Adult attachment and self-disclosure on social networking site: A content analysis of Sina Weibo

4 authors, including:

Na Hu
East China Normal University
7 PUBLICATIONS **7** CITATIONS

Xu Chen
Southwest University in Chongqing
52 PUBLICATIONS **266** CITATIONS

Some of the authors of this publication are also working on these related projects:

Project   Plasticity and neural mechanisms of insecure attachment individuals View project

Adult attachment and self-disclosure on social networking site: A content analysis of Sina Weibo

Liang Chen[a,b,1], Na Hu[a,b,c,1], Cong Shu[a,b], Xu Chen[a,b,*]

[a] Faculty of Psychology, Southwest University (SWU), Chongqing, 400715, China
[b] Research Center of Mental Health Education, Southwest University (SWU), Chongqing 400715, China
[c] School of Psychology and Cognitive Science, East China Normal University (ECNU), Shanghai 200062, China

A B S T R A C T

The popularity of social networking sites (SNSs) provides a new tool for self-disclosure. Previous studies have applied the attachment theory to illuminate individual differences in self-disclosure on SNS. However, several limitations and inconsistent results still need further research. First, previous studies neglect the potential difference between attachment anxiety and attachment avoidance (two dimensions of attachment insecurity) in predicting SNS self-disclosure. Besides, related studies have been limited to the disclosure of certain information, college samples and self-report data, which may lead to untrustworthy sample representativeness and measured deviation. Current research develops an evaluation model of self-disclosure based on observable information on Sina Weibo, a large SNS in mainland China. The model includes textual information, personal profile, and profile image on SNS as index and can well reflects users' self-disclosure amount and depth on SNS. Based on the model, current research finds that individuals with high attachment anxiety disclose less personal information on their SNS profile page, while those with high attachment avoidance show a decreased disclosure of profile image on SNS. Finally, explanations of adult attachment as a predictor, limitations of the current research, implications and areas for future research are discussed.

1. Introduction

With the rapid development of internet, a variety of internet services have a significant impact on interpersonal communication and social interaction. At the center of online information transfer are the popularity of social networking sites (SNSs)(Raacke & Bonds-Raacke, 2008) which provide a new tool for information sharing (Boyd & Ellison, 2007) and become an environment in which individuals can publicly disclose one's identity and personal information (Varnali & Toker, 2015). As a core behavior on SNS (Caplan, 2007), users disclose various self-related information on SNS including images, profile information, feelings, thoughts, and etc. Examining others' SNS pages, one may find that some people tend to disseminate these self-related information, whereas others do not. Recent research suggested this individual difference in self-disclosure on SNS (Al-Saggaf & Nielsen, 2014; Chen, Pan, & Guo, 2016; Thompson, 2012). In interpersonal relationship, self-disclosure can reinforce the closeness among individuals (Derlega, Winstead, Wong, & Greenspan, 1987) and thus plays a central role in the development and maintenance of relationships (Collins &

Miller, 1994; Derlega et al., 1987). Considering attachment theory is a particularly powerful framework for explaining individual differences in thoughts, emotions and behaviors in offline and online social interaction (Collins & Allard, 2007; Hart, Nailling, Bizer, & Collins, 2015; Rom & Alfasi, 2014), current research focus on the role of adult attachment in self-disclosure on SNS.

Previous studies have examined the applicability of attachment theory to explain self-disclosure on SNS (Aharony, 2016; Shang, Chen, & Chang, 2015; Yaakobi & Goldenberg, 2014). One research find that insecurely-attached individuals tend to disclose more self-related information on Facebook (Aharony, 2016). While another research suggest the greater information dissemination of securely-attached individuals (Yaakobi & Goldenberg, 2014). It is thus clear that several limitations and inconsistent results still need further research. Specifically, previous study (Aharony, 2016) lack of attention to the difference between anxious and avoidant individuals (they are both insecurely-attached individuals) in SNS self-disclosure, which needs further evidence. In addition, related research draw conflict conclusions. The probable reasons may be that previous studies have been limited to the

---

disclosure of certain information (Chang & Heo, 2014; Christofides, Muise, & Desmarais, 2009; Kolek & Saunders, 2008; Yaakobi & Goldenberg, 2014) and thus fail to fully reflect the concept of self-disclosure on SNS. Besides, some research limit to college sample (Aharony, 2016; Yaakobi & Goldenberg, 2014) and heavily depend on participants' self-report data (Aharony, 2016; Shang et al., 2015; Yaakobi & Goldenberg, 2014) which may lead to untrustworthy sample representativeness and measured deviation. Therefore, it remains to be developed a more comprehensive, objective and effective measurement of self-disclosure on SNS.

Current research contain two studies to resolve limitations and conflicts mentioned above. These studies attempt to expand the applicability of attachment theory as a framework for understanding self-disclosure on SNS and creatively develop an objective evaluation model of SNS self-disclosure providing a new method for measuring self-disclosure.

2. Literature review

2.1. Self-disclosure on SNS

Self-disclosure is the act of revealing self-related information to others (Jourard & Lasakow, 1958) which can reinforce the closeness among individuals (Derlega et al., 1987) and thus plays a central role to establish interpersonal relationships (Collins & Miller, 1994; Derlega et al., 1987). Compare to face to face contexts, online social interaction are highly anonymous, asynchronous, and lack of visual and nonverbal cues which cause an individual to disclose greater intimate information on SNS (Joinson, 2001; Schouten, Valkenburg, & Peter, 2014; Suler, 2004; Tidwell & Walther, 2002; Walther, 1996). Since SNS functions as an outlet for modern self-disclosure (Hollenbaugh & Ferris, 2014), we simply define SNS self-disclosure as the act of revealing self-related information to others on SNS. Therefore, the research that only focus on the information disclosed in personal profile (Chang & Heo, 2014; Christofides et al., 2009; Kolek & Saunders, 2008) or information related to certain topic such as job security (Yaakobi & Goldenberg, 2014) seems cannot fully reflect the concept of self-disclosure on SNS which may lead to inconsistent results.

Due to the limitations imposed by the Chinese authorities, Facebook, Twitter, and other global SNSs are not currently available for most people living in mainland China leading to the emergence of similar SNSs unique to China, such as Sina Weibo, WeChat, QQzone, and etc. As three large SNSs in China (China Internet Network Information Center, 2017), Sina Weibo is a more public SNS than others (Liu, Min, Zhai, & Smyth, 2016). Since Sina Weibo allows users to "follow" anyone they like and access others' information without permission, Sina Weibo can better reflect the anonymity of online social situation. Therefore, current research mainly focuses on the self-related information disclosed on Sina Weibo.

Most researchers tend to use a modified self-disclosure scale or develop a new questionnaire to measure participants' self-disclosure on SNS (Aharony, 2016; Hollenbaugh & Ferris, 2014; Shang et al., 2015; Yaakobi & Goldenberg, 2014; Zhang & Ling, 2015). While others suggest that the findings based on self-repots reflect participants' self-views rather than actual behaviors (Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011) and are likely to be influenced by social desirability (Amichai-Hamburger & Vinitzky, 2010) and false memory. Therefore, current research uses content analysis (Krippendorff, 2004) to collect almost all self-related information that can be disclosed on Sina Weibo. Based on these information, we develop a more comprehensive, objective and effective measure of self-disclosure on SNS.

