2a) is supported. From model 2, it can be seen that social distance has a significant negative impact on hindrance stressors; thus, Hypothesis 2b (H2b) is supported. Model 5 and model 6 show that challenging stressors impact on broadcast intention significantly, while the effect of hindrance stressors on broadcast intention is not significant. Thus,

**Table 2**
Factor loading, Composite Reliability and Cronbach's Alpha.

| Variable | Item | Factor loadings | CA | CR | AVE |
|---|---|---|---|---|---|
| *Social distance* | I would want the 'social media influencers' to be a close kin by marriage. | 0.670 | 0.888 | 0.890 | 0.538 |
| | I would want the 'social media influencers' to be my close friend. | 0.722 | | | |
| | I would want the 'social media influencers' to be my neighbor. | 0.800 | | | |
| | I would want the 'social media influencers' to be my work group member. | 0.780 | | | |
| | I would want the 'social media influencers' to be a speaking acquaintance only. | 0.656 | | | |
| | I would want the 'social media influencers' to be visitor to my country only. | 0.761 | | | |
| | I would want the 'social media influencers' to be excluded from my country. | 0.733 | | | |
| *Challenge stressors* | The number of projects or assignments I have on live streaming platforms makes me feel pressure. | 0.866 | 0.930 | 0.917 | 0.688 |
| | The amount of time I spend on live streaming platforms makes me feel pressure. | 0.790 | | | |
| | The volume of work that must be accomplished on live streaming platforms makes me feel pressure. | 0.840 | | | |
| | The amount of responsibility I have on live streaming platforms makes me feel pressure. | 0.831 | | | |
| | The scope of responsibility that being one of social media influencers entails make me feel pressure. | 0.819 | | | |
| *Hindrance stressors* | The degree to which rules rather than performance affects live streaming. | 0.852 | 0.918 | 0.926 | 0.756 |
| | The inability to clearly understand what is expected of me on live streaming platforms. | 0.892 | | | |
| | The amount of red tape I need to go through to get my broadcast done. | 0.866 | | | |
| | The lack of job security I have as a broadcaster. | 0.871 | | | |
| *Material values* | I prefer to spend time shopping instead of doing other things. | 0.637 | 0.926 | 0.910 | 0.503 |
| | I will be happier when I have more money to own more products. | 0.671 | | | |
| | I am happy when I think of all the things I have. | 0.749 | | | |
| | I enjoy shopping. | 0.728 | | | |
| | I like to buy things my friends have. | 0.765 | | | |
| | As you get older, the more wealth you have, the more happiness you have. | 0.703 | | | |
| | If I had very few snacks, I wouldn't be willing to share them with others. | 0.637 | | | |
| | I prefer to buy something relatively expensive. | 0.689 | | | |
| | I like to play special games or dress in special clothes. | 0.737 | | | |
| | The only job I want is one that earns a lot of money. | 0.763 | | | |
| *Broadcast intention* | Social media influencers are very attractive to me. | 0.792 | 0.917 | 0.771 | 0.530 |
| | I would like to broadcast something and to be one of social media influencers. | 0.751 | | | |
| | I would like to recommend that my friends broadcast on live streaming platforms. | 0.632 | | | |

**Table 3**

Regression analysis of social distance and perceived stressors on broadcast intention.

| IV | CS | HS | Broadcast intention | | | | | |
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|---|---|---|---|---|---|---|---|---|
| Gender | 0.057 | −0.130 | 0.073 | −0.078 | −0.092 | 0.014 | −0.061 | −0.003 |
| Income | −0.211 | 0.184 | −0.073 | −0.069 | 0.040 | −0.011 | 0.026 | −0.013 |
| Internet experi | 0.005 | 0.044 | −0.052 | −0.083 | −0.065 | −0.041 | −0.037 | −0.054 |
| Social distance | 0.488*** | −0.246** | | 0.796*** | 0.389*** | 0.760*** | 0.522*** | |
| CS | | | | | 0.538*** | | | |
| HS | | | | | | −0.146*** | | −0.387*** |
| Material values | | | | | | | 0.023* | 0.017 |
| CS*MV | | | | | | | 0.066 | |
| HS*MV | | | | | | | | 0.280*** |
| $R^2$ | 0.796 | 0.124 | 0.013 | 0.622 | 0.682 | 0.120 | 0.120 | 0.196 |
| F | 15.549 | 5.236 | 0.677 | 60.887 | 79.396 | 5.050** | 5.050 | 7.153 |

*Notes:* P < 0.1, *p < 0.05, **p < 0.01, ***p < 0.001; CS means challenge stressors, HS means hindrance stressors, MV means material values.

