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Need for relatedness: a self-determination approach to examining attachment styles, Facebook use, and psychological well-being

Jih-Hsuan Lin

College of Communication, National ChengChi University, Taipei City, Taiwan

ABSTRACT

Employing attachment theory and self-determination theory, this study argues that attachment style represents essential innate needs for social connection among individuals and an important antecedent factor in social media research. Thus, attachment style influences how individuals use Facebook for social interaction to satisfy their need for relatedness and achieve psychological well-being. The results from university and national samples showed that individuals with high secure attachment gain satisfaction of the need for relatedness and perceive positive well-being, individuals with high attachment avoidance do not use Facebook for need satisfaction and perceive negative well-being, and individuals with high anxious attachment gain a sense of community through Facebook but still perceive loneliness. Indirect analyses showed that individuals with high secure and anxious attachment dimension lead to higher Facebook use, which provides a higher level of satisfaction of relatedness needs and results in more positive psychological outcomes. Additionally, communication with good friends on both Facebook and offline predicted higher well-being. These results successfully linked attachment theory to the self-determination process and extended both theories into the realm of social media. This study also provided a theoretical framework for future studies to examine the association between Facebook use and well-being. After controlling for personality traits including extraversion and self-esteem, attachment style still had considerable influence on psychological well-being, showing that attachment style is a distinct factor in predicting variances in well-being and further showing that innate need for relatedness is important when studying the need satisfaction process in social media. Future directions are discussed.

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Attachment style; self-determination theory; need satisfaction of relatedness; Facebook; well-being; loneliness

Introduction

The popularity of social network sites (SNSs) among Internet users has received tremendous attention in the worldwide academic literature in recent years, and Facebook has received most of that attention (Piotrowski, 2012). Facebook research has mostly centered on two areas of exploration. One line of research explores users' behavior, relationships

with others, and self-presentation on Facebook through their personalities and their uses and gratifications. Research has identified particular Big Five personality traits (Marshall, Lefringhausen, & Ferenczi, 2015), especially extraversion (Ross et al., 2009), as important factors that influence users' activities and presentation styles on Facebook. The other line of investigation examines the effects of Facebook use on individuals' social capital and psychological well-being. Generally speaking, researchers have found several beneficial outcomes for both extroverted and introverted users in terms of their perceived social capital (Ellison, Steinfield, & Lampe, 2007), well-being (Steinfeld, Ellison, & Lampe, 2008), and adjustment (Lin, Peng, Kim, Kim, & LaRose, 2012).

Unlike previous literature, which was limited by studying the 'effects' of using certain media, recent research has begun to explain users' need satisfaction of relatedness from Facebook (Sheldon, Abad, & Hinsch, 2011) and Facebook enjoyment (Reinecke, Vorderer, & Knop, 2014) through self-determination theory. Whether users satisfy their psychological needs through social interactions on Facebook determines their subsequent enjoyment and performance.

However, in investigations of effects of Facebook on well-being, one construct that is largely overlooked is the natural need for relatedness that an individual exhibits. The author argues that the attachment style that each individual forms, which develops from social interactions between an infant and his or her caregivers, guides that individual's intrinsic need for relatedness with other social beings. As one of the core need satisfaction processes, need satisfaction of relatedness is tightly linked to how Facebook users connect with others and thus achieve greater well-being. Therefore, the need for relatedness (i.e. attachment style) is essential to consider when examining the effects of Facebook use, including how different attachment styles affect Facebook use and users' subsequent need satisfaction and psychosocial well-being.

The purpose of this study is therefore to closely examine how need for relatedness guides and influences how an individual achieves need satisfaction of relatedness from Facebook social connections and how this satisfaction affects psychological well-being. Additionally, a growing literature exploring attachment styles and Facebook has focused on Facebook use and social capital outcomes (Lin, 2015). This study examines the intrinsic motivation of relatedness with users' psychological well-being with respect to using Facebook and to link attachment theory with self-determination theory regarding social media usage. Furthermore, this study explores the types of people who interact on Facebook and offline and the quality of their offline communications to understand the nuances of the potential effects of these online and offline activities on psychological well-being. This study thus offers a more comprehensive theoretical view of users' social perspectives on intrinsic motivation on Facebook and with offline connections, in addition to the self-determination process that influences their overall well-being. To examine this model, this study employed samples from both university students and a representative national survey to offer more evidence for the proposed theoretical mechanisms.

Theoretical background

Attachment style as need for relatedness

Self-determination theory (Deci & Ryan, 1985; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) posits that three basic human needs – autonomy, competence, and relatedness –

must be satisfied for a human being to have a healthy level of well-being. Specifically, the need for relatedness refers to the level of social connectedness one needs. Different people desire different levels of connectedness with other social entities; some prefer to maintain a certain distance from others, whereas others crave close connections. Because being connected to others is one of the core concepts of social media, this study focuses on this essential intrinsic motivation.

Reis et al. (2000) studied intrinsic motivation and daily well-being and found that daily satisfaction of all three needs leads to greater emotional well-being. These authors operationally defined the need for relatedness using the three attachment styles identified by Ainsworth, Blehar, Waters, and Wall (1978) and Hazan and Shaver (1987): secure, avoidant, and anxious-ambivalent (i.e. anxious). Attachment theory (Bowlby, 1969) argues that an adult's attachment style with other social beings is influenced by and develops from the childhood interactions with his or her caregiver that guides the connection strategy with the caregiver to feel secure and to defend against separation from or loss of the caregiver (Bowlby, 1988).