2.2. Category system for SNS self-disclosure

Some previous measures focus on the content of self-disclosure and measure individuals' amount of self-disclosure in different topics

(Aharony, 2016; Jourard & Lasakow, 1958; Miller, Berg, & Archer, 1983; Varnali & Toker, 2015). While others suggest that self-disclosure is a multi-dimensional structure including frequency, amount, depth, breadth or other dimensions (Hollenbaugh & Ferris, 2014; Zhang & Ling, 2015). Based on former one's perspective, current research mainly focus on the disclosure of different types of self-related information on Sina Weibo. Previous researches mainly focus on personal profile (Chang & Heo, 2014; Christofides et al., 2009; Kolek & Saunders, 2008), profile image (Rueda-Ortiz & Giraldo, 2016; Saslow, Muise, Impett, & Dubin, 2013; Shu, Hu, Zhang, Ma, & Chen, 2017; Strano, 2008), and textual content (Cheng, Li, Kwok, Zhu, & Yip, 2017; Liu & Zhu, 2016; Qiu, Lin, Leung, & Tov, 2012). These three categories of information almost cover all self-related information on SNS. Therefore, combined with the characteristics of Sina Weibo, current research classifies SNS self-disclosure into three categories (personal profile, profile image, and textual information) to conduct content analysis.

With regard to personal profile, Sina Weibo allow users to edit six sub-categories of information on personal profile page including basic information, contact information, occupational information, educational information, label information, and personal introduction information. Specifically, basic information involve users' personal attributes such as gender, age, birth-day, relationship status, and etc. In addition, users can also add a number of short personalized labels to describe themselves briefly. Related research suggest that Facebook users tend to share their personal information such as birth-day, relationship status, hometown, e-mail address, along with their school program on personal profile (Christofides et al., 2009; Kolek & Saunders, 2008). These information are people's self-portrayals and might reflect one's real personality (Back et al., 2010). Items in previous questionnaire also involve information about one's work, studies, personality, and interests (Jourard & Lasakow, 1958).

With regard to profile image, since SNS users can see each other's profile images without "friending" each other or interacting further, profile image by which users choose to identify themselves (Watson, Smith, & Driver, 2006) is a public representation of the self within SNS. In particular, those who post photos of themselves as their profile image on SNS can make up for the lack of visual cues in cyberspace. Related study show that 98.7% college students posted a photo of themselves on Facebook (Young & Quan-Haase, 2009). Therefore, photo, especially profile image, may be one of the most telling pieces of self-disclosure on SNS (Hum et al., 2011). According to previous studies (Mesch & Beker, 2010; Young & Quan-Haase, 2009), current research mainly focus on the number of photos in the profile album and the content of the main profile image (whether a photo of themselves is used as one's profile image).

With regard to textual information on SNS, similar to Twitter, Sina Weibo users are allowed to post a 140-character-or-less textual update, called a "tweet" or a "status". The words in "status" could reveal their emotional states, social relationships, thoughts and other self-related topics (Tausczik & Pennebaker, 2010). Therefore, six categories of words in simplified Chinese LIWC (Linguistic Inquiry and Word Count) dictionary (Gao, Hao, Li, Gao, & Zhu, 2013) were included in current research as a measure of the degree of disclosure of textual information. They are "first personal singular pronouns", "social processes words", "affective processes words", "cognitive processes words", "perceptual processes words", and "biological processes words". Since self-disclosure can be broadly defined as act of revealing any statement that starts with "I" to others (Jourard, 1971; Pilkington, Derlega, Metts, Petronio, & Margulis, 1993), the use of first personal singular pronouns (e.g., "I", "me", "mine") can reflect one's general amount of self-disclosure. In addition, social processes words (e.g., "mate", "talk", "friend") are related to one's social relationships. Affective process words (e.g., "happy", "cried", "abandon") refer to positive and negative emotion words. Cognitive process words (e.g., "think", "know", "perhaps") are related to one's opinion and attitudes. Perceptual process words (e.g., "see", "hear", "feels") are those related to personal feeling.

Biological process words (e.g., "face", "eat", "hands") are related to one's body, health and other physical experience. These language clues give away information about individuals' disclosure of their relationships, emotion, opinion, feeling, and body. These topics are also considered in previous measures (Jourard & Lasakow, 1958; Miller et al., 1983).

To sum up, fourteen indexes in three categories cover almost all information that can be disclosed on Sina Weibo. Based on the category system, current research conducts a content analysis and develop an evaluation model of SNS self-disclosure to improve the objectivity and validity of measures.

2.3. Adult attachment

As a potentially useful framework to understand individual's self-disclosure on Sina Weibo, attachment theory was initially used to explain the affection bonds between infants and their primary caregivers (Bowlby, 1969). During early life, individuals abstracted the specific interactive experience into general beliefs about the worthiness of the self and the responsiveness of others which are referred to as internal working model and can be used to interpret the behaviors in subsequent interpersonal relationship (Collins, 1996). The internal working model are presumed to be largely determined by the caregivers' emotional availability and responsiveness to the infant's needs (Bretherton, 1985; Sroufe & Waters, 1977). Based on the internal working model, scholars proposed that intimate relationship in adulthood can also be considered as an attachment process and was conceptualized as adult attachment (Hazan & Shaver, 1987) which stems from early parent-child attachment. Once developed, individual's attachment pattern may be moderately stable across the life span (Fraley, 2002; Fraley & Brumbaugh, 2004; Klohnen & Bera, 1998).

Currently, scholars tend to use methods based on two continuous dimensions of the internal working model, attachment anxiety and attachment avoidance, to measure adult attachment (Brennan, Clark, & Shaver, 1998; Cassidy, 2003). Attachment anxiety reflects one's degree of anxiety and vigilance concerning rejection and abandonment in intimate relationships. While, the other dimension attachment avoidance corresponds to discomfort with closeness and dependency in intimate relationships. Therefore, high scores on these two dimensions indicate one's insecure attachment pattern. Four attachment patterns can be defined by their position on the anxiety and avoidance dimensions: secure (low anxious-low avoidant), preoccupied (high anxious-low avoidant), dismissive (low anxious-high avoidant), fearful (high anxious-high avoidant). Since continuous measure is more appropriate for assessing linear relationship between adult attachment and self-disclosure on SNS (Oldmeadow, Quinn, & Kowert, 2013), the current research focus on individual differences in the two dimensions instead of one's attachment pattern.

With individual differences in the two dimensions, adult attachment shapes thoughts, emotions, and behaviors in intimate relationships (Collins & Allard, 2007). It has also been proved that attachment theory is a particularly useful framework to study individual's affect, cognition, and behavior on SNS (Hart et al., 2015; Rom & Alfasi, 2014). Therefore, attachment theory may be a potentially useful framework to help us understand individual's self-disclosure on SNS.

2.4. Adult attachment and self-disclosure on SNS

In social interaction, appropriate self-disclosure can reinforce the closeness among individuals (Derlega et al., 1987) and thus plays a central role in the development and maintenance of relationships (Collins & Miller, 1994; Derlega et al., 1987). However, individuals' behavior in close relationship are mostly affected by ones' internal working model of attachment (Collins & Allard, 2007). As an important interpersonal behavior, self-disclosure may also influenced by ones' attachment pattern. Therefore, current research suspect that there are

close relationship between adult attachment and self-disclosure on SNS. Previous study have examined the relation and found that insecurely-attached individuals tend to disclose more self-related information on Facebook (Aharony, 2016). The study treated attachment as a single dimension (attachment insecurity) and neglect the potential difference between attachment anxiety and attachment avoidance (two dimensions of attachment insecurity) in predicting SNS self-disclosure. Actually, attachment anxiety and attachment avoidance frequently show significantly different relations to interpersonal behavior (Hart et al., 2015; Hart, Hung, Glick, & Dinero, 2012). Therefore, based on two dimensions of internal working model, current research place emphasis on the difference between attachment anxiety and attachment avoidance in predicting self-disclosure on SNS.

