



Influences of life stress, anxiety, self-efficacy and social support on social networking addiction among college students in China and the United States

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Abstract

Objectives: Studies on the addictive nature of online social networking activities are emerging, as the usage of online social networking platforms has become increasingly popular. This study aimed to investigate the effects of demographic (age and gender), psychosocial (self-efficacy, social support and life stress), and affective (anxiety) factors on Online Social Networking (OSN) addiction among college students in China and the United States.

Method: A convenience sample of 2160 college students (1026 males, 1133 females) aged between 18-25 years old were recruited from China (N = 1035) and the United States (N=1125). These students completed questionnaires on life stress, anxiety, self-efficacy, social support and online social networking activities.

Results: Results showed that 24.5% of the college students in China and 12.1% in the United States were addicted to online social networking. For both countries, OSN addicts reported more life stress and higher anxiety than non-addicts. Only US addicts reported lower self-efficacy and less social support than non-addicts in US. Multivariate analyses also showed that OSN addiction was related to female gender, low self-efficacy, life stress and anxiety among college students in the United States. For college students in China, OSN addiction was associated with life stress and anxiety only.

Conclusions: The present results indicate that country-specific health education approaches and interventions regarding OSN addiction are warranted in order to maximize the efficiency of strategies.

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Keywords: Online social networking addiction; Risk factors; Anxiety; Cross-cultural comparison

Introduction

Social networking sites are web-based virtual communities where users interact with real-life friends and meet other people with shared interests. It has been one of the major driving forces behind people using the Internet. Social networking sites/platforms/apps such as Facebook, Twitters, and Instagram in the United States (US) and WeChat and Renren in mainland China have attracted large numbers of users. Statistics have shown that about 70% of Americans use social networking sites to connect with one another, engage with news content, share information and entertain themselves [1]. In China, Wechat is the most widely used social networking platforms and was estimated to have almost 900 million monthly active users [2]. With the increasing availability and diversification of the social networking sites, recent clinical and research attention have begun to focus on the potentially addictive nature of online social networking [3,4]. Online Social Networking (OSN) addiction involves the problematic use of online social networking sites accompanied by an overall sense of lack of control as well as other addiction symptoms, such as higher tolerance, withdrawal experiences, and preoccupation [3]. Research has shown that about 9.4% of US college students reported disordered social networking [5], and 28.6% of undergraduate students would be classified as at-risk of OSN addiction [6].

A few psychosocial factors have been found to associate with OSN addiction among college students and young adults. For example, loneliness was related to the use of online social networking sites for social connection among university freshmen in the US [7]. Poor offline social support was linked to higher tendency of OSN addiction among college students in China [6,8]. Favourable outcome expectancies and high self-efficacy regarding Internet use were positively associated with tendency to OSN addiction among Chinese smart phone users [9]. However, it was also found that young people's perceived efficacy of using online social networking sites did not predict their actual high usage of these sites [10]. Also, a study on university students in Macao, China found that lower self-efficacy in reducing Internet use was associated with higher tendency to OSN addiction [6]. Other research also noted that when confronted with excessive life stress, young people may incline to increase their Internet use (including the use of social networking sites) to manage moods, compensate for social interaction, and escape from reality. Tang, et al., [11] reported that after controlling for demographic characteristics, interpersonal and school-related problems as well as anxiety symptoms were significantly associated with Internet-related addiction [11].

Researchers have found that individuals with emotional and psychological disturbances had higher tendencies to be addicted to online activities to fulfil their social and emotional needs due to availability, easiness and high anonymity of these activities [12]. It was also found that difficulties in emotion regulation was related to OSN addiction among US undergraduate students [13]. College students were more prone to anxiety due to (1) transition from high school to college life, (2) new lifestyle, new friends, roommates, exposure to new cultures and alternate ways of thinking, (3) academic pressure and tough competition, (4) separation from home, and (5) difficulty to achieve social intimacy [14]. Social networking sites have created new and non-personal way to interact with others and college students may take advantage of this technological trend to obtain support in order to cope with their anxiety during college years [15]. Indeed, anxiety was found to be a significant

predictor for Facebook addiction among Turkish undergraduate students [16]. A recent large scale study in Norway also found that anxiety could predict OSN addiction, even after controlling for demographic factors and other psychiatric conditions such as ADHD and OCD [17].