The attachment styles that develop from infancy determine an adult individual's preference for forming or seeking connections with other people (Ainsworth et al., 1978; Bartholomew & Horowitz, 1991). Hazan and Shaver (1987) found that individuals with these three different styles experience romantic relationships differently. These attachment styles are associated with mental models of self and social relationships. In the context of social relationships, secure people generally do not worry about the distance or perceived connectedness between themselves and others. They feel comfortable depending on others, and they let others depend on them, thus maintaining a comfortable balance (Fraley & Shaver, 2000). Conversely, people with an avoidant attachment style are the opposite; they are uncomfortable and may become nervous when others are close to them. People with an anxious attachment style often worry about their friends or partners leaving them and want to be as close to others as possible, which may frighten these others away (Kenny & Rice, 1995).

This study argues that attachment style describes the level of relatedness individuals need in social interactions. The avoidant attachment style can be positioned as the least degree of relatedness needed from individuals, whereas individuals with the anxious style exhibit the highest degree of need for relatedness. Individuals with the secure style have a moderate need, between the avoidant and anxious styles.

Attachment style, Facebook use, relatedness need satisfaction, and well-being

Several studies have linked attachment style with interpersonal behavior, such as romantic relationships (Hazan & Shaver, 1987), friendships (Buote, Wood & Pratt, 2009), and subsequent emotional well-being (Fraley & Shaver, 2000). An emerging line of research has also begun to investigate the role of adult attachment style in interpersonal communication (Kenny & Rice, 1995) and social self-efficacy (Wright & Perrone, 2010) among college students. Jenkins-Guarnieri, Wright, and Hudiburgh (2012) found that attachment styles and extraversion are associated with users' interpersonal competency on Facebook. Although these authors treated attachment styles as control variables in their study, their results showed that the anxious attachment style is positively associated with Facebook use.

A growing body of research applies attachment style in social media and shows that predictions of attachment theory with respect to offline social connections also apply to online social media and serve as a guide for understanding an individual's affective and cognitive use of Facebook (Rom & Alfasi, 2014). Individuals with high secure attachment are comfortable initiating and maintaining social connections with others and are more likely to become social hubs with large networks (Yaakobi & Goldenberg, 2014); they also perceive greater bonding and bridging social capital from Facebook than others (Lee, 2013; Lin, 2015). High anxious orientation individuals are associated with a high level of Facebook use and show constant concern for how others perceive them on Facebook (Lin, 2015). In contrast, high attachment avoidance is correlated with less Facebook use and lower interest than the other dimensions (Oldmeadow, Quinn, & Kowert, 2013) and is negatively correlated with perceived bonding and bridging social capital (Lee, 2013). These recent findings indicate that Facebook serves attachment functions and that individuals approach Facebook with different levels of need for relatedness.

Following the logic of attachment style in self-determination theory, it follows that different needs for relatedness among people will indicate that different levels of social interaction will satisfy their social needs, i.e., needs that are vital to psychological well-being and social satisfaction. Additionally, satisfying these needs through social media should lead to higher perceived social support and sense of community – as a result of both online bonding and bridging social capital (Lin, 2015) – and naturally reduce loneliness (La Guardia, 2007). Sheldon et al. (2011) found that Facebook provides satisfaction of relatedness for users and that disconnection from it increases the drive for need for relatedness, which indicates that Facebook is a source of need satisfaction of relatedness. Previous studies have found that need satisfaction of relatedness partially mediated the need for relatedness with respect to well-being (La Guardia & Patrick, 2008); the present study further examines these processes via Facebook use. This study argues that the need satisfaction process is key to understanding the previous literature regarding the impact of Facebook use on well-being. Based on theory and recent evidence, this study first predicts that secure (H1a) and anxious (H1b) orientations will be positively associated with Facebook use, whereas avoidant attachment orientation (H1c) will not be associated with Facebook use. Second, the secure (H2a) and anxious (H2b) attachment styles will gain need satisfaction of relatedness through Facebook use, which will lead to better psychological outcomes. In contrast, the avoidant attachment style (H2c) will not gain need satisfaction of relatedness and psychological well-being through Facebook use (Figure 1).

Attachment style, online and offline communication, and well-being

When examining the factors that influence well-being, *whom* to interact with and *how* well the interaction goes are key elements to investigate, in addition to the important role of attachment style. Studies have shown that overall network size (i.e. number of connections on Facebook) is not a consistent predictor of well-being (Ellison, Steinfield, & Lampe, 2011); some studies have shown a positive association between network size and well-being (Manago, Taylor, & Greenfield, 2012), whereas others have shown negative correlations (Campisi et al., 2012). Greitemeyer, Mügge, and Bollermann (2014) indicated that responsive interpersonal interactions from friends on Facebook affect users'

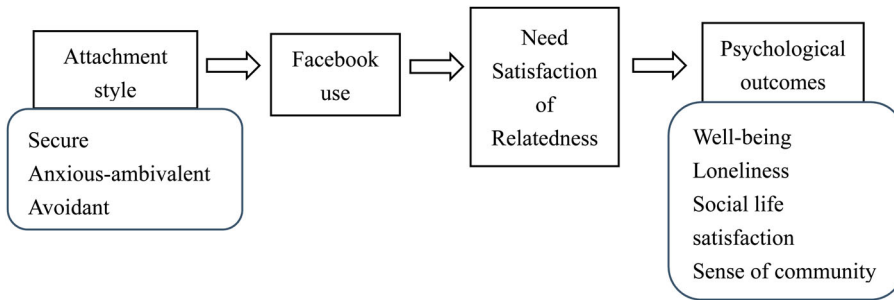


Figure 1. The self-determination process of need satisfaction of relatedness on well-being through Facebook use.