With regard to those with high attachment avoidance, we assume that they dislike to disclosure self-related information on SNS. Avoidant individuals tend to form a negative model of others (Luke, Maio, & Carnelley, 2004) and use deactivating strategies to keep distance from others in relationships (Kobak & Sceery, 1988). On the one hand, these individuals do not believe that others will be responsive to their disclosure. Therefore, they reduce self-disclosure on SNS intend to protect themselves from hurt and disappointment. On the other hand, with the tendency to be compulsively self-reliant, avoidant people do not expect to reinforce the closeness with others in social interaction on SNS. Therefore, they decrease self-disclosure to avoid intimate relationships. Previous studies found supporting evidences. In face to face situation, avoidant college students feel uncomfortable in disclosing their distress to others (Wei, Russell, & Zakalik, 2005). Avoidant individuals dislike to disclose intimate self-related information (Mikulincer & Nachshon, 1991) and those who feel uncomfortable with closeness disclose less to their partner (Collins & Read, 1990). In addition, college students' score on attachment avoidance can also negatively predict their self-disclosure in cyberspace (Cheng, 2014). High attachment avoidance was related to less Facebook use (Oldmeadow et al., 2013) and less willingness to deliver job security information to others via SNS (Yaakobi & Goldenberg, 2014).

Conversely, with regard to individuals with high attachment anxiety, we hypothesis that they exhibit greater self-disclosure on SNS. With negative model of the self, anxious individuals tend to use a hyper-vigilant strategies to form dependent relationships and desire closeness but fear rejection and abandonment in relationships (Kobak & Sceery, 1988; Luke et al., 2004). Compare to face-to-face interaction, SNS provide a situation that anxious individuals can hold relationships at a psychological arm's distance and increase their feelings of intimacy (Nitzburg & Farber, 2013). Besides, by managing how they present themselves to others on SNS, such individuals may feel more confident to form close relationships (Oldmeadow et al., 2013). Therefore, individuals with high attachment anxiety may disclose more self-related information on SNS to reinforce closeness and seek proximity. Supporting evidences show that compare with avoidant individuals, anxious individuals show more self-disclosure in face-to-face situation (Mikulincer & Nachshon, 1991). In online situation, anxious individuals use Facebook more frequently (Oldmeadow et al., 2013) and exhibit more willingness to deliver neutral job security information to others on SNS (Yaakobi & Goldenberg, 2014). People with high score of attachment anxiety was positively associated with usage of SNS and prone to express their information on the public SNS (Morey, Gentzler, Creasy, Oberhauser, & Westerman, 2013). However, other research fail to find the relation between attachment anxiety and self-disclosure on cyberspace (Cheng, 2014). Further evidence is needed.

To sum up, two dimensions of attachment insecurity may exhibit different pattern in predicting self-disclosure on SNS. Current research expect that individuals with high attachment avoidance exhibit less self-disclosure on SNS, while those with high attachment anxiety show an increased self-disclosure on SNS.

2.5. Current research

Literature review show that there are still several limitations and inconsistent results in related research. First, previous study treated attachment as a single dimension (attachment insecurity) (Aharony, 2016). However, several evidences mentioned above support that the difference might exist between attachment anxiety and attachment avoidance (two dimensions of attachment insecurity) in predicting SNS self-disclosure. Therefore, further research is needed to confirm this pattern.

In addition, previous studies draw inconsistent results. One research find that insecurely-attached individuals tend to disclose more self-related information on Facebook (Aharony, 2016). While another research suggest the greater information dissemination of securely-attached individuals (Yaakobi & Goldenberg, 2014). The reasons may be that Yaakobi's study only focus on the disclosure of information about job security which seems cannot fully reflect the concept of self-disclosure on SNS. Besides, both studies resorted to self-report data which may lead to measured deviation. Therefore, it remains to be developed a more comprehensive, objective and effective measurement of self-disclosure on SNS.

Two studies were included in current research to resolve limitations and conflicts mentioned above. Study 1 construct an evaluation model of SNS self-disclosure based on almost all observable information posted on ones' SNS pages. We hypothesis that self-disclosure on SNS can be classified into three aspects: personal profile, profile image, and textual information (H1). Composite score of the evaluation model is significantly related to one's score on questionnaire as a criterion (H2). Based on the evaluation model, Study 2 further investigate the difference between attachment anxiety and avoidance in predicting self-disclosure on Sina Weibo. We hypothesis that individuals with high attachment anxiety exhibit more self-disclosure on SNS (H3), while those with high attachment avoidance show a decreased self-disclosure on SNS (H4). Two studies in current research attempt to expand the applicability of attachment theory as a framework for understanding self-disclosure on SNS and creatively develop an objective evaluation model of SNS self-disclosure providing a new method for measuring self-disclosure.

3. Study 1

3.1. Participants and procedure

Study 1 conduct content analysis to translate almost all meaningful observable information on Sina Weibo into structural data. Based on these data, Study 1 use factor analysis to develop an evaluation model of self-disclosure on SNS. Finally, the criterion validity of the model is tested. In sum, the procedure of Study 1 can be divide into three phases: questionnaire survey, content analysis, and data analysis.

First, a total of 707 Sina Weibo users were invited to complete a questionnaire through Sojump.com, a website which provides an all-in-one solution from participant recruitment to online survey. Similar to MTurk.com, participants recruited through Sojump.com are more representative of the population and diverse than college samples (Buhrmester, Kwang, & Gosling, 2011). However, only 300 participants (93 male, 207 female; aged 18–39, $M = 27.12$, $SD = 4.27$) provide valid Sina Weibo account which is essential to content analysis in next phase.

Second, through the Sina Weibo account provided by participants in the upper phase, researcher can visit their home page by the search function of Sina Weibo and then conduct content analysis to translate the observable information into structural data. As mentioned above, Study 1 conduct content analysis from three aspects: personal profile, profile image, and textual information (see Table 1).

(1) Personal profile. According to the coding procedure used in previous research (Banczyk, Krämer, & Senokozlieva, 2008), Study 1

encode all observable information presented on personal profile page including basic information, contact, occupation and education, descriptive labels, and personal introduction. For every information which appear on profile page, observer encode it as 1. Differently, personal introduction is coded as the number of characters in introduction.

(2) Profile image. This information is coded as the number of photos in profile album and according to whether a photo of themselves is used as one's profile image (use an actual profile image = 1, not use = 0).

(3) Textual information. Since previous research emphasize the initiative of self-disclosure on SNS (Zheng, 2013), Study 1 only include the textual information in original status. Resorting to the TextMind (Gao et al., 2013), a Chinese language psychological analysis system, we conduct automatic words segmentation and then access the word counts of "first personal singular pronouns", "social processes words", "affective processes words", "cognitive processes words", "perceptual processes words", and "biological processes words".

Finally, based on data collected from previous phases, researchers conduct factor analysis to develop an evaluation model of self-disclosure on SNS. The criterion validity of the model is also examined.

3.2. Measures

To examine the validity of the evaluation model, we use a scale of self-disclosure on SNS (Zheng, 2013) as a criterion. With adequate reliability and validity, the scale revised from self-disclosure scales created by Wheeless and Grotz (1976) is composed of 5 subscales and 18 items as follow: Intention, amount, positivity, honesty, and depth. Since the evaluation model only focus on the observable information on SNS, we only use amount (three items, e.g., "I seldom talk about myself on SNS"; $\alpha = 0.80$, $M = 2.77$, $SD = 1.01$) and depth subscales (four items, e.g., "I often reveal intimate and personal information on SNS"; $\alpha = 0.82$, $M = 2.70$, $SD = 0.97$) as criterion of the model.

3.3. Analysis

Study 1 conduct factor analysis to develop an evaluation model of self-disclosure on SNS. Besides, Correlation analysis is used to examine the criterion validity of the model.

3.4. Results

Since the dimension and value of the index are discrepant, all the data are standardized before factor analysis (Qin, 2014). Firstly, the applicability of factor analysis is examined by the KMO and Bartlett's test. The KMO value is well above the criterion ($KMO > 0.5$) proposed by Kaiser (1981) which means that the data have factorability (Mulaik, 2010), in the current study, the KMO is 0.91. The Bartlett's test also draw significant results ($\chi^2 = 4043.37$, $df = 66$, $p < 0.001$) indicating a certain correlation between index and the applicability of factor analysis.