Studies have been equivocal regarding the effect of gender on OSN addiction. Some studies showed that females tend to develop addictive use of social networking sites and texting in comparison to males [18,19]. Another study on the Facebook usage of African American college students showed no gender difference in excessive Facebook use [20]. Other studies, on the other hand, have reported higher levels of OSN addiction among men [21]. Age also appears to be a significant factor. OSN addiction was found to be more prevalent in younger compared to older people [18,22], as online platforms play a crucial role in the leisure and social lives of youth nowadays.

To the best of our knowledge, there was not yet a cross-cultural study examining the role of anxiety on OSN addiction in the presence of other demographic and psychosocial risk factors. This study examined the conjoint role of several risk factors (demographics of age and gender, psychosocial factors, and emotional factor of anxiety) in multivariate analyses with a comparative sample of Chinese and US college students.

Method

Procedure

A convenience sample of 2160 college students (1026 males, 1133 females) aged between 18-25 years old were recruited from China (N = 1035) and the US (N=1125). The students were recruited via advertisement in university websites, student activity centres, and dormitories. They were from different departments of the universities. US students completed the online English questionnaires. The English questionnaire was translated to Chinese by one expert in the field who are proficient in both English and Chinese. The Chinese version was then back-translated to English by another Chinese-English bilingual expert. Modifications were then made to the Chinese translation to ensure translation equivalence. The final Chinese version of the questionnaire was then administered to students in China who completed the questionnaires by paper-and-pencil. The questionnaires took about 20 minutes to complete, and no personal identifiable data was collected.

Ethics

The study was approved by the Institutional Review Board of the affiliated university of the authors. Informed written consents were obtained before students individually completed a set of anonymous self-administered questionnaire.

Sample

The total sample included 2160 college students (China: N=1035; US: N=1125), with 1026 males and 1133 females. The ages of the total sample ranged from 18 to 25 years old, with a mean age of 20.58 years (SD=1.89). Compared to US students, Chinese students were younger (means=21.49, 19.60 respectively; $t=-26.84$, $p<.000$).

Instruments

Online social networking addiction (OSN addiction)

The 6-item Bergen Facebook Addiction Scale (BFAS) [3] was used to measure OSN addiction. The original term "Facebook

use” was changed to “online social networking” to include the use of various online social networking sites [19]. Internal reliabilities of this scale for this study averaged to be .83. The scores range from 6 to 30. Scoring cut-off of 19 was used to categorize OSN addiction. The Cronbach’s alpha coefficient for this study is 0.79.

Anxiety

Anxiety was measured by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [23]. Scoring 3 or more of the 6 symptoms on the anxiety scale (with at least symptoms having been present for more days than not for the past 6 months) is used to identify anxiety. For current study, the internal reliability alpha is 0.84.

Self-efficacy

Self-efficacy was measured by the general perceived self-efficacy scale [24]. It is a 10-item scale that measures general self-efficacy. The retest-reliability was $r=0.67$ [24]. A typical item is “Thanks to my resourcefulness, I can handle unforeseen situations”. Possible responses are not at all true (1), hardly true (2), moderately true (3), and exactly true (4), yielding a total score between 10 and 40. The Cronbach’s alpha for this study is 0.87.

Social support

The short form of the Social Support Questionnaire [25] was used to measure an individual’s satisfaction with his or her perceived social support using a 4-point Likert scale ranging from 1=strongly disagree to 4= strongly agree. It is a 6-item questionnaire, and total score ranges from 6 to 24. Past research has found this scale having very good internal reliability of .94 [26]. For this study, the Cronbach’s alpha coefficient is 0.87.

Life stress

Participants’ lifetime experience of stressful events was assessed with a 9-item checklist [27]. These items include stress in relation to work/study, health, family/interpersonal, financial, law abiding, alcohol/drug use, psychiatric/emotional concerns, sleeping/eating disturbance, and disruptive gambling of family members. Participants were asked to indicate with “yes” or “no” to each item on the checklist. For this study, the internal consistency alpha value was 0.65.