Hypothesis 3a (H3a) and Hypothesis 3b (H3b) are supported.

From model 7 and model 8, it can be seen that the moderation of materialistic values on the relationship between challenging stressors and broadcast intention is not significant (p > 0.1), but the moderating effect between hindrance stressors and broadcast intention is established (p < 0.001). Hypothesis 4b (H4b) is supported, but Hypothesis 4a (H4a) is not supported. In summary, with the exception of Hypothesis 4a (H4a), which is not supported by the data, the other research hypotheses in the paper are supported by the data and passed the empirical tests.

### 4.4. Mediation effect analysis

Bootstrap method was used to test the mediating effects of challenge stressors and hindrance stressors between social distance perception and broadcast intention with Mplus 7.0. First, the mediation effect of challenge stressors was tested. By iterating 2000 times, the indirect effects of the social distance on the broadcast intention through challenge stressors were significant at the 95% CI (L −0.1934, U 0.0213, including 0). The direct effect of social distance on the broadcast intention is significant (β = 0.1385, SE = 0.0785, p = 0.009). That is to say, challenge stressors, partially mediated the relationship between social distance perception and broadcast intention. Second, the mediating effect of hindrance stressors was tested. The indirect effects of the social distance on the broadcast intention through hindrance stressors were significant at the 95% CI (L −0.1914, U 0.0184, including 0). And the direct effect of social distance on the broadcast intention is significant (β = 0.2312, SE = 0.0918, p = 0.003). Thus, hindrance stressors also play as a partially mediating variable between social distance and broadcast intention.

## 5. Conclusions, implications and future lines

### 5.1. Conclusions and discussions

With the feature of real-time interaction, be entertaining, ornamental value, live streaming platforms reached widely engagement of fans (Yu et al., 2018). However, the driving factors of broadcast behavior on social live streaming platforms have been underexplored. It is interesting to examine why an increasing number of internet users in mainland China have attempted social network video broadcasting to become SMIs. This study attempts to explain this phenomenon from the perspective of social distance and perceived stress. Based on Cognitive Transactional Theory, the research model of the present study was constructed, and survey data were collected from users of representative live broadcast platforms in mainland China. The data of users of live broadcast platforms were tested empirically to obtain the conclusions of this paper.

First, users' perceived social distance from 'SMIs' was positively related to their broadcast intention. The development of internet technology has increased the channels for interactive communication between users and 'SMIs', and frequent interactive communication has brought users and 'SMIs' closer in perceived social distance. Studies of consumer behavior confirmed that individuals with closer social distance are more persuasive in product evaluation and word-of-mouth information than individuals who are farther apart in social distance (Hernandez-Ortega et al., 2017). Therefore, users perceive that close social distance to SMIs would promote the user's evaluation of their favorite micro-celebrities and provide an important force that drives the user to perform online video broadcasts.

Second, users' perceived social distance from 'SMIs' is positively related to their perceived challenge stressors, but it is negatively related to their hindrance stressors. The closer the social distance between users and SMIs, the closer and more trusting the relationship between them, which can effectively alleviate users' pressure to become SMIs and encourage them to adopt more positive strategies to form challenge stressors rather than hindrance stressors.

Third, users perceive challenge stressors to be positively related to their broadcast intention, but they perceive hindrance stressors

to be negatively related to their broadcast intention. Users who wish to become SMIs through broadcasts experience various pressures, such as pressure from time, personal aspects of the family, the platform of the network and future competitors. An individual's cognitive evaluation of contextual stimuli is the key to stress (Sulsky & Smith, 2007). Users who perceive challenge stressors will develop the perception that they will achieve success after overcoming stress and will adopt a positive coping strategy. On the contrary, users who perceive hindrance stressors will develop pressures that produce no cognitive benefit and will adopt negative coping strategies (LePine et al., 2005). Therefore, different perceived cognitions of internet users have different correlations with their live broadcast intention.