According to the Kaiser criterion (Kaiser, 1960), three factors (components whose eigenvalues greater than one) were extracted by principle component analysis and maximum variation rotation method (see Table 2). The three factors can respectively explain 50.09%, 14.27%, and 10.01% (cumulative 74.37%) of the total information on Sina Weibo. Confirming the hypothesis H1, the component matrix (see Table 3) show that the component 1 is textual information which highly relate to first personal singular pronouns, social processes words, affective processes words, cognitive processes words, perceptual processes words, and biological processes words. The component 2 is personal information which highly relate to basic information, contact information, occupational and educational information, label information, and personal introduction information. The component 3 is profile image which highly relate to profile album and actual profile image.

According to the score coefficient in Table 3 and variance contribution rate in Table 2, we can acquire the computational formula of

Table 1
Category system for SNS self-disclosure.

First-class index	Second-class index	Index meanings
Personal profile	Basic information	Number of personal attributes
	Contact information	Number of contact information
	Occupation and education	Number of work and education experience
	Labels	Number of descriptive labels
	Personal introduction	Number of characters in introduction
Profile image	Profile album	Number of pictures in profile album
	Actual profile image	Whether an actual photo is used as profile image
Textual information	First personal singular pronouns	Number of first personal singular pronouns
	Social processes words	Number of social processes words
	Affective processes words	Number of affective processes words
	Cognitive processes words	Number of cognitive processes words
	Perceptual processes words	Number of perceptual processes words
	biological processes words	Number of biological processes words

every factor and comprehensive factor as follow:

$$F_1 = 0.170*X_7 + 0.178*X_8 + 0.181*X_9 + 0.183*X_{10} + 0.182*X_{11} + 0.184*X_{12}$$

$$F_2 = 0.386*X_1 + 0.385*X_2 + 0.409*X_3 + 0.348*X_4$$

$$F_3 = 0.628*X_5 + 0.552*X_6$$

$$F = (50.091*F_1 + 14.274*F_2 + 10.009*F_3)/74.374$$

Therefore, using these formulae, we can access Sina Weibo users' scores on general self-disclosure and three categories of information.

Finally, the criterion validity of the model is examined (see Table 4). Confirming the hypothesis H2, the composite score of the model is significantly related to one's scores on amount and depth sub-scales. Specifically, except for personal profile factor, both profile image factor and textual information factor are significantly positively related to one's score on amount and depth sub-scales. Notably, the relation between profile image factor and depth dimension show greater significance which means that profile image is a kind of relatively intimate information.

3.5. Discussion

Confirming the hypothesis H1, results of Study 1 show that self-disclosure on SNS include three factors: textual information, personal profile, and profile image. These factors can respectively explain 50.09%, 14.27%, and 10.01% of the total information on Sina Weibo. Confirming the hypothesis H2, the model based on observable information can well evaluate individual's self-disclosure amount and depth.

As main outlet of self-disclosure on SNS (Zhang, 2009), textual information factor can explain about half of the total information on SNS

Table 3
Component matrix.

	Component 1 (Textual information)	Component 2 (Personal information)	Component 3 (Profile image)
Basic information	0.369	0.645	−0.144
Occupation and education	0.301	0.479	−0.343
Labels information	0.301	0.450	−0.435
Personal introduction	0.286	0.598	−0.117
Profile album	0.217	0.334	0.734
Actual profile image	0.223	0.504	0.563
First personal singular pronouns	0.956	−0.103	0.027
Social processes words	0.944	−0.157	−0.010
Affective processes words	0.973	−0.146	−0.003
Cognitive processes words	0.971	−0.162	−0.030
Perceptual processes words	0.970	−0.153	0.025
biological processes words	0.938	−0.193	0.030

Table 4
The criterion validity test.

	Amount	Depth
Personal profile	0.02	0.00
Profile image	0.12*	0.16**
Textual information	0.12*	0.12*
Composite score	0.13*	0.13*

* $p < 0.05$.
** $p < 0.01$.

Table 2
Total variance explained.

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.011	50.091	50.091	6.011	50.091	50.091	5.565	46.375	46.375
2	1.713	14.274	64.365	1.713	14.274	64.365	1.943	16.196	62.570
3	1.201	10.009	74.374	1.201	10.009	74.374	1.416	11.803	74.374
4	0.820	6.834	81.208						
5	0.735	6.125	87.333						
6	0.661	5.508	92.841						
7	0.528	4.403	97.244						
8	0.119	0.995	98.238						
9	0.104	0.864	99.103						
10	0.056	0.463	99.565						
11	0.035	0.292	99.857						
12	0.017	0.143	100.000						

and well reflect individual's amount and depth of self-disclosure. Through these textual information, individual can express their opinion, emotion, feeling and other important self-related information. Supporting evidences find that through conversations on SNS, individuals express their unique concerns and positions regarding polices to be involved with the political process (Fernandes, Giurcanu, Bowers, & Neely, 2010). Posting messages to the "wall" is also the most frequently used communication feature for users to contribute content to a Facebook group (Bender, Jimenezmarroquin, & Jadad, 2011).

Profile picture is a kind of public information on SNS related to one's personal image and well reflect individual's amount and especially depth of self-disclosure on SNS. In off-line social situation, face evaluation plays an important role in developing social relationship (Oosterhof & Todorov, 2008). Therefore, the use of actual profile image may compensate the lack of visual cues in SNS and help to construct one's identity (Hum et al., 2011). In addition, SNS users may also use a photo of themselves and their romantic partner as profile image to reveal their relationships status (Emery, Muise, Dix, & Le, 2014; Shu et al., 2017).

Contrary to expectation, current research find that personal profile information is not significantly relate to one's level of self-disclosure on SNS which further confirm that focusing on personal information cannot fully reflect the concept of self-disclosure on SNS. The reason maybe that SNS users all tend to moderately disclose personal information on profile page. Although SNS users concern about privacy issue, they tend to disclose a variety of personal information on SNS including birth-day, e-mail address, hometown, relationship status, educational experience, and etc. (Acquisti & Gross, 2006; Christofides et al., 2009). SNS users seems fail to aware of the security problem of disclosing these information (Wildemuth, 2008), which is called as "privacy paradox" by Barnes (2006). Users reveal personal information seems to increase ones' opportunity for social interaction and formation of relationships (Donath & Boyd, 2004). Previous study also found that those reveal more on SNS profiles have higher social support from same gender friends (Goldner, 2008).

In sum, the evaluation model developed in Study 1 include almost all important and well-studied self-related information on SNS. Previous studies only focus on a part of these information and thus fail to fully reflect the concept of self-disclosure on SNS. However, although the model can well reflect one's amount and depth of self-disclosure on SNS, it is hard for it to measure one's honesty, intension or other subjective dimensions of self-disclosure.

4. Study 2

4.1. Participants and procedure

707 participants in Study 1 were also invited to complete the adult attachment and control variables measures in Study 2. A total of 300 participants among them (93 male, 207 female; aged 18–39, $M = 27.12$, $SD = 4.27$) provide useable objective data of self-disclosure on SNS through the evaluation model developed in Study1. The role of adult attachment on SNS self-disclosure were examined.

4.2. Measures

4.2.1. Self-disclosure on SNS

The evaluation model developed in Study 1 is used to measure the degree of objective self-disclosure on SNS including personal profile information (five index, e.g., "occupation and education"; $\alpha = 0.26$, $M = 0.28$, $SD = 0.21$), profile image information (two index, e.g., "numbers of photo in profile album"; $r = 0.35$, $M = 0.31$, $SD = 0.31$), and textual information (six index, e.g., "first personal singular pronouns"; $\alpha = 0.86$, $M = 0.10$, $SD = 0.15$).