Demographic factors

Participants were also asked to provide information about their age and gender.

Data Analysis

The data were analysed with the computerized statistical package, SPSS version 23. Descriptive statistics including means and SDs were used to describe the data. Independent sample t-test and Chi-square tests were used to investigate country differences. Pearson correlation coefficients were calculated to assess the interrelationships between two variables. Two hierarchical regression analyses were conducted separately for China and US samples. OSN addiction as the dependent variable of these regression analyses. There were 3 groups of predictors: Demographic variables (age and gender) were entered in the first step, followed by psychosocial factors (self-efficacy, social support and life stress), and emotional factor (anxiety) was entered in the last step. Preliminary analyses ensured that there was no violation of the assumptions of normality, linearity, multi collinearity and homoscedasticity.

Results

Table 1 showed the sample characteristics of the current sample. Chinese students reported higher scores on OSN addiction than US students (means=15.41, 12.55 respectively; $t=14.09$, $p<.000$). Among Chinese students, males and females did not differ on OSN addiction. However, US female students reported higher scores on OSN addiction (means=13.46, 11.63, respectively; $t=-6.58$, $p<.000$). Table 2 presents correlation coefficients of major variables as broken down by China and US students. OSN addiction was positively correlated with anxiety and life stress in both countries. OSN addiction was negatively correlated with self-efficacy and social support in the US sample.

Results from regression analyses stratified by country are presented in Table 3. In China, age and gender were entered in Step 1, explaining 0.1% ($F(2, 999) = .50$, $p=.61$) of the variance in OSN addiction. Self-efficacy, social support and life stress were entered in Step 2 explained a further 2.3% of the variance in OSN addiction, $\Delta R^2=.023$ ($\Delta F(3, 996)=4.94$, $p<.000$). Anxiety was entered into Step 3 and explained a further 4.6% of the variance in addictive social networking, $\Delta R^2=.046$, ($\Delta F(1, 995) = 7.71$, $p<.000$). The total variance explained by the model as a whole was 6.8%, $F(6, 995)= 13.14$, $p<.000$). In the final model, only life stressor ($\beta = .09$, $p <.05$) and anxiety ($\beta = .23$, $p <.000$) were positively associated with OSN addiction in China.

For US students, age and gender were entered in Step 1 of the multiple regression, explaining 3.5% of the variance in OSN addiction ($F(2, 1094) = 20.73$, $p<.000$). Self-efficacy, social support and life stress were entered in Step 2 and explained a further 5.5% of the variance in OSN addiction, $\Delta R^2 = .055$ ($\Delta F(3, 1091) = 1.88$, $p<.000$). Anxiety was entered into Step 3 and explained a further 3.3% of the variance, $\Delta R^2 = .033$, ($\Delta F(1, 1090) = 4.01$, $p<.000$). The total variance explained by the model as a whole was 12.3%, $F(6, 1090)= 26.63$, $p<.000$). In the final model, being female ($\beta = .13$, $p<.000$), life stress ($\beta = .12$, $p <.000$), anxiety ($\beta = .20$, $p<.000$), and low self-efficacy ($\beta = -.08$, $p<.05$) were associated with OSN addiction among US college students.

According to the cut-off score of the scale on OSN addiction, 18% of the total sample would be classified as online social networking addicts. The percentages of OSN addiction were higher among college students in China than in the US (24.5% vs 12.1%). Table 3 shows the differences in self-efficacy, social support, life stress and anxiety among online social networking addicts and non-addicts in China and the US. For both countries, social networking addicts reported more life stress and higher anxiety than non-addicts. When students were further grouped by countries, addicts in the US reported lower self-efficacy and less social support than non-addicts in US. There was no difference on self-efficacy and social support between Chinese addicts and non-addicts.