Fourth, the moderating effect of users' material values between their perceived challenge stressors and broadcast intention was not established, but the moderating effect between their perceived hindrance stressors and broadcast intention was significant. The possible reasons may be as follows. Similar to González-Morales and Neves' (2015) conclusion that challenge stressors" are not always positively linked with performance but are positively related only when these stresses are deemed as opportunities. In this study, users' perceptions of challenge stressors may not consider broadcasting as an 'internet celebrity' to be an opportunity for self-identity. Compared with users without explicit materialism, users with high materialist values care less about spiritual pursuit and satisfaction. The users with high materialist values are more inclined to show off their possessions to create personal identity (Dittmar, 1992). Thus, users with high materialist values will not waste their efforts to broadcast behavior that does not produce personal identity when they consider the task of live broadcast could not helps too much personal identity construction. On the contrary, internet users who perceive hindrance stressors believe that pressure will not produce any benefit and adopt a negative strategy; thus, they may not develop a live broadcast to become SMIs to reach a desirable status. Users with low materialist values do not seek material compensation from participation in live streaming platforms, which is likely to inhibit their motivation. Thus, materialist values do not moderate the relationship between perceived challenge stressors and broadcast intention.

### 5.2. Managerial implications

The research conclusions of this study suggest that to attract internet users to become broadcasters and SMIs, live streaming platforms can make various attempts. First, users' perceived social distance from SMIs will directly positively affect their broadcast intention. Therefore, on the one hand, platforms need to create and establish the identity tags of broadcaster or SMIs to enhance users' sense of identity with the internet celebrity. On the other hand, broadcast platforms should promote SMIs through various channels to close the social distance between network users and the internet celebrity. Second, users' perceived challenge stressors and hindrance stressors have different effects on users' willingness to broadcast live. Broadcast platform can establish a nurturing mechanism for users who perceive challenge stressors, giving them a reasonable return and meeting their expectations while simultaneously reducing the perceived stressors of high-quality network users. This can be accomplished through the introduction of simple operability and impartial platforms for live software to ease perceived stressors. Finally, an individual's material values moderate the relationship between the individual's perceived hindrance stress and broadcast intention. Broadcast platforms can create a variety of income mechanisms for network users to attract high-quality users who perceive hindrance stress to participate in broadcasting. At the same time, platforms can establish online users' recognition of online reputations, such as live ratings and live badges, to meet the spiritual needs of users who perceive hindrance stressors.

### 5.3. Limitations and future research

This study has some limitations. First, the main limitation of this study is the bias of sample selection. Although we had used the questionnaire to ensure the respondents had broadcasted at least once on live stream platforms, while the well-known 'SMIs' on live stream platforms had not yet been involved. Because the famous 'SMIs' rarely responded to questionnaires, our questionnaires were sent to the ordinary users on live stream platforms. The difference of well-known 'SMIs' and ordinary users on participation of platforms deserve further research. Second, this study was conducted in mainland China, and the findings of this study are likely to be different in other countries and regions. Therefore, future research should consider more appropriate samples and collect information from both types of users of various live broadcast platforms. In addition, cross-cultural research can be used to compare the similarities and differences between China and other countries' potential users of video direct broadcasting to explore more general research conclusions.

### Appendix

*Measure items*

*Social distance*

I would want the 'social media influencers' to be a close kin by marriage.
I would want the 'social media influencers' to be my close friend.
I would want the 'social media influencers' to be my neighbor.
I would want the 'social media influencers' to be my work group member.
I would want the 'social media influencers' to be a speaking acquaintance only.
I would want the 'social media influencers' to be a visitor to my country only.

ARTICLE IN PRESS

F. Zhou, et al.                                                                        Telematics and Informatics xxx (xxxx) xxx–xxx

I would want the 'social media influencers' to be excluded from my country.

*Challenge stressors*

The number of projects or assignments I have on live streaming platforms makes me feel pressure.
The amount of time I spend on live streaming platforms makes me feel pressure.
The volume of work that must be accomplished on live streaming platforms makes me feel pressure.
The amount of responsibility I have on live streaming platforms makes me feel pressure.
The scope of responsibility that being one of "social media influencers" entails makes me feel pressure.

*Hindrance stressors*

The degree to which rules rather than performance affect live streaming
The inability to clearly understand what is expected of me on live streaming platforms.
The amount of red tape I need to go through to get my broadcast done.
The lack of job security I have as a broadcaster.
The degree to which my career seems "stalled".

*Material values*

I prefer to spend time shopping instead of doing other things.
I will be happier when I have more money to own more products.
I am happy when I think of all the things I have.
I enjoy shopping.
I like to buy things my friends have.
As you get older, the more wealth you have, the more happiness you have.
If I had very few snacks, I wouldn't be willing to share them with others.
I prefer to buy something relatively expensive.
I like to play special games or dress in special clothes.
The only job I want is one that earns a lot of money.