4.2.2. Adult attachment

With verified reliability and validity, a Chinese adaption of the Experiences in Close Relationships Scale-Short form (ECR-S)(Wang & Chen, 2013) was used to measure two dimensions, attachment anxiety (nine items, e.g., "I worry a fair amount about losing him or her"; $\alpha = 0.88$, $M = 3.64$, $SD = 1.11$) and attachment avoidance (nine items, e.g., "I don't feel comfortable opening up to him or her"; $\alpha = 0.87$, $M = 2.76$, $SD = 0.93$). Responses were assessed using a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree).

4.2.3. Control variables

According to previous studies, we control the effect of several variables in analysis including age, gender, age on Sina Weibo, extraversion, and emotional stability. Since previous research has found the effect of age on online self-disclosure (Kim, Klautke, & Serota, 2009) and the gender differences in willingness to self-disclosure (Stokes, Childs, & Fuehrer, 1981). Besides, the amount of information presented on SNS is also influenced by the age on Sina Weibo. Therefore, participants were required to report their age and gender in online survey and the age on Sina Weibo was coded from user's personal profile page. Finally, extraversion (negatively related to attachment avoidance) and emotional stability (negatively related to avoidance) are two important personality traits that share considerable variance with adult attachment (Noftle & Shaver, 2006). Therefore, the Chinese version of the 10-Item Personality Inventory (Li, 2013) was used to measure extraversion (two items, e.g., "extraverted, enthusiastic"; $r = 0.51$, $M = 4.33$, $SD = 1.23$) and emotional stability (two items, e.g., "anxious, self-disciplined"; $r = 0.36$, $M = 4.73$, $SD = 1.12$). Responses were assessed using a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree).

4.3. Analysis

Study 2 first conduct a correlation analysis to examine the probable relationships between adult attachment and SNS self-disclosure. Besides, hierarchical regression analyses were performed to investigate the role of adult attachment in predicting self-disclosure on SNS. Three categories of information were consider as outcome variables. In hierarchical regression, all the control variables were initially entered. Attachment anxiety and attachment avoidance were entered next.

4.4. Results

The correlations and descriptive statistics of main variables are presented in Table 5. Attachment anxiety show significantly negative relation to the disclosure of personal profile on SNS. Attachment avoidance is significantly negatively related to disclosure of profile image on SNS. The correlation analysis indicate a negative relationship between insecurity adult attachment and self-disclosure on SNS.

To further examine the hypothesis H3 and H4, a hierarchical regression analysis was performed to investigate the role of adult attachment in predicting self-disclosure on SNS (Table 6). Two dimensions of adult attachment also show different pattern in predicting disclosure of different information on SNS after the age, gender, age on Sina Weibo, extraversion, and emotional stability were controlled. Contrary to hypothesis H3, attachment anxiety can negatively predict the disclosure of personal profile information on SNS ($t = -2.83$, $p < 0.01$). Confirming the hypothesis H4, attachment avoidance can negatively predict the disclosure of profile image on SNS ($t = -2.05$, $p < 0.05$). Contrary to expectation, both attachment anxiety ($t = 0.4$, $p > 0.1$) and attachment avoidance ($t = -1.11$, $p > 0.1$) fail to significantly predict the disclosure of textual information on SNS.

4.5. Discussion

Results in Study 2 show that attachment anxiety and attachment

Table 5

Correlations among the main variables in Study 2.

	Mean	SD	1	2	3	4	5	6
1.Attachment anxiety	3.64	1.11	–					
2.Attachment avoidance	2.76	0.93	0.38***	–				
3.Personal profile factor	0.28	0.21	− 0.12*	0.04	–			
4.Profile image factor	0.31	0.32	− 0.07	− 0.16**	0.22***	–		
5.Textual information factor	0.10	0.15	0.03	− 0.03	0.32***	0.17**	–	
6.Composite factor	0.16	0.14	− 0.03	− 0.06	0.60***	0.50***	0.90***	–

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

avoidance show different pattern in predicting disclosure of self-related information on SNS. Inconsistent to hypothesis H3, anxious individuals tend to disclose less personal information on SNS. The possible reasons maybe that anxious individuals tend to form a negative model of the self and have lower degree of self-esteem (Collins & Read, 1990). With negative belief and emotion experience in social interaction, SNS users with low self-esteem tend to use less words in describing themselves on their profile page (Banczyk et al., 2008). The interview data also find that the primary reasons for users to disclose personal information on SNS was to assist their friends in locating them when conducting searches on SNS (Young & Quan-Haase, 2009). However, anxious individuals tend to use SNS to avoid more personal face-to-face communication since SNS allow them to hold relationships at a psychological arm's distance (Nitzburg & Farber, 2013). Therefore, with low self-esteem, anxious individuals may disclose less personal information on profile to keep themselves anonymous in SNS.

Confirming the hypothesis H4, individuals with high attachment avoidance tend to post less profile image and is reluctant to present their actual photo as profile image. In SNS, identity is mostly constructed by sharing photo rather than words (Zhao, Grasmuck, & Martin, 2008). As an important way of identity construction, photo posted on SNS can be seen as a social product that helps individuals to gain popularity from other users (Christofides et al., 2009). Therefore, individual who post less photo on SNS limits the potential for identity construction and thus potentially reduces one's popularity. However, avoidant individuals tend to form a negative view of others in relationships (Collins & Read, 1990). They tend to keep socially isolated and thus use less and hold less openness attitude to SNS (Oldmeadow et al., 2013). Therefore, avoidant individuals may not concerned with their popularity on SNS and share less profile image to avoid intimacy.

As for H3 and H4, cultural difference maybe a considering factor for explanation the results. Chinese SNS users are more likely to disclose less personal information compared to members of individualistic cultures (Yoo, 2014). On the contrary, members of individualistic cultures maybe exhibit higher levels of self-disclosure on SNSs, and perhaps in real life, than do members of collectivist cultures (Cho, 2007). Privacy is considered valuable and vital in collective cultures. As a result, this may account for the low level of self-disclosure on SNS of Chinese insecurely-attached individuals.

Generally speaking, although attachment anxiety and attachment avoidance show different pattern in predicting different categories of self-related information on SNS, insecurely-attached individuals (those with high attachment anxiety or attachment avoidance) show decreased self-disclosure on SNS. With negative model of the self or others (Collins & Read, 1990), insecurely-attached individuals may be hard to develop trust to others on SNS (Marshall, Bejanyan, Di Castro, & Lee, 2013; Wu & Lin, 2005) and disclose less self-related information to untrusted people (Cozby, 1973; Steel, 1991). Besides, research also find that individuals with low interpersonal trust show more privacy concern and thus disclose less self-related information on SNS (Joinson, Reips, Buchanan, & Schofield, 2010). Therefore, with low interpersonal trust, insecure individuals may be unwilling to disclose self-related information on SNS to avoid privacy disclosure. The finding is inconsistent to previous research based on self-report data (Aharony, 2016). The reason may be that self-report data in previous research only reflect individuals' general view about self-disclosure but not their actual behavior on SNS.

5. General discussion

Most of the hypotheses were confirmed through the two studies in current research. As a core behavior on SNS (Caplan, 2007), self-disclosure is an act of revealing self-related information to others on SNS. The information that users post on SNS constitute a type of behavioral residue, the physical traces left in the environment by our daily actions (Gosling, 2008). Therefore, analyzing the information posted on SNS may indirectly reflect their disclosure behaviors. Follow this view, the evaluation model constructed in Study 1 include personal profile,

Table 6

Results of hierarchical regression analyses of objective SNS self-disclosure.