satisfaction of need for belonging more than network size. This study argues that the types of friendship engaged in on Facebook are key to subsequent psychological well-being (Ellison et al., 2011). Traditional network theory categorized connections based on tie strength (Granovetter, 1973). Whereas tie strength was typically measured by the frequency of communication between individuals, it did not consider the relationship between these individuals, such as whether they were close friends, family members, or coworkers. Recent research in social media has mostly employed bonding versus bridging social capital to categorize strong versus weak ties on social networking sites. This approach measures participants' subjective perceived social support or resources from various types of connections and networks and is limited in its ability to represent the nuances in these rich types of online connections. A few studies have separated types of friends and found that connections with different categories of individuals resulted in various levels of adjustment (Lin et al., 2012) or perceived social capital (Ellison et al., 2011). Therefore, this study proposes that, in addition to the *frequency* in tie strength approach, the *types* of online connections (Manago et al., 2012) should also be examined to gain a more nuanced perspective on well-being. Evidence has indicated that strong ties – such as family members or close friends – provide emotional support, which is related to greater well-being, whereas weak ties, such as average friends, acquaintances, and total strangers, provide mobilization resources but little support for well-being. More interactions with strangers might even lead to greater loneliness (Bessière, Kiesler, Kraut, & Boneva, 2008). This study thus proposes categorizing connections into family members, close friends, average friends, acquaintances, and online-only friends and examining the effects of communication frequency with these connections on well-being.

Another important but understudied element regarding well-being is the offline communication quality of different types of connections. Evidence from adolescents (Reich, Subrahmanyam, & Espinoza, 2012), adults (Subrahmanyam, Reich, Waechter, & Espinoza, 2008), and a national sample (Vergeer & Pelzer, 2009) has indicated that an individual's online network overlaps with offline networks and that users mostly employ Facebook networks to supplement offline social relationships. When managing a complicated offline network, communication quality – rather than communication frequency – is an indicator or predictor of well-being (Kraut, Kiesler, et al., 2002, Kraut, Patterson, et al., 1998; Shen & Williams, 2011). Greater perceived quality of communication with family members is associated with a greater level of well-being. Therefore, this study proposes

that the quality of offline communication with family members, good friends, and average friends should also influence individuals' well-being.

Attachment theory has been extensively studied in offline relationships, predicting how different dimensions of orientation guide an individual's connection strategy and intimacy with romantic partners (Fraley & Shafer, 2000) and friendship networks (Kenny & Rice, 1995). Buote et al. (2009) recently found that attachment style guided and predicted different connections in online and offline friendships. The present study further argues that attachment style, online communication frequency with different connections, and offline communication quality should be considered simultaneously to untangle the complex effects of social connections on well-being (H3). Based on attachment theory and social network theory, secure attachment, frequency of interacting with family members and good friends on Facebook, and offline communication quality with good friends should positively predict a greater level of well-being (Ryan & Deci, 2000), satisfaction with social life (Lin et al., 2012), a sense of community on Facebook (Shen & Williams, 2011), perceived social support (Bessière et al., 2008), and decreased loneliness (La Guardia, 2007). Avoidant attachment and frequency of interacting with online-only friends should both negatively predict well-being. Finally, as previous research (Ellison et al., 2007; Marshall et al., 2015) has indicated, extraversion and self-esteem are both closely related to well-being. Therefore, this study also includes these two important constructs with demographic variables as control variables when investigating the associations discussed above.

Foci of this study

The present study thus focuses on two areas to investigate Facebook users' well-being. First, it examines how different attachment styles lead to different Facebook use and how users achieve need satisfaction of relatedness and subsequently influence their psychological well-being. Second, it investigates the linear relationships that attachment style, types of online connections, and offline communication quality have with well-being, while controlling for personality and demographic covariates. This study aims to provide a more thorough examination of well-being through an individual's need for relatedness and online and offline communication. Samples from university students (study 1) and a national representative survey (study 2) were collected to test the hypotheses.

Study 1: University students

Method

Procedure and participants

An online survey was conducted at four large universities in the northern, central, and southern parts of Taiwan, including both national public and private schools. This survey is part of the Digital Media Audiences Project, which has conducted an annual survey since 2008. Data collection began in December 2012 and lasted one month. Several techniques were employed to promote the annual survey, including email invitations to students at the four universities, posters at the schools, and course promotions. Several prizes were provided as incentives, including various digital devices and gift

certificates. Among the 938 participants who completed the questionnaire, 392 (41.8%) were male and 546 (58.2%) female, 74% were undergraduate students and 26% graduate students, 95% were domestic students, and 51% had monthly stipends of 170–300 US dollars. The average age of the participants was 22.62 years ($SD = 3.90$), with a minimum age of 18 years and a maximum of 51 years.

Measures

Statistics related to the following measured constructs are presented in Table 1.

Attachment style

Attachment style was measured using the statements identified and provided by Hazan and Shaver (1987), which Reis et al. (2000) have operationalized as the need for relatedness. The participants rated three statements on a 7-point Likert scale anchored by 1, representing complete disagreement, and 7, representing complete agreement. Example statements include ‘I am comfortable depending on others’ (secure type), ‘I am nervous when anyone gets too close’ (avoidant type), and ‘I often worry that my partner won’t stay with me’ (anxious type).

Relatedness need satisfaction

Relatedness need satisfaction was measured on a scale ($\alpha = .88$) modified from psychological needs satisfaction (PENS) (Ryan & Deci, 2000) to fit the context of Facebook. The scale consisted of three statements, including ‘I find the relationships I form on Facebook satisfying’, ‘I felt a sense of camaraderie while using Facebook’, and ‘When I was interacting with friends on Facebook, I felt a lot of closeness’. The participants rated these statements

Table 1. Means and standard deviations of each measured construct.

