

ADOLESCENT'S SOCIAL NETWORKING USE AND ITS RELATIONSHIP
TO ATTACHMENT AND MENTAL HEALTH

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Adolescents spend much of their time using the internet and electronic media. Since its inception, the use of online social networking (OSN) sites by adolescents continues to grow. With the proliferation of OSN, it is critical to examine how this activity affects psychological development, but better measurement tools are needed. As researchers struggle to keep up with this rapidly growing field, many gaps remain in the literature investigating the interrelations between adolescent's OSN use and mental health outcomes. Research examining the relationship between OSN and mental health outcomes, specifically depression and anxiety, has produced mixed results suggesting that other factors influence this association. A large research literature documents associations between attachment and mental health. Given that attachment also affects interpersonal communication, several studies have investigated links between attachment and OSN use in adult and college populations. Results indicated that even though attachment to father was independently related to anxiety and depression symptoms, it was not a significant moderator for mental health and OSN. Attachment to mother was a significant moderator for anxiety and depression and several OSN subscales. Based on this information, a greater focus on youth's interpersonal connection and social skills both online and offline may be beneficial when treating adolescents experiencing anxiety or depression.

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INTRODUCTION

Studies estimate that 55% adolescents were using online social networking (OSN) sites in 2006, 73% in 2009 (Lenhart et al., 2010), and 80% in 2011 (Lenhart et al., 2011)—which constitutes a 25% increase in just five years. Since the inception of OSN, researchers have struggled to keep up with this fast growing and changing field of study (Anderson, Fagan, Woodnutt, & Chamorro-Premuzic, 2012). Despite high usage rates, research has revealed little regarding the possible implications of OSN for adolescent development. At a minimum, however, the scarce research available suggests that the use of OSN plays a key role in how adolescents build and maintain social relationships (Lenhart & Madden, 2007). Recent evidence has fueled societal fears about negative outcomes of OSN, with reports linking increased internet use with cyber-bullying, internet addiction, sleep and academic disturbances, and poor parent-child relations (see Shapiro & Margolin, 2014, for a review). In addition, some studies also link OSN to depression and anxiety (Sagioglou & Greitemeyer, 2014; Shaw, Timpano, Tran, & Joormann, 2015)

One of the difficulties of investigating OSN is the absence of a standardized system of measurement. New scales have been developed and used with college and adult samples, but they tend to be narrow in scope, only assessing the use of one OSN site or just one specific activity on an OSN site. One purpose of the current study is to develop and validate a scale to measure multiple aspects of adolescent OSN usage. To establish construct validity, the proposed scale's relationship to perceived social support will be assessed. In recent studies, positive correlations have been found between perceived social support and some OSN behaviors (Nabi, Prestin, & So, 2013; Shaw & Gant, 2002; Subrahmanyam, Reich, Waechter, & Espinoza, 2008).

In addition to scale development, the study aims to explore how OSN is associated with other social relationships and mental health.

Given the limited knowledge available, the attachment literature can provide theoretical and empirical guidance for investigating adolescent functioning in relation to OSN. Potential associations between attachment and OSN have received little research attention, with only one study to date examining attachment and OSN among adolescents (Lei & Wu, 2007), despite the high usage rate of OSN in this population (Lenhart et al., 2011). Due to this gap a second purpose of this study is to build on the dearth of research concerning attachment and OSN. In addition, attachment theory, first developed by John Bowlby in the 1940s (Bretherton, 1992), explains how early parent-child relationships and later romantic relationships shape an individual's personality, social relations, and mental health (Bowlby, 1982). For example, research shows that individuals with an insecure attachment style are at higher risk for having or developing depression and anxiety-related disorders (Hankin, 2009; Irons & Gilbert, 2005), which are two of the most prevalent mental illnesses for adolescents (Costello, Egger, & Angold, 2005; Williamson, Forbes, Dahl, & Ryan, 2005), with an estimated 2% to 5% diagnosis rate for depression and 32.4% diagnosis rate for anxiety-related disorders among adolescents (Kessler et al., 2012).

Currently, the role of OSN in adolescent well-being is uncertain. Initial studies suggest that frequent internet usage leads to higher rates of depression and anxiety, although these studies ultimately remain inconclusive (Best, Manktelow, & Taylor, 2014). Links between OSN and mental health may depend on other factors that have not yet been investigated. In particular, the family attachment network is a key developmental context that may play an important role in this association. Thus, a third purpose of the proposed study is to examine the link between OSN

and adolescent psychological well-being and to explore the potential moderating role of the adolescent-parent attachment relationship.

