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Hua Pang,

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# Understanding the effects of WeChat on perceived social capital and psychological well-being among Chinese international college students in Germany

Hua Pang

*Institute of Media and Communication, Dresden University of Technology,  
Dresden, Germany*

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## Abstract

**Purpose** – The purpose of this paper is to explore how the intensity use of WeChat is associated with perceived social capital and psychological well-being factors among Chinese international students in Germany.

**Design/methodology/approach** – Based on an online survey data collected from 212 Chinese international college students in Germany, correlation analysis and structural equation modeling were sequentially implemented to deal with the research questions.

**Findings** – The correlation analysis results indicate that the intensity of WeChat use is positively correlated with bridging, bonding, and maintained social capital. Additionally, a path model demonstrates that bonding social capital is positively related to life satisfaction and negatively related to the sense of loneliness. Furthermore, both bonding and maintained social capital mediate the relationship between WeChat use and these two well-being outcomes.

**Research limitations/implications** – Theoretically, the research is an initial study contributing to the existing social media literature on evaluating the effects of WeChat use on social capital and well-being. Practically, these obtained results can be beneficial to the understanding the dynamics of how social media may potentially impact students' social connectedness and life quality.

**Originality/value** – Although WeChat has become the most prevalent social networking site in Mainland China, the social and psychological implications of the emerging technology are not completely understood. The paper offers evidence that WeChat has functioned as an efficient platform for sojourners to develop diverse types of social capital and promote well-being in an intercultural setting.

**Keywords** Germany, Social capital, Social networking sites, WeChat, Psychological well-being, Chinese international students

**Paper type** Research paper

## 1. Introduction

Over the past few decades, the worldwide explosion of social networking websites (SNSs) has dramatically transformed individual's social behaviors and networking practices across diverse cultures, nations, and regions. Due to the advantages of convenience of access and the low cost, these communication technologies serve as an alternative and innovative avenue for users to interact with others, and to maintain and strengthen networked interpersonal relations (Chang and Hsu, 2016; Mao and Qian, 2015; Pang, 2018). A recent media investigation shows that the utilization of SNSs is currently the most prevalent online activity around the world, particularly among digital-savvy younger generation (Tsai and Men, 2017). Moreover, prior research has indicated that college students' social media adoption and their engagement in various online activities through the site are related to a range of social and psychological consequences including perceived social capital, civic and political engagement, and satisfaction with life (Burke and Kraut, 2016; Lin and Wang, 2017;



Raza *et al.*, 2017). Consequently, the unprecedented popularity and exponential growth of social media make it imperative to comprehend the nature of this newly emerging media and its potential implications for users' social connectedness and well-being in the digital era.

A plethora of scientific literature has consistently confirmed that using SNSs may foster college students' social interaction and network establishment, and subsequently contributing positively to their personal connections and psychological development (Burke and Kraut, 2016; Nardon *et al.*, 2015; Sandel, 2014). However, surprisingly, the majority of the previous studies in this area have concentrated mainly on Facebook use in western society (Basilisco and Cha, 2015; Lambert, 2016; Sandel, 2014). Comparatively, only a few reports have empirically unearthed the possible effects of indigenous SNS use, especially WeChat on individuals' social capital and well-being consequences (Wen *et al.*, 2016). Actually, among various domestic SNSs available in Mainland China, WeChat has been the most widely utilized social networking service with approximately 846 million active users as of April 2017 (Tencent, 2017).

WeChat (or Weixin in Chinese), is a worldwide free, "all-in-one" mobile-based instant text and voice messaging communication application launched by the Chinese internet giant Tencent in January 2011 (Wen *et al.*, 2016). WeChat has various general and special functions and features. For instance, similar to WhatsApp, WeChat permits users to instantly release short messages in multiple formats (e.g. texts, photos, and real-time voice) to a single individual or a specific group of persons (Chen, 2017). Moreover, unlike WhatsApp, users can post text messages, pictures, stickers, videos, and even web pages in their friend space, and leave comments or simply click the "like" button on other users' posts. In addition to conventional instant messaging services, WeChat serves as an innovative platform for recreation, shopping, payment, as well as transactions (Wen *et al.*, 2016). WeChat offers users a private platform indicating that only person you have admitted to the friend list could read your posts and give comments on them (Gan, 2017). Furthermore, WeChat also allows users to communicate with strangers through "shake" to search of nearby strangers or "drift bottle" to send information to random strangers (Zhang, 2016).

Currently, the SNS is heavily used by Chinese college students and has become an integral component in their daily lives (Pang, 2016; Ye and Lin, 2015). Their online activities in the new technology range from socializing with trusted friends and entertaining to sharing personal information and experiencing a certain service or function (Guo *et al.*, 2017). Yet despite this, researchers still have limited knowledge of the possible benefits of WeChat use. Furthermore, there is a striking lack of empirical research on the causal relationships between international students' SNS use and the improvements in their social capital and well-being in a host country. According to the latest report, Germany has become the third most popular destination among international students after the USA and UK in the world (Li, 2017). In particular, Chinese international students constitute the largest population group of total overseas tertiary-level students in Germany with more than 28 percent (Luyken, 2015). Regarding Chinese international students, they coming from cultural or linguistic minorities may encounter cultural and psychological changes that involve building and maintaining of social ties, as well as psychological adaptation during their time in Germany (Lim and Pham, 2016). In such situations, these newcomers tend to rely on WeChat to acquire social support networks as well as adapt to the new life.