Variables	Response type	<i>M</i>	<i>SD</i>
Attachment style			
Secure type	1–7	3.91	1.36
Avoidant type	1–7	4.05	1.35
Anxious-Ambivalent type	1–7	3.88	1.38
Relatedness need satisfaction	1–7	4.23	1.14
Psychological well-being			
Overall well-being	–6–6	2.33	2.10
Loneliness	1–7	3.27	1.01
Satisfaction of social life	1–7	4.70	1.19
Sense of Community on FB	1–7	4.43	1.26
Perceived social support	1–7	5.26	1.06
Facebook friends interaction frequency			
Family	1 (never)–8 (very frequent)	2.77	1.98
Good friends		5.50	1.40
Average friends		3.94	1.34
Acquaintance		1.99	1.45
Solely online connection		1.04	1.59
Offline communication			
Quality with family	1–5	3.74	1.13
Quality with good friends	1–5	4.27	.81
Quality with average friends	1–5	2.93	1.02
Controls			
Age	number	22.62	4.10
Gender	1 = male	.42	.49
Extraversion	1–7	4.29	1.14
Self-esteem	1–7	5.15	1.02

using a 7-point Likert scale, with 1 representing complete disagreement and 7 representing complete agreement.

Psychological well-being

This study measured psychological well-being from five perspectives. First, *overall well-being* was measured using two positive and negative affect adjectives (Ryan & Deci, 2000). The participants rated two statements, 'Overall, life is happy/frustrating', on a 7-point Likert scale anchored by 1 (completely disagree) and 7 (completely agree). Overall well-being was calculated by using the 'happy' score minus the 'frustrating' score, ranging from 6 to -6. The more positive the score is, the happier the participant perceives his or her life, and vice versa for the negative score.

Second, *loneliness* was measured by the shortened version ($\alpha = .74$) of the revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). The participants rated their loneliness based on four statements, including 'I feel isolated from others', 'I lack companionship', 'My social relationships are superficial', and a reverse-coded statement, 'There are people who really understand me', on a 7-point Likert scale anchored by 1 (completely disagree) and 7 (completely agree).

Third, *social life satisfaction* was measured by a single statement, 'I am satisfied with my social life', taken from Lin et al. (2012) using the same 7-point Likert scale described above. Fourth, *sense of community on Facebook* was also measured using a single statement, 'The people I interact with on FB give me a sense of community', adapted from Shen and Williams (2011). Finally, *perceived social support* was measured by a shortened scale ($\alpha = .72$) from the ISEL-12 (Bessière et al., 2008), which included statements such as 'I know whom to talk to when I feel lonely'.

Facebook use

Time spent on Facebook was measured by two questions. The first asked the participants to indicate the number of days they used Facebook in a typical week, followed by a second question asking the participants to provide the estimated minutes they spent on Facebook in a day on which they used it. The total time was calculated by multiplying days by minutes.

Frequency of interaction with friends on Facebook

The participants rated the frequency with which they interacted with their different types of friends on Facebook, including family members, good friends, average friends, acquaintances, and online connections whom they had never met offline, using an 8-point scale with 1 representing no interaction at all, 2 representing infrequently, and 8 representing frequently.

Offline communication

Offline communication quality (Shen & Williams, 2011) was measured by asking the participants to rate the quality of their communication with family, good friends, and average friends separately on a 5-point scale with 1 representing very bad and 5 representing very good.

Control variables

Extraversion ($\alpha = .78$) was measured by three statements (Bessière et al., 2008), including 'I am outgoing' and 'I am sociable', and scored on a 7-point Likert scale with 1 representing complete disagreement and 7 representing complete agreement. Self-esteem ($\alpha = .79$) was measured using a scale provided by Ellison et al. (2007) that consists of three statements, including 'I feel that I'm a person of worth, at least on an equal plane with others'. The participants rated these statements on a 7-point scale. Table 2 lists zero-ordered correlations between attachment style and outcome variables.

Results

Relatedness need satisfaction

This study first investigated the association between attachment style and Facebook time (H1a–c), and indirect effects of the three attachment styles on psychological well-being, mediated by relatedness need satisfaction through Facebook (H2a–c). To answer this question, structural equation modeling (SEM) was conducted through AMOS 21 to test the fit of the model to the current data set. Because different aspects of well-being were correlated, the covariance of the dependent variables was correlated. The results (Figure 2) indicated that the proposed model had a reasonable fit to the data ($CFI = .94$, $RMSEA = .077$, $p < .001$). The model showed that only the anxious attachment style had a significant and positive association with Facebook time, thus supporting H1b. Secure attachment had a positive but non-significant association with Facebook time, and thus H1a is not supported. The avoidant attachment style had no association with Facebook time. H1c is supported.

Regarding the indirect effects illustrated in H2, the results generated from the SEM and the bootstrapping method through the SPSS PROCESS macro (Hayes, 2013; Preacher, Rucker, & Hayes, 2007) were identical. Table 3 lists the bootstrapped point estimates of the standardized indirect effects, standard error, and the 95% confidence interval. Confidence intervals indicate the significance of the indirect effects, with those containing zero representing insignificant results and those not containing zero representing significant results.

The results in Table 3 show that the indirect effects of the secure attachment style on well-being, social life satisfaction, sense of community, and perceived social support through time spent on Facebook pursuing the satisfaction of relatedness needs are all significant and positive, which indicates that a higher secure attachment dimension leads to higher Facebook use, which provides a higher level of satisfaction of relatedness needs and results in more positive psychological outcomes. Additionally, the indirect effect of the secure attachment style on loneliness is also significant but negative. The indirect effects of the anxious style exhibit patterns identical to those of the secure attachment style; however, the indirect effects of the anxious attachment style are stronger than those of the secure attachment style. None of the indirect effects of the avoidant attachment style on the outcome variables through time spent on Facebook pursuing relatedness need satisfaction was significant. H2a–c are all supported.