*Broadcast intention*

Social media influencers are very attractive to me.
I would like to broadcast something and to be one of social media influencers.
I would like to recommend that my friends broadcast on live streaming platforms.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tele.2019.03.002.

## References

Bogardus, E.S., 1947. Measurement of personal-group relations. Sociometry 10 (4), 306–311.
Bründl, S., Hess, T., 2016. Why do Users Broadcast? Examining individual motives and social capital on social live streaming platforms. Proceedings of the 20th Pacific Asia Conference on Information Systems (PACIS 2016). Chiayi, Taiwan.
Cavanaugh, M.A., Boswell, W.R., Roehling, M.V., 2000. An empirical examination of self-reported work stress among U.S. managers. J. Appl. Psychol. 85 (1), 65–74. https://doi.org/10.1037/0021-9010.85.1.65.
Chae, J., 2018. Explaining females' envy toward social media influencers. Media Psychol. 21 (2), 246–262. https://doi.org/10.1080/15213269.2017.1328312.
Chen, C.C., Lin, Y.C., 2018. What drives live-stream usage intention? The perspectives of flow, entertainment, social interaction, and endorsement. Telemat. Inform. 35, 293–303. https://doi.org/10.1016/j.tele.2017.12.003.
Clarke, S., 2012. The effect of challenge and hindrance stressors on safety behavior and safety outcomes: a meta-analysis. J. Occup. Health Psychol. 17 (4), 387–397. https://doi.org/10.1037/a0029817.
Dickson, J.P., MacLachlan, D.L., 1990. Social distance and shopping behavior. J. Acad. Mark. Sci. 18, 153–161. https://doi.org/10.1177/009207039001800206.
Dittmar, H., 1992. The Social Psychology of Material Possessions: To Have is to be. St. Martin's Press, New York, NY.
Freberg, K., Graham, K., McGaughey, K., Freberg, L.A., 2011. Who are the social media influencers? A study of public perceptions of personality. Public Relat. Rev. 37 (1), 90–92. https://doi.org/10.1016/j.pubrev.2010.11.001.
González-Morales, M.G., Neves, P., 2015. When stressors make you work: mechanisms linking challenge stressors to performance. Work Stress 29 (3), 213–229. https://doi.org/10.1080/02678373.2015.1074628.
Hamilton, W.A., Garretson, O., Kerne, A., 2014. Streaming on twitch: fostering participatory communities of play within live mixed media. Proceedings of the SIGCHI Conference On human Factors in Computing Systems. Toronto, Ontario, Canada.
Hernandez-Ortega, B., Aldas-Manzano, J., Ruiz-Mafe, C., Sanz-Blas, S., 2017. Perceived value of advanced mobile messaging services: a cross-cultural comparison of Greek and Spanish users. Inf. Technol. People 30, 324–355. https://doi.org/10.1108/ITP-01-2014-0017.
Hilvert-Bruce, Z., Neill, J.T., Sjöblom, M., Hamari, J., 2018. Social motivations of live-streaming viewer engagement on Twitch. Comput. Hum. Behav. 84, 58–67. https://doi.org/10.1016/j.chb.2018.02.013.
Hong, Y., Pavlou, P., Wang, K., Shi, N., 2016. On the role of fairness and social distance in designing effective social referral systems. MIS Q. 41 (3), 787–809.

Hu, M., Zhang, M., Wang, Y., 2017. Why do audiences choose to keep watching on live video streaming platforms? An explanation of dual identification framework. Comput. Hum. Behav. 75, 594–606. https://doi.org/10.1016/j.chb.2017.06.006.

Hurst, M., Dittmar, H., Bond, R., Kasser, T., 2013. The relationship between materialistic values and environmental attitudes and behaviors: a meta-analysis. J. Environ. Psychol. 36, 257–269.

Johar, G.V., 2005. The price of friendship: when, why, and how relational norms guide social exchange behavior. J. Consumer Psychol. 15 (1), 22–27. https://doi.org/10.1207/s15327663jcp1501_4.

Karakayali, N., 2009. Social distance and affective orientations. Sociol. Forum 24 (3), 538–562. https://doi.org/10.1111/j.1573-7861.2009.01119.x.

Khamis, S., Ang, L., Welling, R., 2017. Self-branding, 'micro-celebrity'and the rise of social media influencers. Celebrity Stud. 8 (2), 191–208. https://doi.org/10.1080/19392397.2016.1218292.

Kujath, C.L., 2011. Facebook and MySpace: complement or substitute for face-to-face interaction? Cyberpsychol. Behav. Soc. Netw. 14 (1–2), 75–78. https://doi.org/10.1089/cyber.2009.0311.