Additionally, Chinese international students spend considerable time and energy on social media, primarily for relationship maintenance and social interaction (Cao *et al.*, 2018). As Li and Chen (2014) suggested, both Facebook and Renren use are closely related to Chinese international students' ratings of bridging social capital in the USA. Building on prior work by Li and Chen (2014), the objective of this exploratory research focuses on international students studying abroad in Germany to comprehend how Chinese sojourners' use of WeChat communication would influence their social relationships and perception of

well-being in another foreign environment. In addition, this research represents one of the few that attempts to thoroughly understand whether and to what extent users' social capital moderates the relationship between WeChat use and well-being outcomes. Therefore, the significance of this study is that it may further the understanding of the underlying mechanisms behind these complicated associations and simultaneously contribute to broader ongoing controversies over the possible impact of the emerging social media technology on individual's overall quality of life in an intercultural setting (Chan, 2015).

## 2. Theoretical background

### 2.1 WeChat use and bridging and bonding social capital

Social capital is broadly conceptualized as the assets accumulated through the regular social connections between individuals (Coleman, 1988; Ellison *et al.*, 2007). The resources from these relationships are actual or virtual and consist of trust, norms, as well as social networks (Portes, 1998; Williams, 2006). Recently, Li and Chen (2014) have developed a more considered account of social capital, highlighting the theoretical importance of the capital side of the social capital equation, for instance, social capital as an asset that provides instrumental or expressive returns and can be realized. The notion is now recognized as one of the most important widely disseminated concepts across a variety of fields in social science and has continuously expanded its scope into the networked environments to clarify the positive consequences of SNSs (Aharony, 2016; Ellison *et al.*, 2007; Kwon *et al.*, 2013). Based on the original study of Li and Chen (2014), the paper focuses on bridging, bonding, and maintained social capital not only because they are all part of the cognitive social capital class (Johnston *et al.*, 2013), but also because these three types have been assessed and adapted by various researchers in the computer-mediated communication and new media field (Guo *et al.*, 2014; Johnston *et al.*, 2013; Li and Chen, 2014).

Indeed, SNS as a web-based service not only helps people maintain the pre-existing social networks, but also allows them to build up new social ties on the basis of shared interests, views or activities via online communication (Raza *et al.*, 2017). Generally speaking, bridging social capital refers to the values and resources embedded in heterogeneous groups, which reflects weak-tie network and loose connections between individuals, offering relevant informational support or useful perspectives for one another and broadening their horizons (Williams, 2006). Alternatively, bonding social capital emphasizes on the strong-tie network and close and trusting relationships, such as family members, relatives, and close friends, which easily enable individuals to acquire intimacy support and scarce resources effectively (Kwon *et al.*, 2013; Williams, 2006). These two forms of social capital have already been differentiated by two fundamental aspects: tie strength and type of social relationship provided (Burke and Kraut, 2016; Ellison *et al.*, 2007).

Computer-mediated communication, especially SNS use has been discovered to be positively associated with users' formation and maintenance of perceived social capital, mainly including ties with both existing friends and strangers' lurkers (Lambert, 2016; Nardon *et al.*, 2015; Raza *et al.*, 2017). For instance, Lambert (2016) contended that from the social weak or strong ties, individuals can receive not only actual benefits but also intangible ones from other members of the networks, such as mutual trust and emotional bolstering. Similarly, Raza *et al.* (2017) also documented that social networking sites would lead to better social capital, including weak-tie based and strong-tie based social outcomes through creating the intention to continue using them. Nevertheless, the existing literature concentrates primarily on the linkages between American or global SNS use and perceived social capital, and has neglected the nuanced impacts of local social media use such as WeChat on individual's bonding and bridging social capital. In addition, little research has investigated college students abroad, except one empirical study from Li and Chen (2014) which provided additional support to the positive

association between Renren usage and bridging social capital among Chinese students in the USA. Given that WeChat can help the Chinese international college students to maintain relationships with family members, friends, and acquaintances, and also help them to build connections with strangers, these students may have more diverse opportunities to augment their bonding and bridging capital. Moreover, the technical and social affordances offered by WeChat have reduced the cost of social contact (Chen and Li, 2017), which may also bolster the cultivation of both kinds of social capital. Based on the above-mentioned literature, this research hypothesizes:

- H1. WeChat use by international college students in Germany is positively associated with their perceived bridging social capital.
- H2. WeChat use by international college students in Germany is positively associated with their perceived bonding social capital.

### *2.2 WeChat use and maintained social capital*

In 2007, Ellison *et al.* put forward a third type of social capital, named “maintained social capital,” in order to better distinguish between the formation and maintenance of social capital. Specifically, they describe the term as the values created from individuals’ social ties that are geographically disconnected with the alteration of life, for example, valuable ties stayed behind when young adults move away from their home countries for university (Ellison *et al.*, 2007; Li and Chen, 2014). It implies that if people make much effort into sustaining their connections with the acquaintances and friends who are physically separated for long periods, they would obtain maintained social capital. Li and Chen (2014) argued that the definition is especially relevant to the investigation of overseas students who travel to another country different from their own for the purpose of tertiary education. In fact, under the foreign environment, it is necessary for them not only to build a new circle of friends in the host country, but also to stay in touch with old social networks from back home. In general, such social ties offer individuals with a range of potential benefits, consisting of potential specific resources, social support, and a feeling of community belongingness (Forbush and Foucault-Welles, 2016).