Attachment style, online and offline communication, and well-being

H3 further investigated the relationships that attachment style, frequency of online interactions with different types of friends, and offline communication quality have with well-being, holding the demographic and personality variables constant. A series of hierarchical

Table 2. Zero-ordered correlations between attachment style, control variables, and major outcome variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Secure	1	.06	.32**	-.08*	-.08*	.08*	.03	.05	-.01	.11**	.23**	.15**	.27**
2. Avoid		1	.32**	-.06	-.10**	-.31**	-.21**	-.20**	.36**	-.18**	-.08*	-.18**	-.01
3. Anxious			1	-.19**	-.06	-.12**	-.26**	-.16**	.25**	-.14**	.11**	-.06	.18**
4. Age				1	.11**	-.01	.01	-.06	-.02	.01	-.03	-.08*	-.09**
5. Gender					1	.06*	.02	-.03	.05	.05	.01	-.05	-.01
6. Extraversion						1	.47**	.37**	-.39**	.54**	.31**	.39**	.30**
7. Self-esteem							1	.62**	-.54**	.50**	.26**	.52**	.19**
8. Well-being								1	-.57**	.53**	.27**	.46**	.25**
9. Loneliness									1	-.50**	-.21**	-.54**	-.19**
10. Social life										1	.45**	.43**	.33**
11. Community											1	.25**	.61**
12. Perceived social support												1	.32**
13. Need satisfaction of relatedness													1

** $p < .01$.

* $p < .05$.

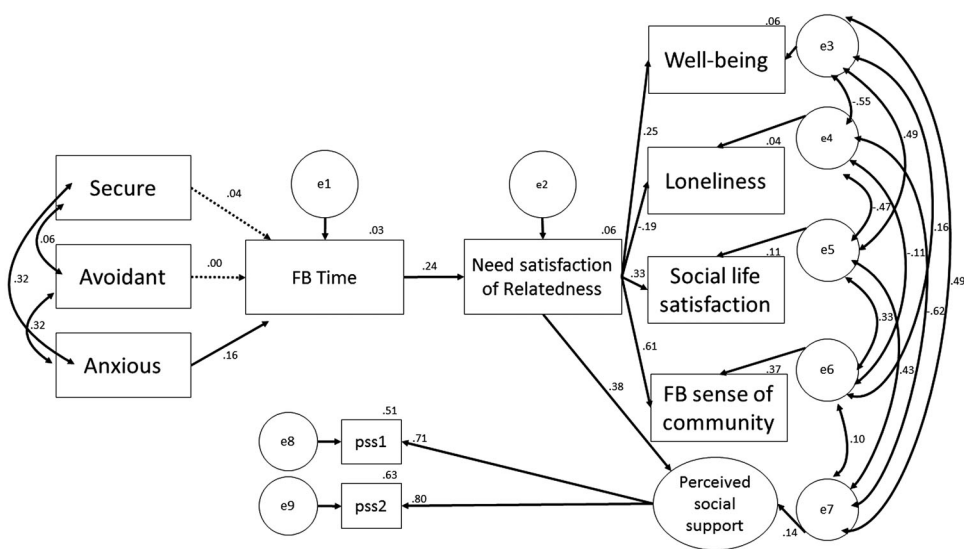


Figure 2. SEM model testing the proposed theoretical model in the university student sample.

Table 3. Statistics of indirect effects from the bootstrapping analyses.

	Standardized effect	Boot SE	Bootstrapped CI
1. Secure → FB time → Relatedness need satisfaction → well-being	.005	.002	.001 to .011*
2. Secure →FB time → Relatedness need satisfaction → Loneliness	-.004	.002	-.007 to -.001*
3. Secure →FB time → Relatedness need satisfaction → Social life satisfaction	.006	.003	.001 to .012*
4. Secure →FB time → Relatedness need satisfaction → Sense of community	.01	.005	.002 to .02*
5. Secure →FB time → Relatedness need satisfaction → Perceived social support	.006	.003	.001 to .01*
6. Avoidant →FB time → Relatedness need satisfaction → well-being	.004	.002	-.001 to .009
7. Avoidant →FB time → Relatedness need satisfaction → Loneliness	-.003	.002	-.007 to .0003
8. Avoidant →FB time → Relatedness need satisfaction → Social life satisfaction	.004	.003	-.001 to .01
9. Avoidant →FB time → Relatedness need satisfaction → Sense of community	.008	.005	-.002 to .02
10. Avoidant →FB time → Relatedness need satisfaction → Perceived social support	.004	.003	-.001 to .01
11. Anxious →FB time → Relatedness need satisfaction → well-being	.01	.003	.01 to .02*
12. Anxious →FB time → Relatedness need satisfaction → Loneliness	-.01	.003	-.02 to -.01*
13. Anxious →FB time → Relatedness need satisfaction → Social life satisfaction	.01	.004	.01 to .02*
14. Anxious →FB time → Relatedness need satisfaction → Sense of community	.02	.006	.01 to .03*
15. Anxious →FB time → Relatedness need satisfaction → Perceived social support	.01	.004	.007 to .02*

*indicates significance; Boot SE = bootstrapped standardized error, CI = confidence interval.

regression analyses were employed by entering demographic variables – including age, gender, extraversion, and self-esteem – in the first step, the three types of attachment style in the second step, frequency of interacting with different types of friends on Facebook in the third step, and offline quality of communication in the fourth step. Table 4 presents the results of the standardized regression coefficients of all five models.

The results of the predictors on well-being showed that the avoidant style negatively predicted well-being ($\beta = -.06, p < .05$), which indicates that a greater tendency toward avoidant attachment is generally associated with more feelings of frustration. However, greater interaction frequency with good friends on Facebook ($\beta = .15, p < .001$) and higher offline communication quality with good friends ($\beta = .10, p < .01$) both positively predicted greater well-being.

