CYBERPSYCHOLOGY, BEHAVIOR, AND SOCIAL NETWORKING
Volume 16, Number 11, 2013

DOI: 10.1089/cyber.2012.0557

RAPID COMMUNICATION

Social Support and Social Interaction Ties on Internet Addiction: Integrating Online and Offline Contexts

Edward Shih-Tse Wang, PhD,[1] and Michael Chih-Hung Wang, PhD[2]

Abstract

This study explores the relationship between social support and social interaction ties on Internet addiction by integrating both online and offline social encounters. A total of 1,642 members of online social communities participated in this research, for which structural equation modeling was used for analysis. The findings show that social support is positively associated with social interaction ties in both online and offline contexts. In addition, online social support and online social interaction ties are positively associated with Internet addiction, whereas offline social support and social interaction ties on Internet addiction are negatively associated. This finding has important implications not only for understanding the cause of Internet addiction but also for understanding the diminishing Internet addiction due to social support and social interaction ties.

Introduction

An excessive use of the Internet results in Internet addiction,[1] a type of behavioral addiction[2] that has been recognized as a mental health problem.[3] Internet addiction has attracted significant research attention,[4–7] and researchers have attempted to explore its causes. Researchers have suggested that key influencers of Internet addiction include recent stressful events[2] and family factors.[2,8] Despite the popular interest and challenge for both academics and practitioners, studies on how to diminish or eliminate Internet addiction are scant. Whereas online surfing has grown dramatically, few researchers have empirically studied or examined how to mitigate Internet addiction. Consequently, knowledge that explores the underlying factors that might preclude Internet addiction and their mechanisms is limited.

Internet addiction is mainly related to the social aspects of Web usage.[9] Social networking sites are predominantly used for social purposes,[10] and people who are immersed in a virtual life forget about the physical world around them,[11] a behavior that may result in Internet addiction.[10] Social networking brings people together into specific groups and is often represented as a form of social relationship. Social interaction is the interpersonal relationship between a person and others, and high social interaction ties show a high level of frequency and time investment.[12] Research has suggested that social networks provide empathy support.[13] A previous study has documented that social relationships importantly influence social support,[14] which refers to social resources or social assets that people use when they need assistance, advice, approval, or protection.[15] Previous research further suggests that group members provide each other social support, which leads to loyalty.[16]

Because of increasing social interactions in online environments, the social network is no longer confined to only a physical space, but now exists in both a physical space (e.g., workplace, school, or the community) and nonphysical cyberspace. The Internet provides surfers the opportunity to build social relationships with other online surfers. The Internet is not addictive, but its highly interactive applications, such as online gaming or online chatting, have the potential to become addictive.[17] Instead of having face-to-face interaction, online social network members communicate with one another online. Despite the common use of the Internet for socializing,[18] little is known of the mechanism of social relationships on Internet addiction. By developing a conceptual model, this study attempts to explore the relationship of social support and social interaction ties on Internet addiction in both online and offline settings.

Methods

Research setting, sample, and data collection

This study used online survey panels and distributed survey questionnaires to online community members who were asked to participate in the survey. The online survey

[1]Graduate Institute of Bio-Industry Management, National Chung Hsing University, Taichung, Taiwan, Republic of China.
[2]Department of Business and Administration, Asia University, Taichung, Taiwan, Republic of China.

was chosen as the research setting because the study subjects were online surfers; thus, an online survey could target them more easily than an offline survey could.[19] If the qualified online community members accepted the invitation, they were requested to share their social interaction experiences with both virtual community members and their acquaintances offline. Thereafter, respondents were asked to determine their level of agreement with each question. In each case, a seven-point Likert scale measured their responses, from 1 (strongly disagree) to 7 (agree), with higher scores indicating a higher level of agreement. A total of 1,642 participant questionnaires were collected, calculated, and determined.

Participant demographic statistics

The sample consisted of more women (60.4 percent) than men (39.6 percent). Respondents fell into various age groups ranging from less than 19 years (3 percent) to more than 60 years (0.2 percent), with most of them between 20 and 39 years of age (81 percent) (mean age = 31.67, $SD = 7.8$). Table 1 shows detailed descriptive statistics related to respondent profiles.