Attachment Theory

John Bowlby first theorized and conducted research on attachment theory in the mid-20th century (Bretherton, 1992). Integrating elements from theories of evolution, ethology, developmental psychology, and psychoanalysis, Bowlby (1969, 1973, 1980) theorized that interactions between infants and their primary caregiver provide the context for the development of internal working models (IWMs) of attachment, which contribute to a characteristic strategy for forming relational bonds with significant others throughout childhood, adolescence, and adulthood. The foundation of individuals' views of themselves and others is formed from IWMs, which influence thoughts, feelings, and behaviors in future relationships (Hazan & Shaver, 1994). When a caregiver can sensitively and responsively meet a child's essential needs for love and nurturance, such as being fed or held, the child develops a secure attachment (Berger, Jodl, Allen, McElhaney, & Kuperminc, 2005). When these needs are not met, the child likely will develop an insecure attachment to the caregiver.

After working at the Tavistock clinic, Mary Ainsworth and her colleagues (Ainsworth, Blehar, Waters, & Wall, 1978) developed a laboratory measure of infant attachment called the "Strange Situation," which classified children into three categories: secure, anxious-avoidant, and anxious ambivalent. Based on hundreds of hours of home observations, the researchers identified various parenting characteristics that were uniquely associated with one of the three attachment patterns. Children whose caregivers are sensitive to their attachment needs will feel secure, trusting that their needs will be met, and also feel safe exploring away from their parents knowing they have a secure base to which they can return for comfort and protection. The

combination of independent exploration and secure base helps the child develop a balance between connection to others and self-reliance, promotes adaptive personality development, and encourages psychological functioning (Mezulis, Hyde, & Abramson, 2006).

On the other hand, a child whose parent demonstrates rejection, inconsistency, or unavailability is more likely to develop an insecure attachment (Bowlby, 1969, 1973, 1980). Parents who reject or ignore their child's attachment needs are likely to foster avoidant attachment in their children, who come to believe that others are undependable. Parents who demonstrate inconsistency, sometimes being available and other times ignoring a child's attachment needs, are likely to foster an anxious attachment in the child. These children often become highly distressed when their parents are unavailable and come to doubt their self-worth. A fourth category, called disorganized, was later identified (Main & Weston, 1981) and found to be related to child maltreatment and other family risk factors (see Lyons-Ruth & Jacobvitz, 2008, for review)

Bartholomew and Horowitz (1991) theorized that attachment could be described in terms of positive or negative self and other models. Attachment anxiety is characterized by a negative IWM of self and a positive IWM of others, resulting in a preoccupation with abandonment by significant others (Mikulincer & Shaver, 2007). These individuals may seem clingy, overly reliant, and demanding toward their attachment figures. Attachment avoidance, on the other hand, is characterized by a positive IWM of self and a negative IWM of others, resulting in a belief that others are undependable so emotions and close relationships are not a priority. Individuals with avoidant attachment may appear distrustful, aloof, and cold toward their attachment figures.

Many researchers argue that primary attachments develop in the first nine months of life (Bowlby, 1969). Longitudinal studies provide evidence that early attachments influence future attachment behaviors through six years of age, and extending into adolescence and early adulthood (see Grossmann, Grossmann, & Waters, 2005, for a review of major longitudinal studies following infants into adulthood). Although attachment patterns typically persist from childhood through adulthood, they can change in response to alterations in attachment relationships and the environment. Rather than forecasting particular social or mental health difficulties, insecure attachment becomes a risk factor for poor adjustment. Research indicates that relationships with peers and romantic partners' experiences can affect attachment (Allen, McElhaney, Kuperminc, & Jodl, 2004; Cozzarelli, Karafa, Collins, & Tagler, 2003; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000; Zayas, Mischel, Shoda & Aber, 2011). Thus, a transactional model suggests that early attachment models and current relationships, as well as ongoing interactions with the environment, influence a person's present day attachment system (Collins & Sroufe, 1999). Strongly positive or negative life events, such as maltreatment by an attachment figure, changes in parenting by an attachment figure, or the addition of new attachment figures introduce alternative relationship dynamics that can contribute to a change in an individual's IWM.