Earlier studies have demonstrated that although old social networks might not be an effective source of support to cope with difficulties, they incline to offer both comfort and stability in the host country (Saw *et al.*, 2013). Extending this finding, Li and Chen (2014) further noted that as human networks still constrained by time and space in the internet era, the valuable resources obtainable via old social connections in the native town may be different from those accessible within the unfamiliar environment. The proliferation of social media technology has been shown to assist students to maintain pre-existing social ties threatened by changes in the geographical distance in their transition to study abroad in the foreign country (Forbush and Foucault-Welles, 2016; Nardon *et al.*, 2015). Moreover, various online communities on social media enable international students to enhance the development of existing social ties by communicating with each other about the shared interests and important topics.

Recently, numerous studies have highlighted the positive impact that social media have on maintaining home country interpersonal support and social capital (Basilisco and Cha, 2015; Johnston *et al.*, 2013; Li and Chen, 2014). For instance, Basilisco and Cha (2015) discovered a positive relationship between the intensity of Facebook use and maintained social capital among Filipinos. However, in terms of WeChat use, there are very few empirical studies that have probed the crucial role of the technology for international students in the process of maintaining social capital. Since Facebook and Twitter have been blocked by the Chinese Government (Chen, 2017), Chinese international students studying in Germany may rely on the indigenous SNSs, especially WeChat, to maintain contact with

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their old friends in mainland China. Therefore, except for differentiating between the bridging and bonding forms of social capital, it would be interesting to uncover how the WeChat use experience may actually impact students' maintained social relations. In this regard, the study proposes the third hypothesis:

*H3.* WeChat use is positively associated with international college students' perceived maintained social capital.

### *2.3 WeChat use and psychological well-being*

Generally, psychological well-being refers to how individuals self-assess and their ability to gratify fundamental needs of their lives, such as autonomy, positive relationships with others, as well as purpose in life (Harrington and Loffredo, 2010). Rubin held that the diversified psychosocial outcomes of audiences actually exist in the whole process of media consumption, and simultaneously these features impact the process and the structure of society (Rubin, 1983). Psychological well-being has increasingly become a core topic in social media research. A body of theoretical and empirical studies has suggested that there are meaningful correlations between the utilization of social media and users' various well-being factors (Basilisco and Cha, 2015; Chen and Li, 2017; Wang *et al.*, 2014).

Admittedly, SNS appears to exert positive impacts on the enhancement of life satisfaction, and the decrease of the levels of loneliness (Basilisco and Cha, 2015; Huang *et al.*, 2017). Explaining these psychosocial outcomes in a social setting, Chan proved that multimodal connectedness and the frequency of strong-tie interactions via new media technologies are able to foster users' quality of life (Chan, 2015). Additionally, people with extensive social media engagement may be more willing to satisfy their demand for relations, as well as feel less lonely at the individual level. This is consistent with the finding of Wang *et al.* (2014), who discovered that people who more actively participate in social media for social purpose tend to experience higher levels of well-being. Moreover, based on an online survey, a recent study examined the connections between social media use, social integration, and well-being among urban migrants in Chinese society, and the results showed that SNS use has positive socio-psychological effects on Chinese urban migrants (Wei and Gao, 2017).

In the current study, it is expected SNS use would exert the overall positive influences on Chinese overseas students' well-being factors. The work concentrates on two psychological consequences, life satisfaction and the sense of loneliness, as they are the most investigated topics in the literature on online communication and social networking sites (Burke and Kraut, 2016; Coll-Planas *et al.*, 2017).

The previous studies have well documented that the emotional comfort and satisfaction received from online social support as well as interactions through social media, which could help individual to overcome the sense of loneliness and enhance life quality (Diener *et al.*, 2009; Forbush and Foucault-Welles, 2016; Saw *et al.*, 2013). Although WeChat has previously been used widely, few studies have focused on the effects of the home country social media use on people's well-being. Such an understanding would shed light on whether and to what extent WeChat may help people promote their satisfaction with life and alleviate their sense of loneliness in a host country with the popularization of social media. Thus, it is plausible to expect that WeChat use positively affects international college students' overall well-being outcomes, leading to the following hypothesis:

*H4.* WeChat use is positively associated with international college students' perceived life satisfaction.

*H5.* WeChat use is negatively associated with international college students' perceived loneliness.

#### 2.4 Social capital and psychological well-being

Considerable prior literature has found that various forms of social capital, including ties with close friends and neighbors, are associated with differentiating indices of psychological well-being (Johnston *et al.*, 2013; Wang *et al.*, 2014). The positive connection between social capital and well-being may be attributable to the fact that personal strong and weak networks can aid in decreasing loneliness, diffusing of heterogeneous information, as well as providing emotional and social support (Forbush and Foucault-Welles, 2016). It has also been reported that individuals with high degrees of friendship activity interact with their contacts more frequently via SNSs, and therefore would be less lonely and happier (Kim and Lee, 2011). Likewise, Chan (2015) documented that users' strong and weak ties with family and friends could mediate the direct relationship between online communication and perceived well-being. Recently, using a two-wave panel in Hong Kong, Chen and Li (2017) indicated that both bonding and bridging social capital were positively associated with individuals' life quality. The results of emerging research imply that social capital plays a significant role in the effects of social media use on individuals' psychosocial well-being factors.