For the model predicting loneliness, the covariates – including gender, extraversion, and self-esteem – were significant, and both the avoidant ($\beta = .22, p < .001$) and anxious styles ($\beta = .08, p < .01$) were positive predictors, with the avoidant style showing a stronger relationship with loneliness than the anxious style. Interaction frequency with good friends ($\beta = -.10, p < .01$) and online-only friends ($\beta = .07, p < .05$) on Facebook were both significant predictors, with the former showing a negative association with loneliness and the latter showing a positive association with loneliness. Offline communication quality with good friends ($\beta = -.12, p < .01$) and with average friends ($\beta = -.08, p < .01$) both had negative associations with loneliness.

Regarding the effects on social life satisfaction, the results indicated that personality factors, including extraversion and self-esteem, were significant positive covariates. The secure attachment style ($\beta = .07, p < .05$) had a positive association with social life. Additionally, interaction frequency with good friends on Facebook ($\beta = .11, p < .01$) and

Table 4. Standardized regression coefficients of hierarchical regression linear models predicting psychological well-being in study 1 ($N = 931$).

Step 1	Well-being	Loneliness	Social life	Sense of community	Perceived social support
Age	-.02	-.04	.04	.08**	-.002
Gender (male = 1, female = 0)	-.003	.06*	.04	.03	-.03
Extraversion	.04	-.09**	.34***	.12**	.11**
Self-esteem	.52	-.37***	.29***	.17***	.38***
Step 2					
Secure	.01	.00	.07*	.14***	.09***
Avoidant	-.06*	.22***	.01	-.03	-.07*
Anxious-ambivalent	-.02	.08**	-.06	.11**	.02
Step 3					
FB interaction: family	.05	-.03	.05	.06	.004
FB interaction: good friends	.15***	-.10**	.11**	.22***	.19***
FB interaction: average friends	-.02	.07	-.05	.08*	-.03
FB interaction: acquaintance	-.03	.004	.03	.06	-.004
FB interaction: online-only friends	-.04	.07*	.02	.04	.01
Step 4					
Offline quality: family	-.003	-.01	-.03	-.05	-.01
Offline quality: good friends	.10**	-.12***	.03	-.003	.11**
Offline quality: average friends	.02	-.08**	.10***	.05	.01
Adjusted R^2 (SE)	.43 (1.57)	.40 (.78)	.38 (.93)	.25 (1.09)	.35 (.85)

* $p < .05$.
** $p < .01$.
*** $p < .001$.

offline communication quality with average friends ($\beta = .10, p < .001$) were positive predictors of social life satisfaction.

For the model predicting sense of community, significant covariates included age, extraversion, and self-esteem. Both the secure ($\beta = .14, p < .001$) and the anxious attachment styles ($\beta = .11, p < .01$) positively predicted sense of community. Interaction frequency with good friends ($\beta = .22, p < .001$) and average friends ($\beta = .08, p < .05$) on Facebook were also significant predictors of sense of community.

The model predicting perceived social support showed a slightly different trend. Extraversion and self-esteem were both significant covariates. The secure attachment style ($\beta = .09, p < .001$) was positively associated with perceived social support, whereas the avoidant attachment style ($\beta = -.07, p < .05$) had a negative association with perceived social support. Interaction frequency with good friends on Facebook ($\beta = .19, p < .001$) and offline communication quality with good friends ($\beta = .11, p < .01$) had positive associations with perceived social support.

Study 2: National sample

Method

Procedure and participants

Of the 2000 representative participants aged 20 and over in the Taiwan Communication Survey (TCS) conducted in 2013, 1109 used Facebook the most and served as the sample for this analysis. The TCS consisted of basic questions regarding media use and 7 sub-topics, with each topic limited to 12 questions. The author designed the sub-topic on social media. The survey was conducted face to face and was assisted by a tablet on which the interviewers could immediately enter data. All the demographics matched those of the national census population. More details can be found on the website (Taiwan Communication Survey, 2013). Of the 1109 Facebook users, the average age was 35.73 years (range 20–99), 47.7% were male, and users spent an average of 713.52 minutes per week on Facebook.

Measures

Because of the strict 12-question limit, it was difficult to incorporate full scales into the survey. Only the secure ($M = 2.92, SD = .97$) and avoidant ($M = 3.14, SD = .95$) attachment styles (Lin, 2015) were included in this survey – measured as in Study 1 but on a scale of 1 (totally disagree) to 5 (totally agree). Facebook time for a week ($M = 713.52, SD = 953.50$), need satisfaction of relatedness ($\alpha = .84, M = 3.53, SD = .70$), age ($M = 35.73, SD = 11.70$), sex (male = 47.7%), social life satisfaction ($M = 3.56, SD = .78$), and sense of community ($M = 3.48, SD = .81$) were measured identically as in Study 1. Regarding overall well-being, the participants rated the statement ‘Overall, you are satisfied with your life’ ($M = 3.64, SD = .801$). The participants also indicated their loneliness by rating the statement ‘You feel lonely from others’ ($M = 2.58, SD = .90$). Finally, only extraversion ($\alpha = .77, M = 3.46, SD = .82$) was included in the topic. The participants answered the statements ‘You are extroverted’ and ‘You are sociable’. All statements were rated on a 5-point Likert scale anchored by 1 (totally disagree) and 5 (totally agree).

Table 5. Standardized regression coefficients of hierarchical regression linear models predicting psychological well-being in study 2 ($N = 1107$).