Lazarus, R.S., Folkman, S., 1984. Stress, Appraisal and Coping. Springer, New York, NY.

LePine, J.A., LePine, M.A., Jackson, C.L., 2004. Challenge and hindrance stress: relationships with exhaustion, motivation to learn, and learning performance. J. Appl. Psychol. 89 (5), 883–891. https://doi.org/10.1037/0021-9010.89.5.883.

LePine, J.A., Podsakoff, N.P., LePine, M.A., 2005. A meta-analytic test of the challenge stressor–hindrance stressor framework: an explanation for inconsistent relationships among stressors and performance. Acad. Manage. J. 48 (5), 764–775. https://doi.org/10.5465/amj.2005.18803921.

Lertwannawit, A., Mandhachitara, R., 2012. Interpersonal effects on fashion consciousness and status consumption moderated by materialism in metropolitan men. J. Bus. Res. 65 (10), 1408–1416. https://doi.org/10.1016/j.jbusres.2011.10.006.

Lin, S.H., Wu, C.H., Chen, M.Y., Chen, L.H., 2014. Why employees with higher challenging appraisals style are more affectively engaged at work? The role of challenging stressors: a moderated mediation model. Int. J. Psychol. 49, 390–396. https://doi.org/10.1002/ijop.12064.

Marwick, A.E., 2013. Status Update: Celebrity, Publicity, and Branding in the Social Media Age. Yale University Press, New Haven, CT.

Marwick, A.E., 2015. Instafame: luxury selfies in the attention economy. Public Cult. 27 (1), 137–160. https://doi.org/10.1215/08992363-2798379.

Marwick, A.E., Boyd, D., 2011. I tweet honestly, I tweet passionately: Twitter users, context collapse, and the imagined audience. New Media Soc. 13 (1), 114–133. https://doi.org/10.1177/1461444810365313.

Podsakoff, N.P., LePine, J.A., LePine, M.A., 2007. Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: a meta-analysis. J. Appl. Psychol. 92 (2), 438–454. https://doi.org/10.1037/0021-9010.92.2.438.

Prem, R., Ohly, S., Kubicek, B., Korunka, C., 2017. Thriving on challenge stressors? Exploring time pressure and learning demands as antecedents of thriving at work. J. Organ. Behav. 38 (1), 108–123. https://doi.org/10.1002/job.2115.

Richins, L., Dawson, S., 1992. Materialism as a consumer value: measure development and validation. J. Consumer Res. 19 (3), 303–316.

Selye, H., 1976. Stress in Health and Disease. Butterworths, London, England.

Senft, T.M., 2008. Camgirls: Celebrity and Community in the Age of Social Networks. Peter Lang Publishing, New York, NY.

Sheldon, P., Bryant, K., 2016. Instagram: motives for its use and relationship to narcissism and contextual age. Comput. Hum. Behav. 58, 89–97. https://doi.org/10.1016/j.chb.2015.12.059.

Sulsky, L., Smith, C., 2007. Works stress: Macro-Level Work Stressors. In: Monat, A., Lazarus, R.S., Reevy, G. (Eds.), The Praeger Handbook on Stress and Coping. Praeger, Westport, CT, pp. 53–86.

Ward, S., Wackman, D., 1971. Family and media influences on adolescent consumer learning. Am. Behav. Sci. 14, 415–427. https://doi.org/10.1177/000276427101400315.

Webster, J.R., Beehr, T.A., Christiansen, N.D., 2010. Toward a better understanding of the effects of hindrance and challenge stressors on work behavior. J. Vocat. Behav. 76 (1), 68–77. https://doi.org/10.1016/j.jvb.2009.06.012.

Xu, Y., 2008. The influence of public self-consciousness and materialism on young consumers' compulsive buying. Young Consum. 9 (1), 37–48. https://doi.org/10.1108/17473610810857309.

Yu, E., Jung, C., Kim, H., Jung, J., 2018. Impact of viewer engagement on gift-giving in live video streaming. Telemat. Inf. 35 (5), 1450–1460. https://doi.org/10.1016/j.tele.2018.03.014.

Zhao, Q., Chen, C.D., Cheng, H.W., Wang, J.L., 2018. Determinants of live streamers' continuance broadcasting intentions on twitch: a self-determination theory perspective. Telemat. Inf. 35 (2), 406–420. https://doi.org/10.1016/j.tele.2017.12.018.