Measures

This study developed a survey consisting of 38 items. All the measures for each construct were adopted from the existing literature and the wording changed slightly to fit the current research context. Both online and offline social interaction ties were measured by two 4-item scales derived from Chiu et al.[20] A sample item for online (offline) social interaction ties was as follows: "You maintain close social relationships with some members in the online community." ("You maintain close social relationships with someone [not in Internet land]"). Two 11-item scales adapted from Leung and Lee[21] were used to measure online and offline social support, respectively. A sample item was, "Some members in the online community whose advice you really want" (online social support) and "Someone (not in Internet land) whose advice you really want" (offline social support). Finally, an 8-item scale adapted from Young[22] measured the level of Internet addiction. A sample item was, "You feel preoccupied with the Internet (you think about your previous on-line activity or anticipate your next on-line session)." Because all the scales were originally in English and this study collected data in Taiwan, a non-English-speaking country, following Reynold et al.,[23] a back-translation procedure was conducted to ensure no differences existed between English and the Mandarin version. All 38 items are presented in Table 2.

Table 1. Descriptive Statistics of Participant Profiles

	Frequency	*Percentage*
Age		
≥19	50	3.0
20–29	637	38.8
30–39	703	42.8
40–49	207	12.6
50–59	42	2.9
≤60	3	0.2
Sex		
Male	651	39.6
Female	991	60.4
Education		
Elementary school	1	0.1
Junior high school	18	1.1
Senior high school	191	11.6
College	288	17.5
University	920	56.0
Master or doctorate	224	13.6

Data Analysis and Results

Confirmatory factor analysis

AMOS 18.0 was used for the structural equation modeling analysis. Following Anderson and Gerbing's[24] procedure, a confirmatory factor analysis (CFA) was performed first, and then a structural model was run to test the research hypotheses. According to Bentler[26] and Browne and Cudeck,[27] this study adopted the goodness of fit of the models with χ^2/df, comparative fit index (CFI), non-normed fit index (NNFI), and root-mean-squared error of approximation (RMSEA). Because χ^2/df depends on the sample size, which is not stable,[28] this study focused only on CFI, NNFI, and RMESA. An acceptable model fit is indicated by CFI and NNFI values ≥0.90 and RMSEA values ≤0.08. All analyses were performed using the covariance matrix. The initial results of the CFA demonstrated a poor model fit ($\chi^2/df = 8{,}430.09/655 = 12.83$; CFI = 0.88; NNFI = 0.87; RMSEA = 0.085). The model was improved by deleting three items (one item from online social support; two items from Internet addiction) based on modification indices, where the final model had an acceptable model fit ($\chi^2/df = 5{,}931.78/550 = 10.785$; CFI = 0.91; NNFI = 0.9; RMSEA = 0.077). After CFA, a multivariate normality test following Bollen[25] that if the Mardia coefficient is less than $P(P+2)$, where P is the number of measurement items (in this study, 35 items), then there is multivariate normality. On the basis of the results from AMOS, the Mardia coefficient was 340.303, which was less than 1,295 (i.e., 35×37); therefore, this study affirms that the data have a multivariate normal distribution, which allows for the use of the maximum likelihood estimation method in the following SEM analyses.

Table 2 presents standardized factor loadings, composite reliability (CR), and average variance extracted (AVE) for each construct (excluding the three deleted items). According to Fornell and Larcker,[29] CR is analogous to the coefficient alpha to examine the reliability of the construct, whereas AVE is to calculate the shared variance for the construct to examine the validity of the construct. Table 2 also shows that the composite reliabilities, ranging from 0.90 to 0.97, exceeded the criterion threshold of 0.6, indicating good reliability. To examine discriminant validity, this study examined whether each latent factor AVE value exceeded squared correlations between each of the latent factors. As shown in Tables 2 and 3, all discriminant validity indicators fell within accepted ranges. Research scales conclusively captured distinct components. Table 3 also shows the means and standard deviations for the final research constructs.