Predictors	Personal profile			Profile image			Textual content		
	B	β	t	B	β	t	B	β	t
Gender	− 0.01	− 0.03	− 0.53	0.11	0.04	2.66**	0.02	0.05	0.87
Age	0.00	− 0.09	− 1.52	− 0.01	− 0.06	− 1.08	0.00	− 0.00	− 0.02
Age on Sina Weibo	0.00	0.28	4.80***	0.00	0.12	2.10*	0.00	0.28	4.92***
Extraversion	0.00	0.01	0.11	0.03	0.13	2.10*	− 0.00	− 0.03	− 0.47
Emotional stability	− 0.01	− 0.03	− 0.50	− 0.01	− 0.04	− 0.63	− 0.01	− 0.07	− 1.07
Attachment anxiety	− 0.03	− 0.18	− 2.66**	0.00	0.02	0.23	0.01	0.04	0.58
Attachment avoidance	0.02	0.07	1.09	− 0.05	− 0.15	− 2.27*	− 0.02	− 0.10	− 1.51
N	300			300			300		
R^2	0.10			0.08			0.09		

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

profile image, and textual information on Sina Weibo users' main page. The Composite score of the model can well reflect users' self-disclosure amount and depth. Based on the model, Study 2 find that insecurely-attached individuals show decreased self-disclosure on SNS, which is inconsistent to previous research based on self-report data (Aharony, 2016). Literature review find supporting evidences, self-esteem and online interpersonal trust seems mediate the negative relationship between adult attachment and self-disclosure on SNS. However, the mediating effect still needs further examination.

6. Limitations and future direction

First, current research attempt to evaluate individuals' self-disclosure on SNS based on observable information on their SNS main page. Although the composite score of the evaluation model can well reflect one's self-disclosure amount and depth on SNS, some researchers suggest that self-disclosure is a multi-dimensional construct and also include intention, honesty and other subjective dimensions except for amount and depth (Hollenbaugh & Ferris, 2014; Zhang & Ling, 2015). However, these subjective dimensions are virtually impossible to measure by observable information on SNS. Therefore, consider the advantage of the evaluation model and the irreplaceability of the self-report measure, future research can attempt to combine these two kinds of measures to study self-disclosure on SNS.

Then, there are question about sample and materials in this article. Our samples are not representative of adults given that we only sampled college students in China, whether the results generalize to all Chinese citizens of subgroups of them is a question for future research. As for materials in this study, we haven't consider someone's whole body or face are not included into picture, future research should address this limitation by using more specific details into profile image.

Moreover, previous work may suggest "rejection sensitivity" link with self-esteem (Göncü & Sümer, 2011), in current study, we mentioned that one of the reasons why anxiety was unexpectedly linked with self-disclosure could be self-esteem. The notion of rejection sensitivity and insecure attachment may be tapping the same underlying construct (Wilkinson & Paoli, 2014). Therefore, rejection sensitivity maybe could explain why anxiety unexpectedly linked with self-disclosure. Future studies could use the concept of "rejection sensitivity" to extend the findings.

In addition, the influencing mechanism of adult attachment on SNS self-disclosure has not been studied. Literature reviews indicate that self-esteem and online interpersonal trust can well explain the negative relationship between adult attachment and self-disclosure on SNS. However, research on the relationship between self-esteem and self-disclosure on SNS still draw numerous inconsistent results (Banczyk et al., 2008; Christofides et al., 2009; Forest & Wood, 2012; Hollenbaugh & Ferris, 2014). Future research should further examine the mediating effect of self-esteem, online interpersonal trust or other possible mediators in the relationship between adult attachment and self-disclosure on SNS.

Finally, as the differences between Twitter and Facebook (Huberman, Romero, & Wu, 2008; Panek, Nardis, & Konrath, 2013), Sina Weibo may differs from other SNSs in details on the outlet of self-disclosure. Besides, the social rule of Sina Weibo is apparently different from other SNS like Facebook and WeChat, a popular SNS in mainland China. The differences in social rule may influence one's self-disclosure behavior on SNS. To specific, Sina Weibo users can "follow" anyone they like and access their information on main page without permission. However, with regard to WeChat and Facebook, before visiting other's main page, users must request permission to be in another user's circle. That is, the social circles on Sina Weibo are more public and anonymous. While research find that anonymity on SNS can positively predict self-disclosure level on SNS (Retelas, 2008). Therefore, generalizing the conclusions from Sina Weibo to other SNSs, such as Facebook and WeChat, may be problematic. Future research should pay

attention to the self-disclosure behavior on different SNSs.

7. Conclusion and implications

The evaluation model of SNS self-disclosure include three factors: Textual information, personal profile, and profile image. These factors can respectively explain 50.09%, 14.27%, and 10.01% of the total information on Sina Weibo. The Composite score of the model can well reflect users' self-disclosure amount and depth. The evaluation model developed in current research improves the validity and objectivity in measurement and provide a new method to measure self-disclosure for future research. In practice, the content analysis can also plays a significant role in public opinion monitoring and network security.

Besides, attachment anxiety and attachment avoidance show different pattern in predicting self-disclosure on SNS. To specific, individuals with high attachment anxiety disclose less personal information on their SNS profile page. While those with high attachment avoidance show a decreased disclosure of profile image on SNS. The results further expand the applicability of attachment theory in explaining behaviors on SNS and provide a new perspective for future online self-disclosure research.

Acknowledgments

References

Acquisti, A., & Gross, R. (2006). Imagined communities: Awareness, information sharing, and privacy on the Facebook. *Lecture Notes in Computer Science, 4258*(1), 36–58.

Aharony, N. (2016). Relationships among attachment theory, social capital perspective, personality characteristics, and Facebook self-disclosure. *Journal of Information Management, 68*(3), 362–386.

Al-Saggaf, Y., & Nielsen, S. (2014). Self-disclosure on Facebook among female users and its relationship to feelings of loneliness. *Computers in Human Behavior, 36*(2014), 460–468.

Amichai-Hamburger, Y., & Vinitzky, G. (2010). Social network use and personality. *Computers in Human Behavior, 26*(6), 1289–1295.

Back, M. D., Stopfer, J. M., Vazire, S., Gaddis, S., Schmukle, S. C., Egloff, B., & Gosling, S. D. (2010). Facebook profiles reflect actual personality, not self-idealization. *Psychological Science, 21*(3), 372.

Banczyk, B., Krämer, N. C., & Senokozlieva, M. N. (2008). *"The wurst" meets "fatless" in MySpace: The relationship between self-esteem, personality, and self-presentation in an online community*.

Barnes, S. B. (2006). A privacy paradox: Social networking in the United States. *First Monday, 11*(9).

Bender, J. L., Jimenezmarroquin, M. C., & Jadad, A. R. (2011). Seeking support on Facebook: A content analysis of breast cancer groups. *Journal of Medical Internet Research, 13*(1), 16.

Bowlby, J. (1969). *Attachment and loss: Attachment. vol. 1*. New York: Basic Books.

Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *IEEE Engineering Management Review, 13*(1), 16–31.

Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson, & W. S. Rholes (Eds.). *Attachment theory and close relationships* (pp. 46–76). New York: Guilford Press.

Bretherton, I. (1985). Attachment theory: Retrospect and prospect. *Monographs of the Society for Research in Child Development, 50*(1/2), 3–35.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's mechanical turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*(1), 3–5.

Caplan, S. E. (2007). Relations among loneliness, social anxiety, and problematic internet use. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society, 10*(2), 234.

Cassidy, J. (2003). Continuity and change in the measurement of infant attachment: Comment on Fraley and Spieker (2003). *Developmental Psychology, 39*(3), 409–412.

Chang, C. W., & Heo, J. (2014). Visiting theories that predict college students' self-disclosure on Facebook. *Computers in Human Behavior, 30*, 79–86.

Chen, X., Pan, Y., & Guo, B. (2016). The influence of personality traits and social networks on the self-disclosure behavior of social network site users. *Internet Research, 26*(3), 566–586.

Cheng, Q., Li, T. M., Kwok, C. L., Zhu, T., & Yip, P. S. (2017). Assessing suicide risk and emotional distress in Chinese social media: A text mining and machine learning study. *Journal of Medical Internet Research, 19*(7), e243.