Adolescent Attachment

Although parents remain important attachment figures in adolescence, close friendships and romantic partners can fulfill attachment needs (Caron, Lafontaine, Bureau, Levesque, & Johnson, 2012; Larson, Richards, Monteta, Holmbeck, & Duckett, 1996). Theoretically, the attachment system functions as a hierarchy and research suggests that the mother is at the top of this hierarchy, with children relying most heavily on their mothers for their attachment needs

(Bowlby, 1973; Main & Weston, 1981; Fraley & Davis, 1997; Trinke & Bartholomew, 1997).

Peers and romantic partners can also act as attachment figures, although typically they are lower in the attachment hierarchy during adolescence. A longitudinal study by Doyle, Lawford, and Markiewicz (2009) with a community sample of adolescents found that mother-adolescent and father-adolescent attachments were more stable than peer attachments. However, teenagers may seem more dismissive toward their parental attachment figures. This behavioral change likely results from the adolescent's attachment needs being met by other attachment figures—in this case, their peers—rather than the adolescent becoming more insecurely attached to their parents (Lieberman, Doyle, & Markiewicz, 1999).

In adolescence, building social bonds with peers becomes an important developmental task (Erikson, 1959). Attachment behaviors shift from an asymmetrical pattern of only receiving support from their primary caregiver, to a symmetrical, more mutual pattern of receiving and giving support to peers (Furman, Stephenson, & Rhoades, 2014). Adolescent friendships start to develop deeper intimacy, encompassing more self-disclosure and trust, which promotes attachment-related dynamics similar to parental attachments (Zimmerman, 2004). In a meta-analysis of 63 articles on parent-child attachment and peer relations, Schneider, Atkinson, and Tardif (2001) concluded that there is a positive association between parent and peer attachment, and this link is strengthened in late childhood and adolescence. Furman, Simon, Shaffer and Bouchey (2002) interviewed high school seniors using the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985) and a Friendship Interview, created to assess internal working models in close friendships. Their results suggest that parent-child attachment significantly relates to peer attachment and an adolescent's ability to form friendships.

Feeney, Cassidy, and Ramos-Marcuse (2008) conducted a study with high school students to examine attachment and support behaviors in discussions between unfamiliar peers. Participants were instructed to have two 10-minute discussions with an unfamiliar peer participant on several topics. In the first discussion, the target peer filled the “support-seeking” role, in which he or she talked about his or her concerns. In the second 10-minute discussion, the target peer was in the “support-providing” role, in which he or she listened to the other peer talk about concerns. Consistent with previous attachment literature, secure teens were more likely to give support and receive support, and when giving support they remained less self-focused and more responsive. Adolescents with an anxious attachment style sought more support and were hostile when in the support-seeking role, but warm and friendly in the support-providing role. Participants with an avoidant attachment style remained more or less indifferent—they did not seek or give support, and displayed neither hostility nor warmth when their peers sought support.

An estimated one in every four to five adolescents will experience a severe mental health disorder by the time he or she turns 18 years old (Merikangas et al., 2010), and the risk increases with insecure attachment. Armsden and Greenberg conducted a study (1987) in which they determined that psychological well-being was significantly associated with secure attachment to both parents in a sample of college students. In particular, research with non-clinical adolescents provides evidence of a significant relationship between insecure attachment and depression or anxiety (Hankin, 2009; Irons & Gilbert, 2005; Muris, Meesters, van Melick, & Zwambag, 2001). More specifically, Murriss et al. reported that adolescents with an anxious attachment had the highest levels of depression and anxiety, adolescents with an avoidant attachment had the second highest levels, and adolescents with a secure attachment had the lowest levels of symptoms.

Depression

Depression is one of the most common mental health problems among adolescents (Costello, Egger & Angold, 2005; Williamson et al., 2005), with prevalence rates ranging from 2% to 5% of all adolescents (Birmaher et al., 1996). Incidences of depression typically peak after puberty (Thapar, Collishaw, Pine, & Thapar, 2012). Depressive symptoms, as indicated by the *The Diagnostic Statistical Manual for Mental Disorders-V* (DSM-5; American Psychiatric Association [APA], 2013), may include: depressed mood, diminished interest, significant weight gain or loss, insomnia or hypersomnia, psychomotor agitation, fatigue, feelings of worthlessness, diminished ability to concentrate, and recurrent thoughts about death. Some common effects of depression in adolescents include academic difficulties, poor peer relationships, behavioral difficulties, conflict with their primary caregiver and/or authority figures, low self-esteem, potential substance abuse, and an overall disruption of normal development (Lemstra et al., 2008).