SEM analyses and hypothesis testing

After CFA analyses, an analysis of the structural model (five factors with 35 items) was conducted. As shown in

Table 2. Standardized Factor Loadings, CR, and AVE for the Scale

Core constructs	*Items*	*Standardized factor loadings*	*CR*	*AVE*
Online social interaction ties	1. You maintain close social relationships with some members in the online community.	0.88	0.92	0.75
	2. You spend a lot of time interacting with some members in the online community.	0.88		
	3. You know some members in the online community on a personal level.	0.79		
	4. You have frequent communication with some members in the online community.	0.90		
Online social support	1. Some members in the online community whose advice you really want	0.72	0.94	0.61
	2. Some members in the online community who give you good advice about a crisis	0.74		
	3. Some members in the online community who give you information to help you understand a situation	0.70		
	4. Some members in the online community you can turn to for suggestions on how to deal with a personal problem	0.70		
	5. Some members in the online community you can get together with for relaxation	0.78		
	6. Some members in the online community you can do something enjoyable with	—[a]		
	7. Some members in the online community you can do things with to help you get your mind off things	0.81		
	8. Some members in the online community who show you love and affection	0.79		
	9. Some members in the online community who love you and make you feel wanted	0.84		
	10. Some members in the online community who comfort you sincerely	0.85		
	11. Some members in the online community you can count on to listen to you when you need to talk	0.86		
Offline social interaction ties	1. You maintain close social relationships with someone (not in Internet land).	0.90	0.95	0.84
	2. You spend a lot of time interacting with someone (not in Internet land).	0.91		
	3. You know someone on a personal level.	0.92		
	4. You have frequent communication with someone (not in Internet land).	0.93		
Offline social support	1. Someone (not in Internet land) whose advice you really want	0.83	0.97	0.78
	2. Someone (not in Internet land) who can give you good advice about a crisis	0.78		
	3. Someone (not in Internet land) who can give you information to help you understand a situation	0.86		
	4. Someone (not in Internet land) you can turn to for suggestions about how to deal with a personal problem	0.83		
	5. Someone (not in Internet land) you can get together with for relaxation	0.90		
	6. Someone (not in Internet land) you can do something enjoyable with	0.92		
	7. Someone (not in Internet land) you can do things with to help you get your mind off things	0.89		
	8. Someone (not in Internet land) who shows you love and affection	0.92		
	9. Someone (not in Internet land) who loves you and makes you feel wanted	0.92		
	10. Someone (not in Internet land) who comforts you sincerely	0.93		
	11. Someone (not in Internet land) you can count on to listen to you when you need to talk	0.90		

(*continued*)

Table 2. (Continued)

Core constructs	Items	Standardized factor loadings	CR	AVE
Internet addiction	1. You feel preoccupied with the Internet (you think about your previous online activity or anticipate your next online session).	—[a]	0.90	0.60
	2. You feel the need to use the Internet with increasing amounts of time to achieve satisfaction.	0.73		
	3. You have repeatedly made unsuccessful efforts to control, cut back, or stop your Internet use.	0.84		
	4. You feel restless, moody, depressed, or irritable when attempting to cut down or stop your Internet use.	0.88		
	5. You stay online longer than originally intended.	0.69		
	6. You have jeopardized or risked the loss of a significant relationship, a job, or an educational or career opportunity because of the Internet.	0.72		
	7. You have lied to family members or others to conceal the extent of your involvement with the Internet.	—[a]		
	8. You use the Internet to escape from problems or to relieve a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression).	0.68		

[a]Items are deleted according to modification indices.
Model fit index: CFI = 0.91; TLI = 0.9; RMSEA = 0.077.
CR, composite reliability; AVE, average variance extracted; CFI, comparative fit index; TLI, Tucker–Lewis index; RMSEA, root-mean-squared error of approximation.

Figure 1, age (a demographic variable) was introduced as a control variable as it is confirmed to correlate with Internet addiction (see Widyanto and McMurran[30]). The results showed an acceptable model fit: $\chi^2/df = 6{,}151.25/585 = 10.515$; CFI = 0.91; NNFI = 0.90; RMSEA = 0.076. This study identifies whether links exist from social interaction ties and social support to Internet addiction in the context of the online and offline environment. This study also examines the contribution of social interaction ties to social support. The model integrates social support and social interaction ties to suggest that regardless of online and offline environments, social interaction ties have a significant relationship with social support ($\gamma_{11} = 0.78$, $p < 0.001$, for the online environment; $\gamma_{22} = 0.78$, $p < 0.001$, for the offline environment). Whereas online social interaction ties ($\gamma_{31} = 0.45$, $p < 0.001$) and online social support ($\beta_{31} = 0.20$, $p < 0.001$) induce Internet addiction, offline social interaction ties ($\gamma_{32} = -0.21$, $p < 0.001$) and offline social support ($\beta_{32} = -0.09$, $p < 0.05$) reduce addiction. Moreover, the control variable, age, does not have significant influence on Internet addiction ($\gamma = -0.03$, not significant).