Discussion

This study showed that rates of OSN addiction differed between college students in China and in the US. In particular, the rates of OSN addiction were higher among Chinese (24.5%) in comparison to US college students (12.1%). These figures are comparable to the prevalence found in previous studies - 9.4% for US college students [5] and 28.6% for Chinese college students [6]. Asian countries were reported with high rates of smart phone ownership and use [28]. Researchers suggested that the popularity of tablets and smart phones among Asian countries

might be one of the reasons behind the increased risks of addiction to online social networking activities [29]. A recent cross-cultural study on Facebook usage found that people who feel as part of a group rather than as unique individuals more often become involved in Facebook, probably because the social network gives them an opportunity to be part of a community that highlights their identity [30]. Asian cultural values of collectivism and interdependence self-construal provide the social motivation to stay connected to maintain relationship could be another justification for this result.

One of the main aims of this study was to examine the effect of anxiety on OSN addiction in the presence of other demographic and psychosocial risk factors in different countries. Results showed that higher anxiety level was found to associate with OSN addiction in both China and the US, even after controlling for other risk factors. Anxiety level was higher among online social networking addicts than non-addicts in both countries. Other study also found that online social networkers were more anxious than depressed [5]. It may be that anxious students may have difficulties communicating and interacting with others in real life. They may perceive online social networking sites as safer platforms [31] and use them as primary means of communication to regulate fears related to real life interaction and anticipated rejection [32]. They may also engage excessively in these online social networking sites to validate their self-worth or reduce intolerable feelings of uncertainty or worry through frequent posting on these sites to obtain comments and "likes" [33]. Anxiety in college students may also be related to FOMO (fear of missing out), a pervasive apprehension that others might be having rewarding experiences from which one is absent. These anxious students tend to have a strong desire to stay continually connected with what others are doing [34]. With social networking sites nowadays, any individual has the ability to see other's updates on their lives in real time. This particular feature of social networking sites enables anxious students to fuel on their need to constantly access to these sites. Over time, these students may become increasingly relied on these sites to reduce their FOMO, eventually leading to OSN addiction.

This study also found that stress in various life domains could predict OSN addiction for students in both countries. Similar findings were noted in studies that showed stressors stemming from interpersonal and school-related problems and anxiety symptoms were associated with Internet-related addiction, after controlling for demographic characteristics [27]. Online social networking sites have created new and non-personal way for people to interact with others and many students have taken advantage of this technological trend to obtain support in order to cope with the stress during college years [15]. Online social networking also provides immediate and interactive comments and feedback, and students may become overly relied on this mode of support. This may reduce students' motivation and ability to seek alternate source of support, leading to repeated and addictive use of online social networking in order to cope with life stress.

Previous studies had shown that poor social support is associated with OSN addiction among college students in both US and China [6-8, 35]. However, this study found that social support failed to predict OSN in both countries. One plausible reason could be the evolution and development of the functions of social networking sites in the recent years. Social networking sites started off as online platforms for enhancing communica-

tion and bonding and was believed to contribute to well-being because it increases social capital, and, in turn, social support [36]. However, in recent years, in addition to basic features for communication such as chatting, blogging, instant messaging etc, online social networking sites have also evolved to provide more variety of features for the users. They have become online platforms to make profiles, upload photos and videos, join different groups/online communities, learn about latest news and events, play games, share music and video, and even dating and shopping. Some celebrities also used their social networking accounts to create fans club and live updates their fans regularly. It could be argued that, for the youths, seeking social support may no longer be the main motivation for using online social networking sites. Other features of these sites, for example, live feed when one's idol go online, information on sales in one's favourite boutique etc might serve as a hook for the youths to access these sites. On top of that, with the availability of mobile phones nowadays, youths are able to access and respond to these live feeds on online social networking sites anytime and anywhere to get the most updated news, all these greatly increase the risk to develop OSN addiction.