Predictors	Well-being	Social life	Loneliness	Sense of community
Step 1				
Age	.09***	.06*	-.08**	-.02
Sex (male = 1)	-.02	.001	.01	-.08***
Extraversion	.23***	.38***	-.21***	.27***
Step 2				
Age	.08*	.06*	-.088***	-.016
Sex (male = 1)	-.02	.000	.009	-.083***
Extraversion	.23***	.39***	-.201***	.269***
Facebook time	-.04	-.02	-.042	.029
Step 3				
Age	.07*	.056	-.041	-.002
Sex (male = 1)	-.03	-.005	.052	-.073*
Extraversion	.23***	.383***	-.221***	.261***
Facebook time	-.04	-.023	-.049	.025
Secure	-.01	.001	.229***	.075*
Avoidant	-.07*	-.076**	.161***	-.011
Adjusted R^2 (SE)	.06 (.78)	.15 (.72)	.13 (.84)	.09 (.78)

*** $p < .005$.

** $p < .01$.

* $p < .05$.

Results

The same mediation analyses employed in Study 1 were conducted in Study 2 to investigate the proposed need satisfaction process through Facebook on well-being. The results showed trends consistent with Study 1. Secure attachment has positive indirect effects on well-being ($b = .003$, $SE = .001$, $CI = .001, .005$, $p < .05$), satisfaction of social life ($b = .004$, $SE = .001$, $CI = .001, .007$, $p < .05$), and sense of community on Facebook ($b = .007$, $SE = .002$, $CI = .003, .013$, $p < .05$) through Facebook use and need satisfaction of relatedness. Additionally, secure attachment has a negative indirect effect on loneliness ($b = -.0001$, $SE = .0006$, $CI = -.00027, -.00003$, $p < .05$). Avoidant attachment does not have any significant indirect effect on these four psychological outcomes.

Regarding the linear examination, because of the limited variables available in the national sample, the author entered age, sex, and extraversion in the first step, Facebook use time in the second step, and attachment style in the third step in a series of hierarchical regression models (Table 5). Facebook use time was not significant when first entered in the second step or the third step. The results showed that after controlling for age, sex, extraversion, and Facebook use, the avoidant attachment style negatively predicted well-being and satisfaction with social life and positively predicted loneliness. Conversely, secure attachment positively predicted sense of community on Facebook but also predicted loneliness.

Discussion

Existing literature regarding Facebook use on individuals' well-being has shown inconsistent findings. Some research (Ellison et al., 2007; Ellison et al., 2011) has shown positive effects on users' well-being, supporting the 'poor get richer' hypothesis from the Internet paradox research; different research has suggested greater benefits received from

interacting with others on Facebook, supporting the 'rich get richer' hypothesis (Lin et al., 2012); and still other research has shown that Facebook undermines users' well-being (Kross et al., 2013). Recent research further showed that Facebook use dampens emotional well-being because of users' perceived time wasting on Facebook (Sagioglou & Greitemeyer, 2014) and their passive Facebook use style (Verduyn et al., 2015).

The current study argues that the need satisfaction process from the self-determination approach is key to understanding users' well-being through Facebook use. Additionally, the present study argues that attachment style is an essential antecedent to include when investigating the effects of the need satisfaction process on well-being through Facebook use. Because individuals exhibit different degrees of the innate need for relatedness, attachment style influences each individual's pursuit of relatedness need satisfaction. Individuals also seek different approaches to satisfy these relatedness needs; for example, the current results showed that the secure and anxious attachment dimensions seek need satisfaction of relatedness through Facebook, whereas the avoidant orientation does not. Although a few studies have begun to examine how Facebook use satisfies the need for relatedness (Abellera, Ouano, Conway, Camilotes, & Doctor, 2013; Sheldon et al., 2011), no study has examined the role of attachment style in the process of using Facebook to satisfy need for relatedness, which further affects well-being.

The results from the SEM and a series of mediation analyses using university students and a national sample supported the argument that different attachment styles influence individual choices to employ Facebook to satisfy relatedness needs, which leads to better psychological outcomes, such as greater well-being, higher satisfaction with social life, less loneliness, greater sense of community, and more perceived social support. High secure and anxious attachment achieved relatedness need satisfaction by spending more time on Facebook, and this need satisfaction further predicted better psychological outcomes. However, the indirect effects showed that Facebook does not provide relatedness need satisfaction for high avoidant attachment and thus did not lead to greater outcomes. This result provides another perspective to explain the complicated processes regarding the effects of Facebook use on individuals' well-being.

Self-determination theory has successfully explained the intrinsic motivation that individuals exhibit regarding well-being (Reis et al., 2000) through the need satisfaction process. This process has recently been extended in digital games (Peng, Lin, Pfeiffer, & Winn, 2012) and social media (Reinecke et al., 2014). The present study extended self-determination theory to Facebook by closely examining the effects of the need for relatedness, conceptually and operationally defined as attachment style, on the need satisfaction process and well-being. The results supported the self-determination process and showed that different attachment dimensions are linked to various degrees of need satisfaction and are associated with different approaches to achieving need satisfaction through Facebook use, integrating evidence from the previous literature (Oldmeadow et al., 2013; Sheldon et al., 2011) through attachment theory and self-determination theory. The results suggest that attachment theory and the self-determination process form a well-validated theoretical approach to examining the effects of Facebook use on well-being.

In addition to testing the theory, this study also examines the linear relationship between attachment style and well-being and considers the roles of online and offline communication simultaneously. Hierarchical regression models among university students showed a consistent association between attachment style and well-being in the mediation

analyses. Additionally, interaction online and offline with different types of connections was related to the subsequent outcomes. The results from this study supported earlier literature (Bessière et al., 2008) and showed that a higher frequency of interaction with online-only connections on Facebook had a positive association with loneliness. Less frequent interaction with good friends on Facebook and lower offline communication quality with good and average friends resulted in higher levels of loneliness. Conversely, interactions with good friends on Facebook and offline were significant factors contributing to all dimensions of well-being. Having balanced interactions with good and average friends resulted in greater social satisfaction and sense of community on Facebook. These findings indicated that maintaining bonding and bridging capital contributed to users' well-being (Ellison et al., 2007).