Moreover, according to Bakken et al.,[31] not only age but also sex plays an important role in understanding Internet addiction. This study considered sex as a moderator and conducted a further analysis. A group comparison followed two steps: (a) an overall chi-square difference test (constrained all the paths being equal vs. all the paths estimated freely), and (b) a chi-square difference test on individual paths. Results for overall chi-square difference show that sex moderates the relationships among proposed models ($\Delta\chi^2[7] = 113.11$, $p < 0.05$), and then the differences between each individual structural path were tested to identify which of the paths caused differences in the research model structure. As shown in Table 4, only online social support on Internet addiction found that male ($\beta = 0.34$, $p < 0.05$) and female ($\beta = 0.14$, $p < 0.05$) have significant differences ($\Delta\chi^2[1] = 5.96$, $p < 0.05$).

Table 3. Basic Statistics

Constructs	Items	Mean	SD	Correlations				
				OnSIT	OnSS	OfSIT	OfSS	IA
OnSIT	4	4.12	1.08	0.86				
OnSS	10	4.34	0.96	0.72**	0.78			
OfSIT	4	4.97	1.07	0.36**	0.39**	0.91		
OfSS	11	5.07	1.04	0.37**	0.42**	0.75**	0.88	
IA	6	3.50	1.12	0.45**	0.41**	−0.02	0.01	0.77

The square root of the AVE for each construct is shown on the diagonal. Pearson correlation coefficients among the study variables. Scores: 1, strongly disagree; 4, neutral; 7, strongly agree.
**Correlation is significant at the 0.01 level (two-tailed).
OnSIT, online social interaction ties; OnSS, online social support; OfSIT, offline social interaction ties; OfSS, offline social support; IA, Internet addiction.

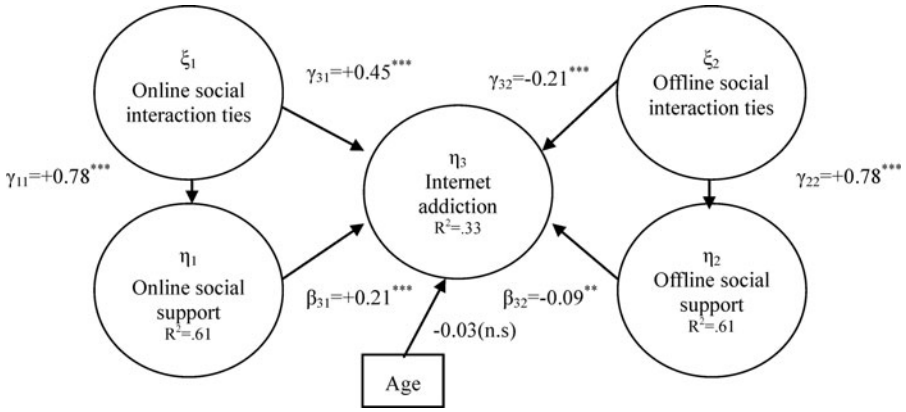

FIG. 1. Research results.

Discussion

This work integrates social interaction ties and social support of online and offline environment links to Internet addiction. The results of the current research show that Internet addiction is motivated by cyberspace social encounters. In the online environment, social support and social interaction ties are highly related to Internet addiction. On the basis of the research findings of this study, people who participate in online social network activities might form close social relationships with people in the online environment. These relationships might give them certain information or help them understand a situation, resulting in their feelings that they can count on someone online to listen to them when they need someone to talk to. In these cases, they feel the need to increase their Internet use, but repeatedly make unsuccessful efforts to control or stop their use. This finding is in line with that obtained by Yeh et al.,[32] who found that Internet addiction was predicted by virtual social support. People who obtain social support from their virtual networks show signs of elevated levels of Internet addiction.[33]