Cheng, Y. (2014). Research on how attachment style of college students effects their online self-disclosure. *Master's thesis* (Retrieved from China Master's Theses Full-text Database).

China Internet Network Information Center (2017). The 40th China statistical report on internet development. Retrieved from http://cnnic.cn/hlwfzyj/hlwxzbg/hlwtjbg/201708/P020170807351923262153.pdf.

Cho, S. H. (2007). Effects of motivations and gender on adolescents' self-disclosure in online chatting. *Cyberpsychology & Behavior, 10*(3), 339–345.

Christofides, E., Muise, A., & Desmarais, S. (2009). Information disclosure and control on Facebook: Are they two sides of the same coin or two different processes? *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society, 12*(3) (341).

Collins, N. L. (1996). Working models of attachment: Implications for explanation, emotion and behavior. *Journal of Personality and Social Psychology, 71*(4), 810.

Collins, N. L., & Allard, L. M. (2007). Cognitive representations of attachment: The content and function of working models. In G. O. Fletcher, & M. S. Clark (Eds.). *Blackwell handbook of social psychology: Interpersonal processes* (pp. 60–85). Malden, MA: Blackwell.

Collins, N. L., & Miller, L. C. (1994). Self-disclosure and liking: A meta-analytic review. *Psychological Bulletin, 116*(3), 457–475.

Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology, 58*(4), 644.

Cozby, P. C. (1973). Self-disclosure: A literature review. *Psychological Bulletin, 79*(2), 73–91.

Derlega, V., Winstead, B. A., Wong, P., & Greenspan, M. (1987). Self-disclosure and relationship development: An attributional analysis. In M. E. Roloff, & G. R. Miller (Eds.). *Interpersonal processes: New directions in communication research* (pp. 172–187). Newbury Park, CA: Sage.

Donath, J., & Boyd, D. (2004). Public displays of connection. *BT Technology Journal, 22*(4), 71–82.

Emery, L. F., Muise, A., Dix, E. L., & Le, B. (2014). Can you tell that I'm in a relationship? Attachment and relationship visibility on Facebook. *Personality and Social Psychology Bulletin, 40*(11), 1466–1479.

Fernandes, J., Giurcanu, M., Bowers, K. W., & Neely, J. C. (2010). The writing on the wall: A content analysis of college students' Facebook groups for the 2008 presidential election. *Mass Communication and Society, 13*(5), 653–675.

Forest, A. L., & Wood, J. V. (2012). When social networking is not working individuals with low self-esteem recognize but do not reap the benefits of self-disclosure on Facebook. *Psychological Science, 23*(3), 295.

Fraley, R. C. (2002). Attachment stability from infancy to adulthood: Meta-analysis and dynamic modeling of developmental mechanisms. *Personality and Social Psychology Review, 6*(2), 123–151.

Fraley, R. C., & Brumbaugh, C. C. (2004). A dynamical systems approach to conceptualizing and studying stability and change in attachment security. In W. S. Rholes, & J. A. Simpson (Eds.). *Adult attachment: Theory, research, and clinical implications* (pp. 86–132). New York, NY, US: Guilford Publications.

Gao, R., Hao, B., Li, H., Gao, Y., & Zhu, T. (2013). Developing simplified Chinese psychological linguistic analysis dictionary for microblog. *2013 international conference on brain and health informatics. Maebashi, Japan.*

Goldner, K. R. (2008). *Self disclosure on social networking websites and relationship quality in late adolescence.* ETD Collection for Pace University.

Göncü, A., & Sümer, N. (2011). Rejection sensitivity, self-esteem instability, and relationship outcomes: The mediating role of responsibility attributions. *European Psychologist, 16*(4), 303–313.

Gosling, S. (2008). *Snoop: What your stuff says about you.* New York, NY: Basic Books.

Gosling, S. D., Augustine, A. A., Vazire, S., Holtzman, N., & Gaddis, S. (2011). Manifestations of personality in online social networks: Self-reported Facebook-related behaviors and observable profile information. *Cyberpsychology, Behavior and Social Networking, 14*(9), 483–488.

Hart, J., Hung, J. A., Glick, P., & Dinero, R. E. (2012). He loves her, he loves her not: Attachment style as a personality antecedent to men's ambivalent sexism. *Personality and Social Psychology Bulletin, 38*(11), 1495.

Hart, J., Nailling, E., Bizer, G. Y., & Collins, C. K. (2015). Attachment theory as a framework for explaining engagement with Facebook. *Personality and Individual Differences, 77*, 33–40.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*(3), 511–524.

Hollenbaugh, E. E., & Ferris, A. L. (2014). Facebook self-disclosure: Examining the role of traits, social cohesion, and motives. *Computers in Human Behavior, 30*(1), 50–58.

Huberman, B. A., Romero, D. M., & Wu, F. (2008). Social networks that matter: Twitter under the microscope. *Social Science Electronic Publishing, 14*(1), 2009.

Hum, N. J., Chamberlin, P. E., Hambright, B. L., Portwood, A. C., Schat, A. C., & Bevan, J. L. (2011). A picture is worth a thousand words: A content analysis of Facebook profile photographs. *Computers in Human Behavior, 27*(5), 1828–1833.

Joinson, A. N. (2001). Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity. *European Journal of Social Psychology, 31*(2), 177–192.

Joinson, A. N., Reips, U. D., Buchanan, T., & Schofield, C. B. P. (2010). Privacy, trust, and self-disclosure online. *Human Computer Interaction, 25*(1), 1–24.

Jourard, S. M. (1971). Self-disclosure: An experimental analysis of the transparent self. *Revista Española de Cardiología, 63*(12), 1438–1443.

Jourard, S. M., & Lasakow, P. (1958). Some factors in self-disclosure. *Journal of Abnormal Psychology, 56*(1), 91.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*(1), 141–151.

Kaiser, H. F. (1981). A revised measure of sampling adequacy for factor-analytic data matrices. *Educational and Psychological Measurement, 41*(2), 379–381.

Kim, J., Klautke, H. A., & Serota, K. B. (2009). *Effects of relational motivation and age on online self-disclosure: A content analysis of MySpace profile pages.*

Klohnen, E. C., & Bera, S. (1998). Behavioral and experiential patterns of avoidantly and securely attached women across adulthood: A 31-year longitudinal perspective. *Journal of Personality and Social Psychology, 74*(1), 211–223.

Kobak, R. R., & Sceery, A. (1988). Attachment in late adolescence: Working models, affect regulation, and representations of self and others. *Child Development, 59*(1), 135–146.

Kolek, E. A., & Saunders, D. (2008). Online disclosure: An empirical examination of undergraduate Facebook profiles. *NASPA Journal, 45*(1), 1–25.

Krippendorff, K. (2004). *Content analysis: An introduction to its methodology* (second edition). California: Sage.

Li, J. (2013). Psychometric properties of ten-item personality inventory in China. *China Journal of Health Psychology, 11*, 1688–1692.

Liu, X., & Zhu, T. (2016). Deep learning for constructing microblog behavior representation to identify social media user's personality. *Peerj Computer Science, 2016*(2).

Liu, Z., Min, Q., Zhai, Q., & Smyth, R. (2016). Self-disclosure in Chinese micro-blogging: A social exchange theory perspective. *Information & Management, 53*(1), 53–63.

Luke, M. A., Maio, G. R., & Carnelley, K. B. (2004). Attachment models of the self and others: Relations with self-esteem, humanity-esteem, and parental treatment. *Personal Relationships, 11*(3), 281–303.

Marshall, T. C., Bejanyan, K., Di Castro, G., & Lee, R. A. (2013). Attachment styles as predictors of Facebook-related jealousy and surveillance in romantic relationships. *Personal Relationships, 20*(1), 1–22.

Mesch, G. S., & Beker, G. (2010). Are norms of disclosure of online and offline personal information associated with the disclosure of personal information online? *Human Communication Research, 36*(4), 570–592.