Individuals with lower self-efficacy tend to perceive a higher probability of receiving negative outcomes in the interpersonal domain of life and lack confidence that they could effectively deal with negative situations [37]. Online interactions on social networking platforms are far more "manageable" than the real life relationships, and hence create a "safe haven" for individuals to develop and maintain social interaction. This might make individuals with low self-efficacy more prone to develop OSN addiction. In line with this thinking, this study found that low self-efficacy was a significant predictor for OSN addiction. However, this result was evident among US students only but not among Chinese students. A plausible explanations could be the perceived negative outcome expectations (e.g. cyberbullying) among US students regarding online social networking. Past cross-cultural studies did find that North American students reported higher levels of cyberbullying than their Asian counterparts [38,39]. An interesting study found that the capabilities to use new media technology and to produce "high quality" posts in order to attract followers and the mastery of latest trendy grassroots language were described to be essential to avoid online criticism or discrimination and produce more positive social networking experience [40]. In order to avoid cyberbullying, individual with low self-efficacy in US might be spending excessive time in formulating their postings and responses on social networking platforms as well as checking their account more in order to invigilate responses from their readers which could lead to the plight of getting addicted. Moreover, personal characteristics were stronger predictors of the usage of social networking sites in an individualistic than in a collectivistic culture [41]. This is consistent with the emphasis on self in the individualistic culture and on family, friends and one's groups in the collectivistic culture. Since collectivistic culture such as China emphasized more in the importance of groups, hence, individual personal characteristics such as self-efficacy may only have minor influence on OSN addiction among Chinese students.

The current study found that gender was a significant predictor for OSN addiction in the US, with females being more likely to be addicted after controlling for demographic and psychosocial factors. However, this gender difference was not found among Chinese college students. In fact, gender differences in OSN addiction are inconclusive in the literature. For example, some studies found that female Americans use social network-

ing sites and had more social motives than American males [42]. However, another study found that there was no difference in the prevalence of OSN addiction for male and female undergraduate students [14]. In China, studies regarding gender differences on social networking addiction are scarce. One recent study from Macau, China found that male college students reported higher Internet addictive tendencies than female students, but not social networking use [6]. Future cross-cultural studies should be conducted to further investigate gender differences on OSN addiction in different countries [43,44].

Limitations

This study has several limitations, thus, caution should be taken when generalizing and interpreting its findings. This study recruited only college students and used self-report instruments instead of diagnostic tools to define OSN addiction. Furthermore, only cross-sectional data was obtained, thus, causal effect would not be established. Homogeneity of various social networking sites was assumed without examining the specific nature of these sites. Also, anxiety was examined with self-reports of DSM anxiety symptoms without clinician assessment. Findings may thus reflect either an over- or under-estimation

of the phenomenon. Another limitation of the present study involved the Web based convenience sampling methodology in the US sample which might have led to an oversampling of individuals who worried about their online habits. Finally, a common questionnaire protocol with same measurement scales is used for both countries. Hence, unique experiences of students in individual countries were not explored.

Conclusions

Despite the limitations, the current study filled in the gap of knowledge in some important aspects. The current study shed light on the plausible country-specific health education approaches and treatment plans regarding social networking addictions. In particular, while considering intervention or treatment for OSN addiction among college students for all countries, it is suggested that management of anxiety and life stress should be included. The program regarding prevention and recovery of OSN addiction should also include components that teach young adults how to cope with anxiety and life stress in order to maximize the effectiveness of intervention strategies. Besides this, specific attention and effort should be targeted at female college students and students with lower self-efficacy in US while handling the issue of OSN addiction.

Tables

Table 1: Sample Characteristics

	Total (N=2160)	China (N=1035)	United States (N=1125)	
Gender				
Male	1026 (47.5%)	467 (45.5%)	559 (49.7%)	$\chi^2 (1) = 4.42, p = .04 < .05$
Female	1133 (52.5%)	567 (54.8%)	566 (50.3%)	
	Mean(SD)	Mean (SD)	Mean(SD)	
Age	20.58 (1.89)	19.60 (1.18)	21.49 (1.96)	$t(2157) = -26.84, p < .000$
Self-Efficacy	29.37(4.91)	27.86 (4.61)	30.75 (4.78)	$t(2135) = -14.20, p < .000$
Social Support	17.86(3.75)	18.29 (3.29)	17.46 (4.09)	$t(2126) = 5.11, p < .000$
Life Stress	1.92(1.83)	1.67 (1.66)	2.16 (1.95)	$t(2124) = -6.16, p < .000$
Anxiety	4.38(1.76)	4.27 (1.77)	4.48 (1.75)	$t(2127) = -2.92, p < .05$
Social Networking	13.92(4.91)	15.41 (4.64)	12.55 (4.76)	$t(2154) = 14.09, p < .000$
	Male	15.26 (4.69)	11.63(4.58)	
	Female	15.53 (4.59)	13.46(4.76)	
		$t(1028) = -.93, p = .35$	$t(1123) = -6.58, p < .000$	