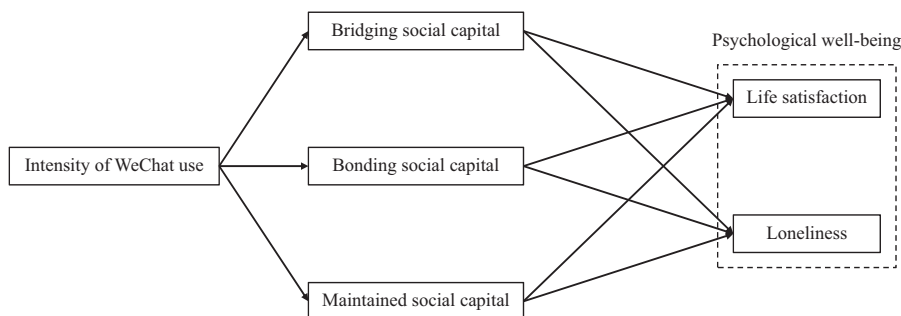
However, most of the past research touching upon the connections between measures of well-being and social capital tended to over-emphasize the importance of family members, intimate relationships, and close friends (Ramosacaj *et al.*, 2014), while ignoring the potential linkages between psychological well-being and the other two components of social ties including bonding and maintained social capital among students. In the case of Chinese overseas students in Germany, mediated communication interaction, in particular the intensity use of WeChat, may help them by strengthening involvement with strong and weak social networks in both host country and home country, and increasing useful resources or opportunities accessibility related to their personal interests the communities to which they belong (Chen and Li, 2017), thus contributing to the improvement of their psychological states. Given that, the research is the first of this kind to explicitly investigate whether all three dimensions of social capital were linked to Chinese international students' psychological well-being through WeChat use in the given intercultural context. Based on the achievements in studies of social media effect and well-being consequences, the study formed the following six hypotheses:

- H5a.* For WeChat users, bridging social capital will be positively related to life satisfaction.
- H5b.* For WeChat users, bridging social capital will be negatively related to loneliness.
- H6a.* For WeChat users, bonding social capital will be positively related to life satisfaction.
- H6b.* For WeChat users, bonding social capital will be negatively related to loneliness.
- H7a.* For WeChat users, maintained social capital will be positively related to life satisfaction.
- H7b.* For WeChat users, maintained social capital will be negatively related to loneliness.

### 3. Research model and methodology

#### 3.1 Research model

The conceptual model of this research is presented in Figure 1. In this proposed model, building on the prior findings, WeChat use is anticipated to be significantly correlated to bridging, bonding, and maintained social capital. Additionally, this model also attempts to further understand how the intensity use of WeChat may affect international students' psychological well-being consisting of life satisfaction and loneliness through these three distinctive types of social capital.



## Effects of WeChat on perceived social capital

**Figure 1.**  
The hypothesized research model

### 3.2 Research participants and procedures

A web-based survey was administered between September and October 2017 at a large public university in the southwestern Germany. Target participants were recruited from major Chinese SNSs and instant messaging groups of international students from China studying at this university. The study placed a website link on these platforms, connected students to the electronic version of the questionnaire, and prepared gift cards as reward for each respondent. The advantage of adopting such kind of online sampling strategy is that it can help researchers to access and investigate a large number of users effectively and conveniently (Tewari, 2015). Participants took about 25 minutes to finish the anonymous questionnaire regarding WeChat use, social capital, life satisfaction and loneliness. As college students currently account for a substantial portion of WeChat users (Gan, 2017), the study sample is deemed to be appropriate. A total of 339 qualified respondents filled out the survey. The responses of 127 participants were removed due to the incomplete answers. As a result, the remaining data from 212 international students were reserved for further analysis. Table I shows the demographic profile of the samples used in the research.

### 3.3 Measurements

**3.3.1 Intensity of WeChat use.** The scale used to assess the intensity of WeChat use was created by Ellison *et al.* (2007). The study adopted this scale because it can measure affective and cognitive attitudes toward WeChat use, and is identified to be a more holistic concept in comparison with other conventional notions such as frequency of use or total time spent in media use (Dhir and Tsai, 2017). Furthermore, it has been extensively applied in the computer-mediated communication and social media literature (Wen *et al.*, 2016). In order to satisfy the context of the current research, the study revised some words in the measures. The scale consists of three parts: the amount of time spent on WeChat on a typical day, the number of total friends, and a series of Likert scale attitudinal items to tap students' emotional attachment to the new media. Table II presents the summary statistics for the intensity of WeChat use. With respect to the degree of users' emotional connectedness with WeChat, participants are asked to indicate their level of agreement (from 1 = strongly disagree to 5 = strongly agree) with these five statements consisting of "WeChat is part of my everyday activity," "I am proud to tell people I am on WeChat," "WeChat has become part of my daily routine," "I feel out of touch when I haven't logged onto WeChat for a day," "I feel I am part of the WeChat community at the campus," and "I would be sorry if WeChat shut down." Then the seven individual questions were standardized and averaged to form a scale of WeChat use intensity ( $\alpha = 0.82$ ) (see Table II).