Mikulincer, M., & Nachshon, O. (1991). Attachment styles and patterns of self-disclosure. *Journal of Personality and Social Psychology, 61*(2), 321–331.

Miller, L. C., Berg, J. H., & Archer, R. L. (1983). Openers: Individuals who elicit intimate self-disclosure. *Journal of Personality and Social Psychology, 44*(6), 1234–1244.

Morey, J. N., Gentzler, A. L., Creasy, B., Oberhauser, A. M., & Westerman, D. (2013). Young adults' use of communication technology within their romantic relationships and associations with attachment style. *Computers in Human Behavior, 29*(4), 1771–1778.

Mulaik, S. A. (2010). *Foundations of factor analysis.* Boca Raton, FL: Chapman & Hall/CRC.

Nitzburg, G. C., & Farber, B. A. (2013). Putting up emotional (Facebook) walls? Attachment status and emerging adults' experiences of social networking sites. *Journal of Clinical Psychology, 69*(11), 1183–1190.

Noftle, E. E., & Shaver, P. R. (2006). Attachment dimensions and the big five personality traits: Associations and comparative ability to predict relationship quality. *Journal of Research in Personality, 40*(2), 179–208.

Oldmeadow, J. A., Quinn, S., & Kowert, R. (2013). Attachment style, social skills, and Facebook use amongst adults. *Computers in Human Behavior, 29*(3), 1142–1149.

Oosterhof, N. N., & Todorov, A. (2008). The functional basis of face evaluation. *Proceedings of the National Academy of Sciences of the United States of America, 105*(32), 11087–11092.

Panek, E. T., Nardis, Y., & Konrath, S. (2013). Mirror or megaphone? How relationships between narcissism and social networking site use differ on Facebook and Twitter. *Computers in Human Behavior, 29*(5), 2004–2012.

Pilkington, C. J., Derlega, V. J., Metts, S., Petronio, S., & Margulis, S. T. (1993). Self-disclosure. *Journal of Marriage and the Family, 55*(4), 1056.

Qin, T. (2014). Evaluation of user influence in micro blogging: A case study based on Sina micro-blog. *Master's thesis* (Retrieved from China Master's Theses Full-text Database).

Qiu, L., Lin, H., Leung, A. K., & Tov, W. (2012). Putting their best foot forward: Emotional disclosure on Facebook. *Cyberpsychology, Behavior and Social Networking, 15*(10), 569.

Raacke, J., & Bonds-Raacke, J. (2008). MySpace and Facebook: Applying the uses and gratifications theory to exploring friend-networking sites. *Cyberpsychology & Behavior, 11*(2), 169–174.

Retelas, G. (2008). Anonymity and self-disclosure on MySpace. *Master's thesis* (Retrieved from Dissertations & Theses - Gradworks).

Rom, E., & Alfasi, Y. (2014). The role of adult attachment style in online social network affect, cognition, and behavior. *Journal of Psychology and Psychotherapy Research, 1*, 24–34.

Rueda-Ortiz, R., & Giraldo, D. (2016). *Profile image: Ways of self-(re-)presentation on the Facebook social network.* Basel Switzerland: Springer International Publishing.

Saslow, L. R., Muise, A., Impett, E. A., & Dubin, M. (2013). Can you see how happy we are? Facebook images and relationship satisfaction. *Social Psychological and Personality Science, 4*(4), 411–418.

Schouten, A. P., Valkenburg, P. M., & Peter, J. (2014). An experimental test of processes underlying self-disclosure in computer-mediated communication. *Cyberpsychology, 3*(2), 1–15.

Shang, R. A., Chen, Y. C., & Chang, J. W. (2015). *Individual attachment style, self-disclosure, and how people use social network.* (International conference on multidisciplinary social networks research).

Shu, C., Hu, N., Zhang, X., Ma, Y., & Chen, X. (2017). Adult attachment and profile images on Chinese social networking sites: A comparative analysis of Sina Weibo and WeChat. *Computers in Human Behavior, 77*, 266–273.

Sroufe, L. A., & Waters, E. (1977). Attachment as an organizational construct. *Child Development, 48*(4), 1184–1199.

Steel, J. L. (1991). Interpersonal correlates of trust and self-disclosure. *Psychological Reports, 68*(3), 1319–1320.

Stokes, J., Childs, L., & Fuehrer, A. (1981). Gender and sex roles as predictors of self-disclosure. *Journal of Counseling Psychology, 28*(6), 510–514.

Strano, M. M. (2008). User descriptions and interpretations of self-presentation through Facebook profile images. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 2*(2), 5.

Suler, J. (2004). The online disinhibition effect. *Cyberpsychology & Behavior: The Impact of*

the Internet, Multimedia and Virtual Reality on Behavior and Society, 7(3), 321.

Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. *Journal of Language and Social Psychology, 29*(1), 24–54.

Thompson, A. W. (2012). To post or not to post: An examination of gender differences in undergraduates' self-disclosure on Facebook. *Master's thesis* (Retrieved from Dissertations & Theses - Gradworks).

Tidwell, L. C., & Walther, J. B. (2002). Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations: Getting to know one another a bit at a time. *Human Communication Research, 28*(3), 317–348.

Varnali, K., & Toker, A. (2015). Self-disclosure on social networking sites. *Social Behavior and Personality: An International Journal, 43*(1), 1–13.

Walther, J. B. (1996). Computer-mediated communication impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*(23), 3–43.

Wang, J., & Chen, J. (2013). The Chinese version of the experiences in close relationship scale (ECR)-short form: Reliability, validity. *Science of Social Psychology, 28*(10), 106–111.

Watson, S. W., Smith, Z., & Driver, J. (2006). *Alcohol, sex and illegal activities: An analysis of selected Facebook central photos in fifty states.* Online Submission*vol. 27*.

Wei, M., Russell, D. W., & Zakalik, R. A. (2005). Adult attachment, social self-efficacy, self-disclosure, loneliness, and subsequent depression for freshman college students: A longitudinal study. *Journal of Counseling Psychology, 52*(4), 602–614.

Wheeless, L. R., & Grotz, J. (1976). Conceptualization and measurement of reported self-disclosure. *Human Communication Research, 2*(4), 338–346.

Wildemuth, B. M. (2008). *The illusion of online privacy.* (online).

Wilkinson, R. B., & Paoli, T. D. (2014). Rejection sensitivity and attachment insecurity: An experimental approach to exploring the origins of rejection sensitivity. *International association for relationship research biennial conference*.

Wu, C. H., & Lin, Y. C. (2005). *The influence of adult attachment styles on the sense of trust to cyber-others and cyber self-certainty*.

Yaakobi, E., & Goldenberg, J. (2014). Social relationships and information dissemination in virtual social network systems: An attachment theory perspective. *Computers in Human Behavior, 38*(2), 127–135.

Yoo, J. (2014). *Exploring cross-cultural differences in self-presentation and self-disclosure in social networking sites: A comparison of korean and american sns users.* Social Science Electronic Publishing.

Young, A. L., & Quan-Haase, A. (2009). Information revelation and internet privacy concerns on social network sites: A case study of Facebook. *International conference on communities and technologies*.

Zhang, J. (2009). Effects of different motivations on college students' self-disclosure. *Journal of China University of Geosciences, 9*(3), 22–26.

Zhang, Y., & Ling, Q. (2015). SNS as intimacy zone: Social intimacy, loneliness, and self-disclosure on SNS. *Global Media Journal, 13*, 1.

Zhao, S., Grasmuck, S., & Martin, J. (2008). Identity construction on Facebook: Digital empowerment in anchored relationships. *Computers in Human Behavior, 24*(5), 1816–1836.

Zheng, X. (2013). Revision of the scale of self-disclosure on social networking sites and its influencing mechanism. *Master's thesis* (Retrieved from China Master's Theses Full-text Database).