Table 2: Correlation coefficients between study variables

VARIABLES	CHINA (N=1035)						US (N=1125)					
	1	2	3	4	5	6	1	2	3	4	5	6
1. AGE	-	0.03	-0.04	0.01	0.02	0.03	-	0.01	0.01	.09**	0.01	-0.03
2. SELF-EFFICACY		-	-0.01	-0.17**	-0.23**	-0.05		-	.34**	-.21**	-.24**	-.18**
3. SOCIAL SUPPORT			-	-0.04	0.02	-0.01			-	-.25**	-.15**	-.10**
4. STRESSOR				-	0.29**	.15**				-	.34**	.23**
5. ANXIETY					-	.26**					-	.29**
6. ONLINE SOCIAL NETWORKING ADDICTION						-						-

* Correlation is significant at the .01 level (2-tailed); ** Correlation is significant at the .001 level (2-tailed)

Table 3: Results from the Hierarchical Regression Analyses

	ONLINE SOCIAL NETWORKING ADDICTION									
	China					United States				
	B	SE	Beta	t	Δ R2	B	SE	Beta	t	Δ R2
STEP 1					-.001					.035**
GENDER (MALE=1)	.24	.29	.03	.82		1.79	.28	.19	6.34**	
AGE	.07	.13	.02	.58		-.11	.07	-.04	-1.48	
STEP 2					.023**					.055**
GENDER (MALE=1)	.23	.30	.03	.79		1.44	.28	.15	5.12**	
AGE	.07	.12	.02	.54		-.14	.07	-.056	-1.94	
SELF-EFFICACY	-.02	.03	-.02	-.48		-.12	.03	-.12	-3.71**	
SOCIAL SUPPORT	-.01	.04	-.01	-.20		-.03	.04	-.03	-.94	
LIFE STRESS	.44	.09	.16	4.91**		.43	.07	.18	5.79**	
STEP 3					.046**					.033**
GENDER (MALE=1)	.24	.29	.03	.84		1.12	.28	.13	4.30**	
AGE	.06	.12	.02	.53		-.13	.069	-.053	-1.86	
SELF-EFFICACY	.03	.03	.03	.90		-.08	.03	-.08	-2.69*	
SOCIAL SUPPORT	-.02	.04	-.01	-.35		-.03	.04	-.02	-.76	
LIFE STRESS	.26	.09	.09	2.88*		.29	.076	.12	3.86**	
ANXIETY	.61	.09	.23	7.09**		.55	.08	.20	6.52**	

* Significant at the .01 level (2-tailed); **Significant at the .001 level (2-tailed)

Table 4: Differences between Online Social Networking Addicts and Non-addicts

	CHINA		UNITED STATES	
	Addicts (N=253)	Non-addicts (N=778)	Addicts (M=136)	Non-Addicts (N=989)
SELF-EFFICACY	27.84 (4.68)	27.84 (4.58)	29.92 (5.57)	30.86 (4.65)
	t(1015) = .015, p = .99		t(1114) = 2.15, p < .05	
SOCIAL SUPPORT	18.38 (3.28)	18.26 (3.30)	16.56 (4.66)	17.59 (4.00)
	t(1024) = .48, p = .63		t(1096) = 2.71, p < .05	
LIFE STRESSOR	2.11 (1.76)	1.53 (1.61)	3.05 (2.20)	2.04 (1.89)
	t(1022) = -4.84, p < .000		t(1096) = -5.68, p < .000	
ANXIETY	4.77 (1.52)	4.10 (1.81)	5.16 (1.41)	4.39 (1.78)
	t(1025) = -5.27, p < .000		t(1096) = -4.75, p < .000	

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