**3.3.2 Bridging social capital.** The bridging social capital scale was adopted from the Internet Social Capital Scales constructed by Williams (2006). The study applied this scale because it could offer clarification of social capital and its formation online and offline, and



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Item	Frequency	%	Mean	SD
<i>Gender</i>				
Male	107	50.5		
Female	105	49.5		
<i>Age</i>				
18-21 years old	19	9.0	2.49	0.84
22-25 years old	96	45.3		
26-29 years old	75	35.4		
30-33 years old	18	8.5		
34-37 years old	4	1.9		
<i>Education level</i>				
Graduate students	46	21.7	1.93	0.60
Postgraduate students	134	63.2		
PhD students	32	15.1		
<i>Year in Germany</i>				
< 1 year	66	31.1	2.73	1.50
1-2 years	37	17.5		
2-3 years	39	18.4		
3-4 years	29	13.7		
> 4 years	41	19.3		
<i>WeChat use experience</i>				
< 6 months	1	0.5	4.72	0.66
6 months-1 year	3	1.4		
1-2 years	10	4.7		
2-3 years	26	12.3		
> 3 years	172	81.1		

**Table I.**  
Descriptive statistics  
for the sample

**Note:**  $n = 212$

Items and scale	<i>M</i>	SD
Intensity of WeChat use (Cronbach's $\alpha = 0.82$ )	3.79	0.65
About how many total WeChat friends do you have? 1 = less than 50, 2 = 50-100, 3 = 101-150, 4 = 151-200, 5 = more than 200	3.80	1.32
On a typical day, about how much time do you spend on WeChat? 1 = less than 30 minutes, 2 = 30 minutes-1 hour, 3 = 1-2 hours, 4 = 2-3 hours, 5 = more than 3 hours	3.51	1.18
WeChat is part of my everyday activity	4.45	0.71
I am proud to tell people I am on WeChat	3.27	0.94
WeChat has become part of my daily routine	4.31	0.78
I feel out of touch when I have not logged onto WeChat for a day	3.63	1.06
I feel I am part of the WeChat community at the campus	3.56	0.94
I would be sorry if WeChat shut down	3.80	0.99

**Table II.**  
Summary statistics  
for the intensity  
of WeChat use

**Note:**  $n = 212$

the tradeoffs between these two (Johnston *et al.*, 2013; Williams, 2006). The items consist of, for example, "I am willing to spend time to support general activities at this university," "I am interested in what goes on at this university," and "Interacting with people at this university makes me want to try new things." Respondents indicated their level of agreement (from 1 = strongly disagree to 5 = strongly agree) to these four statements. The four items were then averaged to form a measure of bonding social capital ( $\alpha = 0.84$ ,  $M = 3.71$ ,  $SD = 0.72$ ).

**3.3.3 Bonding social capital.** The bonding social capital was measured using the four-item scale developed by Williams (2006). The four items for the bonding social capital measure consist of “There are several people at the college I trust to solve my problems,” “There are several people at this university I can turn to for advice about making important decisions,” “There are several people I feel comfortable talking to at this university about intimate personal problems,” and “If I needed an emergency loan of money, I know several people at this university I can turn to.” Responses were reported on a five-point Likert scale from 1 = strongly disagree to 5 = strongly agree ( $\alpha = 0.90$ ,  $M = 3.38$ ,  $SD = 1.06$ ).

**3.3.4 Maintained social capital.** The scale constructed by Ellison *et al.* (2007) was utilized to assess participants’ maintained social capital, with slight wording modifications. The scale is composed of five items designed to measure maintaining home country social capital of that Chinese international students’. The items include, for example, “It would be easy to find friends to come to my friend reunion party in China,” and “I’d be able to stay with some friends in China if traveling back to China.” The participants responded based on a five-point scale. The scores of these questions were subsequently averaged to generate a scale of maintained social capital ( $\alpha = 0.81$ ,  $M = 3.89$ ,  $SD = 0.63$ ).

**3.3.5 Life satisfaction.** Regarding life satisfaction, it refers to the global cognitive judgments of an individual’s quality of life on the basis of the chosen criteria (Diener *et al.*, 2009). Life satisfaction was gauged using four items from the psychological well-being scale (Diener *et al.*, 2009). Responses were requested to report on a five-point Likert scale with a higher score indicating greater satisfaction with life at the university. The example items consist of, for example, “I lead a purposeful and meaningful life,” and “My social relationships are supportive and rewarding.” The answers to these questions were reported on a five-point Likert scale. The reliability estimate for this five-item scale indicated a relatively high reliability ( $\alpha = 0.85$ ,  $M = 3.16$ ,  $SD = 0.74$ ).

**3.3.6 Loneliness.** The measure of loneliness was adopted from the UCLA loneliness scale constructed by Russell (Russell, 1996). The UCLA Loneliness Scale has been discovered to be both reliable and valid among college students (Guo *et al.*, 2014). The scale was composed of three items such as “I feel a lack of companionship,” and “I feel no one really knows me.” All participants indicated on a five-point Likert scale the extent to which they agreed with each statement to measure their perceived loneliness. ( $\alpha = 0.78$ ,  $M = 2.81$ ,  $SD = 0.80$ ).

**3.3.7 Demographic variables.** Participants were instructed to report their demographic information including gender, age, education level, residence length in Germany, as well as WeChat usage experience (see Table I).

## 4. Analytical strategy

All data analyses were conducted by using the SPSS version 20.0 and AMOS version 19.0. Preliminary descriptive analyses were first implemented to characterize the current sample and offer insight into the possible effects of WeChat on Chinese international students’ differentiated forms of perceived social capital, sense of loneliness, and life satisfaction in Germany. After that, a zero-order correlation analysis was run to explore the intertwined relationships among the main scaled variables of the research while controlling for gender, age, education level, residence length, and WeChat usage experience. Finally, a structural model was utilized to explicitly assess the structural connections among these constructs.