This study also showed that attachment style is a distinct factor in predicting variances in well-being from personality traits such as extraversion and self-esteem (Lin, 2015). The Big Five personality traits focus on individuals' traits formed throughout life, whereas attachment style concerns one's innate need for relatedness and style of connecting with other social beings. The results suggested that after controlling extraversion and self-esteem, attachment style still explained considerable variances of well-being. Therefore, attachment style is an important antecedent construct to consider in social media research.

The evidence from both the university students and the national sample supported attachment theory and self-determination theory and indicated that need for relatedness matters in the process of achieving satisfaction from Facebook for well-being. The essential question here becomes whether avoidance of Facebook by high avoidant attachment results in a 'poor remain poor' situation. If neither offline communication quality with friends nor online communication frequency provides relatedness need satisfaction for the avoidant dimension, what might satisfy such a need? Perhaps individuals with high avoidant attachment still have a need to belong (Carvallo & Gabriel, 2006) but do not seek their need satisfaction of relatedness through Facebook as those individuals with secure or anxious attachment do. Alternatively, perhaps individuals with high avoidant attachment are sensitive to acceptance cues in social interactions, and the positive or negative social feedback would influence their perceived connectedness with others (MacDonald & Borsook, 2010). Future studies might resolve this intriguing question by further investigating the role of perceived social competence (Anders & Tucker, 2000) on Facebook for those with high avoidant attachment and individuals' autonomous ability to use Facebook (Reinecke et al., 2014).

Another question is whether it is possible for an individual to have a mix of these three styles. Can an individual exhibit both high secure and avoidant styles at the same time? For example, can someone feel secure with some people and avoidant toward others? Might someone feel anxious in a particular social context and avoidant in others? There are different approaches to measuring attachment style, including the four-category model (Bartholomew & Horowitz, 1991) and the Experiences in Close Relationships Scale-Revised (Fraley et al., 2000), both of which consist of items that measure the avoidant and anxious dimensions. Due to the question design limitation of this survey, this study could not employ the complete scale. Additionally, as the previous literature has argued (Oldmeadow et al., 2013), direct statements of attachment style provide all three separate dimension scores for each participant instead of categorizing participants into different

styles, which is better suited for linear examination. Furthermore, this study argues that attachment style is somewhat complex, and an individual may exhibit multiple degrees of orientation regarding these three styles. The present research did not separate participants into groups by attachment style but instead explored all the styles together, which should be considered when interpreting the results. As the results indicate, the treatment of attachment styles as underlying dimensions (Jenkins-Guarnieri et al., 2012; Oldmeadow et al., 2013) aligned with predictions from theory and showed results consistent with the literature that employed a categorization approach (Lee, 2013; Yaakobi & Goldenberg, 2014).

The contribution of this study is threefold. First, attachment style has been demonstrated to be an important but largely neglected construct in Facebook research, in addition to the Big Five personality traits (Marshall et al., 2015). The present study showed the complete process beginning with an individual's innate need for relatedness and examined how this process influences the approach to achieving need satisfaction from Facebook, which further results in different degrees of psychological well-being in university students and a national sample. These results successfully linked attachment theory to the self-determination process and extended both theories into the realm of social media. This study also provided a theoretical framework for future studies to examine the association between Facebook use and well-being. Second, after controlling for personality traits including extraversion and self-esteem, attachment style still had considerable influence on psychological well-being, showing that attachment style is a distinct factor in predicting variances in well-being and further showing that innate need for relatedness is important when studying the need satisfaction process in social media. Third, this study showed that avoidant individuals are an intriguing and special dimension that requires further examination. For example, how does technology or perhaps other factors heighten their psychological well-being? Additionally, the ambivalent dimension deserves further attention to explore how technology and both online and offline communication support achieving such need satisfaction.

This study is not without limitations. Specifically, due to survey limitations, attachment style was measured in statements rather than on a full scale. Repeated evidence from university students and a national sample might alleviate this concern. Additionally, the results from both samples supported predictions from theory and were consistent with previous findings. Second, both surveys were conducted in a cross-sectional setting, which should be considered when interpreting the results from the mediation analyses. Although it might be argued that mediation cannot be examined in cross-sectional data, the author contends that the mediation process was grounded in theory: the direction was theorized from an individual trait to Facebook use, followed by need satisfaction from Facebook and subsequent well-being. Additionally, a linear investigation showed consistent directions. However, these are survey limitations, and future studies should examine indirect effects in an experimental approach to find more robust evidence. Furthermore, most of the constructs in the study were measured on shortened versions of scales or represented by single items, mainly due to the length requirements in both surveys. Readers should interpret the results with this limitation in mind.

This study concludes that attachment style influences how individuals utilize Facebook to satisfy their need for relatedness, which further leads to their psychological well-being. Among the three styles, the anxious style receives the most benefit from Facebook, in

which individuals achieve the most need satisfaction of relatedness from Facebook. The study also showed that online interaction and offline communication quality play important roles in the participants' well-being. High-quality interactions with good friends contribute to a greater degree of perceived psychological well-being and social support. Future research should take attachment style into account when examining associations between Facebook use and well-being. Additionally, the autonomy and competence to use Facebook to interact with other connections are other areas to explore with attachment style.

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Notes on contributor

Jih-Hsuan (Tammy) Lin is an Associate Professor in the Department of Advertising at the National ChengChi University. Her research interests focus on examining psychological mechanism in digital games and social media, and the role of interactivity in media effect studies.

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