In contrast to online social support and social interaction ties, offline social support and social interaction ties are found to negatively relate to Internet addiction. This is no mere symbolic exercise; social support and social interaction ties in an offline environment can potentially prevent Internet addiction. This result is consistent with the findings obtained by Tsai et al.,[34] who indicated that offline social support had a negative influence on Internet addiction. Social support and social interaction ties occurring in an offline environment such as among family, colleagues, classmates, and friends decrease Internet addiction. Recommendations regarding the phenomenon begin by drawing attention to the importance of participating in social activities in an offline environment that intentionally maintains the social relationships within the family and friends, in the real world.

The control variable of age demonstrates no significant (although negative) relationship on Internet addiction, despite a profile that shows that the majority of respondents range in age from 20 to 39 years. Results of group comparison show that compared with females, the relationship that online social support has on Internet addiction is stronger for males. This interesting finding is perhaps because males tend to engage in task-oriented interactions,[35] whereas females prefer social–emotional behavior.[36,37] Therefore, when other members in the online community provide assistance, advice, approval, or protection (see definition of social support above), males are more likely to become addicted to the Internet than females are.

Table 4. Group Comparison

Model specification	*Male*	*Female*	*Chi-square differences and model fit*			
			$\Delta\chi^2$ (Δdf)	*CFI*	*NNFI*	*RMSEA*
Unconstrained	—	—	—	—	—	—
Baseline model	—	—	n.a.	0.9	0.89	0.056
Constrained	—	—	—	—	—	—
All structure loading	—	—	113.11 (7)[a]	0.9	0.89	0.056
Structural loading by path	—	—	—	—	—	—
OnSIT→OnSS (γ_{11})	0.82[a]	0.76[a]	2.108 (1)[n.s.]	0.9	0.89	0.056
OnSIT→IA (γ_{31})	0.38[a]	0.46[a]	0.553 (1)[n.s.]	0.9	0.89	0.056
OfSIT→IA (γ_{32})	−0.18[a]	−0.20[a]	0.008 (1)[n.s.]	0.9	0.89	0.056
OfSIT→OfSS (γ_{22})	0.80[a]	0.77[a]	0.271 (1)[n.s.]	0.9	0.89	0.056
OnSS→IA (β_{31})	0.34[a]	0.14[a]	5.96 (1)[a]	0.9	0.89	0.056
OfSS→IA (β_{32})	−0.08[a]	−0.10[a]	0.021 (1)[n.s.]	0.9	0.89	0.056
Age→IA	−0.03[n.s.]	−0.03[n.s.]	0 (1)[n.s.]	0.9	0.89	0.056

$\Delta\chi^2$ (1) = 3.84 ($p < 0.05$).
[a]Significance level < 0.05.
n.a., not applicable; n.s., nonsignificant; NNFI, non-normed fit index.

This study attempted to integrate social support and social interaction ties in two distinct fields that affect Internet addiction. A key weakness of this study was that it was based on a cross-sectional design and, therefore, did not provide evidence of causality. The possibility that Internet addiction may increase the online social ties and social support and may reduce offline social ties and support cannot be ruled out. Therefore, future research should consider a longitudinal research design, conducted over different periods. A caveat for this study is that it was conducted in Taiwan and its generalizability is uncertain. Previous research has shown that the Taiwanese society is fundamentally collectivist and relationship-oriented.[38] These social cultures may further explain why social support and social interaction ties affect Internet addiction. To provide evidence of generalizability, future research is needed to replicate our findings in countries with different social and cultural backgrounds. A greater understanding is needed of how social relationships influence Internet addiction behavior and causes academics and practitioners to take advantage of this enabling knowledge and insight. Finally, this study concerns only social support and social ties in both online and offline contexts on Internet addiction, respectively, without considering individual differences on these factors. Because of the complexity of individuals, future research can conduct a latent cluster analysis to get more insights for understanding respondents' differences on these research constructs.

Author Disclosure Statement

No competing financial interests exist.

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Address correspondence to:
Dr. Michael Chih-Hung Wang
Department of Business and Administration
Asia University
500, Lioufeng Road, Wufeng
Taichung 41354
Taiwan
Republic of China

E-mail: mchwang@asia.edu.tw