## 5. Results

### 5.1 Descriptive analysis of WeChat use

Within the 212 valid respondents, 50.5 percent were male and 49.5 percent were female. The participants were aged between 18 and 37 years ( $M = 2.49$ ;  $SD = 0.84$ ), with the vast majority (80.7 percent) being between 22 and 29 years of age. In regard to education

level, 46 were graduate students (21.7 percent), 134 were postgraduate students (63.2 percent), and 32 (15.1 percent) were doctoral students. In addition, 51.4 percent have resided in Germany for more than two years, and the average length is approximately two years ( $SD = 1.50$ ). In fact, during the last five years, WeChat has attracted a larger numbers of students from college campuses (Gan, 2017). Results also revealed that all of the participants owned WeChat account and approximately 81.1 percent of respondents had used WeChat for more than three years, while 12.3 and 4.7 percent had experiences of 2-3 years and one to two years, respectively (see Table I). Furthermore, the average students spent two hours on WeChat every day ( $SD = 1.18$ ) and 77.9 percent of respondents reported spending more than one hour every day. As illustrated in Table II, the mean number of friends on the newly SNS was roughly 200 ( $SD = 1.32$ ). Over half of (45.3 percent) students had more than 200 friends on WeChat, 17.5 percent had 151-200, 14.6 percent had 101-150, and 17.0 percent reported 50-100 friends.

### 5.2 Correlations between WeChat use, social capital, and well-being

Prior to path analyses, a correlation analysis was conducted to assess possible relationships between WeChat use, social capital, and psychological well-being. Table III shows the correlation between all the key variables in the study. As predicted, the intensity of WeChat use has significant positive associations with bridging ( $r = 0.301, p < 0.01$ ), bonding ( $r = 0.292, p < 0.01$ ) and maintained social capital ( $r = 0.293, p < 0.01$ ). It implies that Chinese students who utilized WeChat more intensively during their study abroad would gain larger and dispersed social relationships, compared with those students who utilized WeChat less intensively. In addition, the highest correlation coefficient among these three distinct categories of social capital variables is 0.301 (the association between WeChat use and bridging social capital in Germany). As for the correlation between WeChat use and individuals' well-being outcomes, the analysis shows that intensity of WeChat use is positively related to satisfaction with life in Germany ( $r = 0.047, p < 0.05$ ) and negatively related to the perceived loneliness ( $r = -0.06, p < 0.05$ ). Similarly, bridging ( $r = 0.153, p < 0.05$ ), bonding ( $r = 0.264, p < 0.01$ ), and maintained social capital ( $r = 0.146, p < 0.05$ ) are also significantly associated with gratification with university life. Furthermore, bonding ( $r = -0.252, p < 0.01$ ) and maintained social capital ( $r = -0.317, p < 0.01$ ) are found to be negatively correlated with the sense of loneliness (see Table III).

### 5.3 Path results of the structural model

For further estimating the proposed hypotheses, path analysis techniques based on structural equation modeling were performed to provide an overall picture of the intricate connection. AMOS 19.0 was employed to gain the maximum-likelihood estimates of this hypothesized model parameters. The present study used structural equation modeling because it is a robust statistical method that estimates all variables and their hypothesized relationships in the research model simultaneously, and more importantly, investigates the

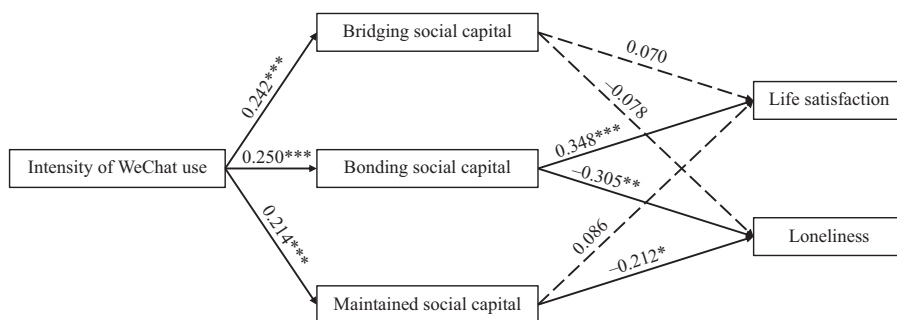
**Table III.**  
Zero-order  
correlations among  
the key variables

Variables	1	2	3	4	5	6
1. Intensity of WeChat use	1					
2. Bridging social capital	0.301**	1				
3. Bonding social capital	0.292**	0.491**	1			
4. Maintained social capital	0.293**	0.397**	0.316**	1		
5. life satisfaction	0.047*	0.153*	0.264**	0.148*	1	
6. Loneliness	-0.060*	-0.128	-0.252**	-0.210**	-0.317**	1

Notes:  $n = 212$ . \* $p < 0.05$ ; \*\* $p < 0.01$

validity and adequacy of the structural model (Chen *et al.*, 2008). More specifically, the proposed research model shown in Figure 1 was examined by using structural equation modeling. In this model, age, gender, education level, residence length, and WeChat usage experience were controlled as covariates. Meanwhile, a variety of fit indices were applied to evaluate the relative goodness-of-fit of the hypothetical model. It is noted the criteria for a good-fitting model is indicated by a non-significant  $\chi^2$  test (Li and Chan, 2017), 0.8 or greater for the goodness-of-fit index and adjusted goodness-of-fit index (AGFI) (Yang *et al.*, 2004), 0.9 or greater for the comparative fit index (CFI) and Tucker-Lewis index (TLI) (Kenny and McCoach, 2003), and 0.08 or less for the root mean squared error of approximation value (RMSEA) (Garg and Kumar, 2017). In the present study, fit indices suggest that this measurement model has a very excellent fit to the empirical data ( $\chi^2 = 2.18$  with  $p = 0.824$  and  $df = 2$ ; RMSEA = 0.000; RMR = 0.008; CFI = 1.000; AGFI = 0.986; IFI = 1.016; TLI = 1.050). Figure 2 shows the outcomes of path standardized coefficients for the structural equation model.