Previous research has demonstrated a strong predictive relationship between insecure attachment and depression. Sund and Wichstrom (2002) found that in a non-clinical sample of adolescents, insecure attachment positively predicted current levels of depression when controlling for gender, age, other demographics, and stressful life events. Furthermore, adolescents who demonstrated an insecure attachment style and depressive symptoms at the time of the initial data collection showed an increase in depressive symptoms one year later. In particular, attachment-related alienation from parents was found to be the highest predictor of later depression. Agerup, Lydersen, Wallander and Sund (2014) found similar results in a community sample of adolescents, concluding that less secure attachment to mother was significantly related to adolescents' depression symptomology. Another study with a clinical

sample of adolescents provided evidence that patients who were depressed reported higher rates of insecure attachment than patients who had recovered from a major depressive episode (Armsden, McCauley, Greenberg, Burke & Mitchell, 1990). This finding suggests that insecure attachment may not only be a risk factor for depression, but it might also increase symptom severity and diminish the likelihood of recovery.

Studies conducted with adolescents suggest that both anxious and avoidant attachment patterns are risk factors for depression (Lee & Hankin, 2009; Cole-Detke & Kobak, 1996). When assessing the different attachment patterns (secure, anxious, avoidant) in relation to a single attachment figure, Cummings, George, Koss, and Davies (2013) found that anxious attachment to mother was the best predictor for depression. Similarly, when looking at adolescent secure, anxious, or avoidant attachment to their mother and father simultaneously, adolescents with an anxious attachment to both mother and father endorsed the most depressive symptoms (Kamkar, Doyle, & Markiewicz, 2012). The literature is less consistent with regard to avoidant attachment. Some researchers have found a significant relationship between avoidant attachment and depression (Rosenthal, Somers, Fleming, & Walsh, 2014), while others have not (Mickelson, Kessler & Shaver 1997; Permuy, Merino, & Fernandez-Rey, 2010).

A secure relationship with their parents can protect adolescents from depression (Duchesne & Ratelle, 2014). Secure parent-child attachment is associated with secure peer attachment and positive peer interaction, while also influencing adolescents' ability to seek support from their parents, peers, or romantic partners (Furman et al., 2002). Difficulty with developing peer and romantic partner bonds and an inability to seek support from these relationships often leads to many negative mental health implications for adolescents. Studies indicate that low family or low peer support predict later depression symptoms (Au, Lau, & Lee,

2009; Laible, Carlo, & Raffaelli, 2000; Weber, Puskar, & Ren, 2010). Similarly, a longitudinal study by Sheeber, Hops, Albert, Davis, and Andrews (1997) found that low family support predicted depression symptoms one year later, but that depressive symptoms did not predict low family support a year later.

Anxiety

Anxiety-related disorders are common among adolescents with an estimated prevalence rate of 2.2% for Generalized Anxiety Disorders (GAD) and 32.4% for any anxiety-related disorder (Kessler et al., 2012). GAD symptoms, as indicated by the *The Diagnostic Statistical Manual for Mental Disorders-V* (DSM-5; American Psychiatric Association [APA], 2013), may include: excessive anxiety and worry, an inability to control worrying, worry-related symptoms such as restlessness, fatigue, difficulty concentrating, irritability, muscle tension, or sleep disturbance, clinically significant distress, or impaired functioning. GAD may lead to impaired functioning in school and in interpersonal interactions (Wood, 2006).

Bowlby's (1973) original work on attachment hypothesized a link between anxiety and insecure attachment, which subsequent research continues to support. Results from an extensive literature review examining family dynamics and anxiety supported a positive relationship between high anxiety symptoms and insecure attachment in adolescents (Bögels & Brechman-Toussaint, 2006). A more recent meta-analysis of 46 studies investigating insecure attachment and anxiety symptoms resulted in an effect size of $r = .30$, suggesting that attachment and anxiety symptoms are moderately related (Colonna et al., 2011). Longitudinal research has found that participants who were insecurely attached at 12 months demonstrated higher levels of social phobias at age 11 (Bar-Haim, Dan, Eshel, & Sagi-Schwartz, 2007). Scholars have argued that the etiology of anxiety in children is related to a child's negative perception of their

autonomy and their personal efficacy (Barlow, 2002; Rapee, 2001). Secure attachment is associated with personal efficacy and a balance between autonomy and connection (Ainsworth & Bowlby, 1991), which may protect adolescents from anxiety disorders.