After that, this current study evaluated the structural model to investigate the effects of WeChat use on students' social capital and well-being consequences. The outcomes show that the intensity of WeChat use is positively related to bridging social capital ( $\beta = 0.242$ ,  $p < 0.001$ ), bonding social capital ( $\beta = 0.250$ ,  $p < 0.001$ ), and maintained social capital ( $\beta = 0.214$ ,  $p < 0.001$ ). Accordingly, *H1-H3* are supported. Among the three perceived social capital dimensions, the respective betas reflect that WeChat use intensity has a stronger effect on bonding social capital than bridging social capital and maintained social capital do. Additionally, bonding social capital is discovered to be significantly associated with life satisfaction ( $\beta = 0.348$ ,  $p < 0.001$ ) and loneliness ( $\beta = -0.305$ ,  $p < 0.01$ ), which confirmed *H6a* and *H6b*. Moreover, the maintained social capital is negatively and significantly associated with and the sense of loneliness ( $\beta = -0.212$ ,  $p < 0.05$ ), whereas it is not positively associated with life satisfaction. Therefore, *H7b* is supported. *H7a* is not supported. However, bridging social capital indicates no significant association with satisfaction with life or the feeling of loneliness, as such, *H5a* and *H5b* are not supported. When the connection between bonding social capital and life satisfaction was taken into account, the relationship between intensity of WeChat use and satisfaction with life became insignificant. This result emphasizes the crucial role of bonding social capital in mediating the relationship between the intensity of WeChat use and life satisfaction. Meanwhile, bonding and maintained social capital also have a complete mediating effect on the relationship between the intensity of WeChat and loneliness. Accordingly, WeChat use may enhance people's life satisfaction and reduce their feeling of loneliness indirectly. *H4* and *H5* are therefore statistically supported.



Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

**Figure 2.** Path analysis model of WeChat use, social capital and well-being outcomes

## 6. Discussion

### 6.1 Main findings

The present study aims at uncovering whether interactions on WeChat could influence Chinese international students' perceived social capital and psychological well-being outcomes in the new environment. More specifically, the paper investigates a hypothesized research model that assesses the underlying mechanism in the associations among the intensity of WeChat use, three distinct types of social capital, life satisfaction, and perceived loneliness. While few studies specifically explore WeChat, this study highlights its significance in promoting diverse social networks relations for Chinese students studying in Germany, and sheds light on the role of the new technology in contributing to those students' psychological well-being.

First, the outcomes reveal that WeChat usage has a significant positive effect on students' bonding, bridging social capital in Germany university, and maintaining social capital in the home country. In other words, the more Chinese students studying in Germany utilize WeChat, the higher levels of bridging, bonding, and maintained social ties are, respectively. The result indicates that the swift emergence of WeChat not only plays a pivotal role in assisting students to expand and manage their weak and strong social relationships in their Germany college environment, but also helping them stay in touch with their pre-existing social connections in Mainland China for diverse information and resources. As claimed by Sleeman *et al.* (2016), social media platform could be deemed as a bridge for sustaining social connection with friends, acquaintance and family members from home, or new people in the host context. In addition, it is noteworthy that intensity of WeChat usage has the strongest effect on bonding social capital, followed by bridging social capital, and maintained social capital. The results confirm that international students' use of WeChat is more beneficial for building and maintaining bonding social capital than bridging social capital and, simultaneously, has a stronger influence on increasing their bridging and bonding social capital levels in their Germany college environment than maintained social capital in their home country. These results support recent findings that when individuals share their inner thoughts or moods with others around them through social media, they may obtain a better quality of social relationships and enhance their social integration (Chen and Li, 2017).

Second, bonding social capital is found to be positively related to life satisfaction, which demonstrates that strong ties are positive predictors of life satisfaction. Additionally, as hypothesized, bonding social capital has a direct and negative impact on international students' sense of loneliness. This result is closely aligned with the previous literature suggestions that the accumulation of stronger rather than weaker ties would be closely associated with a range of positive outcomes consisting of increased life satisfaction, enhanced self-esteem, and decreased loneliness (Burke and Kraut, 2016; Coll-Planas *et al.*, 2017). In particular, Sheer and Rice (2017) discovered that the stronger bonds with close friends in an individual's social networks and the more informational and interpersonal resources available could bolster satisfaction with current life and alleviate the feeling of loneliness. It is thus perhaps not surprising that bridging social capital does not significantly predict the psychosocial outcome of students. Another interesting finding is maintaining home country social capital merely influences the sense of loneliness, but could not impose the impact on the overall life satisfaction. One possible explanation could be that for international students, due to language, cultural barriers and academic pressure, keeping in touch with their connections in the host country may not make them feel happier or facilitate the possibilities to improve their quality of life in a foreign country (Li, 2017; Lim and Pham, 2016).

Third, intensity of WeChat use not only directly impacts three dimensions of social capital, but also contributes to life satisfaction. The path analysis demonstrates that, as mediated by a sense of support from strong social ties, the intensity of WeChat use

indirectly affects users' satisfaction of their life rather than having a direct influence. One possible explanation can be that by utilizing WeChat, users can maintain their strong social relationships and, ultimately, gain a sense of satisfaction (Chan, 2015; Wen *et al.*, 2016). Additionally, the findings reveal the important mediating role of maintaining home country social capital has on perceived loneliness. The outcomes not only support the notion that mediated communication is associated with closer and higher quality relationships, which in turn promotes an individual's psychological well-being (Lambert, 2016), but also offer evidence that social media would indirectly improve psychological well-being by connecting strongly tied individuals (Chen and Li, 2017).

### 6.2 Implications for research and practice

This investigation makes several significant theoretical contributions. First, this work is an initial study contributing to the existing social media literature on evaluating quantitatively the causal effects of WeChat use on social capital (i.e. bridging social capital, bonding social capital and maintained social capital), and testing whether WeChat use is indirectly associated with psychological well-being (i.e. life satisfaction, loneliness) through different social capital in Germany, which has been largely ignored by previous studies (Burke and Kraut, 2016; Chen and Li, 2017; Pang, 2017). Given that WeChat has been embedded in the abroad study life of Chinese international students, the impact of the newly emerging social media on the possible social and psychological consequences needs to be considered as a crucial topic in communication research (Sleeman *et al.*, 2016). Hence, this paper extends upon the results reported by Li and Chen (Li and Chen, 2014) by giving statistical evidence that the intensity of WeChat use is positively correlated with Chinese international students' bonding, bridging social capital, and maintained social capital in another typical western country. Second, focusing on the outcomes of psychological aspects, the work presents a comprehensive picture of personal WeChat usage and the causal links that go from WeChat to psychosocial factors. Thus, this study contributes a better understanding of psychological outcomes of the new media and attempts to fill the research gaps in this field. Third, the current study further develops a research model by assessing the moderating roles of not only bonding social capital but also maintained social capital. The study demonstrates that the crucial moderating roles of these two types on the relationship between WeChat use and psychological well-being. Therefore, the results provide empirical evidence for supporting the notion that computer-mediated communication through social media can be an alternative way to enhance the well-being of individuals who are familiar with the novel media (Appelbaum and Kopelman, 2014).

Meanwhile, the research also has significant practical implications for professional media practitioners and marketing managers. The results reveal that bonding social capital is the most important predictor of international students' well-being perception in the online setting, followed by bridging and maintaining social capital. Therefore, marketing managers could highlight the effort toward developing effective incentive strategies to encourage international students to employ SNSs such as WeChat to broaden and manage their social ties because this would benefit their online bridging and maintained social capital (Wen *et al.*, 2016). For example, in order to facilitate social interactions, designers of WeChat could offer some mechanisms that allow users to extend their social circle by adding new friends, uploading photos and videos, and commenting beyond spatial and temporal constraints. Additionally, the outcomes confirm that the intensity of WeChat use can facilitate social capital, which in turn increase the perceived life satisfaction and reduce the feeling of loneliness. Thus, social media providers could set up online groups on WeChat and organize various online activities to boost the utilization of WeChat among Chinese international students (Chang and Hsu, 2016). Through interaction and communication on the new social media, international students would obtain gain greater social capital, and consequently lead to the increased personal well-being.

### 6.3 Limitations and future research

The limitations of the current study should be acknowledged. First, considering the empirical research only concentrates on the specific population of Chinese overseas students studying in Germany; hence, the outcomes may not be generalizable to the whole community of international students in Germany. A future study could uncover WeChat use in other settings and different communities consisting of younger and older WeChat users. Second, the current study lacks the analysis of how the certain affordances and usage of WeChat may affect college students' social capital and well-being. As shown in previous studies, friending on social media was positively linked with bridging capital (Bohn *et al.*, 2014; Kim and Lee, 2011). Moreover, the present study does not distinguish between active and passive WeChat use. This distinction would enable an investigation of whether active and passive WeChat use would affect social capital and well-being differently, as found in some studies (Krasnova *et al.*, 2013). Thus, it could be interesting to examine different patterns of WeChat use and their diverse impact on social relations and psychological well-being in the future work. Finally, due to the actual social ties development is of valuable and social media change over time, follow-up research could explore the long-term implications of social media use on psychological well-being by conducting a longitudinal study.

## 7. Conclusion

To summarize, this present study makes an early effort to systematically investigate the questions about whether the intensity of WeChat use is associated with three types of social ties by differentiating bonding, bridging, and maintained social capital, and discover how these distinct forms of social capital are related to psychological well-being among Chinese students studying abroad in Germany. The obtained results provide robust evidence that WeChat functions as an efficient and cost-effective platform for sojourners to maintain and develop diverse types of social capital. Moreover, the study constructed a hypothesized model to identify that interacting with WeChat would exert influence on well-being outcomes through bonding and maintained social capital among these sojourners in a host country. The results of this empirical study shed a more nuanced insight for further research in a new media context.

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#### Corresponding author

Hua Pang can be contacted at: [Cassieph@163.com](mailto:Cassieph@163.com)

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