In Wittchen's (2002) study on adolescents with GAD, the results suggested that many of the worries in this developmental period relate to interpersonal difficulties. According to Bögels and Brechman-Toussaint (2006), people with an anxious attachment often report high levels of worry about their relationships, and thus would be more likely to have an anxiety-related disorder. Similarly, Colnnesi and colleagues' (2011) meta-analysis on a sample of children suggested that anxious attachment had the strongest association to anxiety symptoms. In a longitudinal study with 350 high school students, Lee and Hankin (2009) reported a positive correlation between anxiety symptoms and both anxious and avoidant attachment at the time of the initial study and five months later when the final questionnaires were administered.

Online Social Networking

The use of online social networking (OSN) over the past decade has grown exponentially in ways that were inconceivable to past generations. Boyd and Ellison (2007) define OSN as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within a bounded system.” One of the most common OSN sites is Facebook, which launched in 2004, and has since been recognized as the catalyst for the explosion of OSN (Anderson et al., 2012).

Due to the increased use of social networking sites, researchers have created a number of scales that attempt to measure usage rates. One of the most frequently used scales is the *Facebook Intensity* scale created by Ellison (2007), which measures a user's number of friends,

time spent on Facebook, and attitudes toward Facebook use. To evaluate negative effects of internet use such as mood changes, a compulsive need to use the internet, and deteriorated functioning, many studies have used the *Internet Addiction Test* (IAT; Young, 1998). However, most researchers create their own scales that only pertain to one social networking site or activity. These scales are rarely used in other studies, nor are they generally validated. Thus, there is a need to develop a relevant and reliable measure of OSN that provides a comprehensive picture of OSN use among adolescents.

Adolescent Use of Online Social Networking

Even though many adults use OSN sites, adolescents are usually the first to use and dominate a new OSN site. It was estimated in 2006 that 55% of adolescents used OSN and by 2009 that estimate rose to 73% (Lenhart et al., 2010). Lenhart et al. also found that adolescents spend an average of 11 hours per day exposed to electronic media. With how quickly social media is adapting, changing, and growing, it is difficult for the literature to keep up, so it should be assumed that these studies are underestimating the current use by adolescents. Nevertheless, social media is clearly embedded in the lives of adolescents, and it is important to investigate this new communication trend. Peer interactions are vital to adolescent development and OSN has created marked changes in the structure by which adolescents communicate.

Research shows that negative consequences of OSN for adolescents include cyber-bullying and internet addiction, in addition to sleep and academic disturbances (Shapiro & Margolin, 2014). Other potential problems reported by students are misinterpretations, increased drama, and amplification of problems online (Reich, 2010). Similarly, increased use of OSN by adolescents has been linked to greater parent-child conflict (Mesch, 2006; Subrahmanyam & Greenfield, 2008).

Many studies, however, have found positive effects of OSN. Unlike childhood, when friendships derive primarily from shared activities and interests, adolescents' relationships begin to value trust, self-disclosure and loyalty (Brown & Larson, 2009; Collins & Steinberg, 2006). OSN sites may encourage the development and maintenance of these relational attributes. The use of OSN for communication by adolescents has been found to be similar to in-person communication in terms of the interaction's goals, which usually are to stay in touch with friends, make plans, and increase their knowledge about others (Lenhart & Madden, 2007; Pempek, Yermolayeva, & Calvert, 2009). In a study conducted by Subrahmanyam, Reich, Waechter, and Espinoza (2008), college students reported that 49% of their in-person friends were also "friends" on OSN sites, and that they used OSN as a way to maintain those in-person friendships. Findings were similar in a high school sample of adolescents, with only 17% reporting online friends who were not also in-person friends (Reich, Subrahmanyam & Espinoza, 2012). This online medium for friendship maintenance has been shown to increase quality and intimacy in relationships (Ellison, Steinfield & Lampe, 2007). In another high school sample, 43% of participants reported that OSN made them feel more connected to their friends. Research suggests that adolescents who use OSN accrue significantly higher levels of social capital (Ahn, 2010), which indicates relationships with multiple people who can be used as resources (Coleman, 1988). Much is still unknown about OSN's ability to foster connectedness, which warrants the need for further research.

Online Social Networking and Attachment

Despite attachment theory's relevance to social development, very little research has explored how an individual's attachment system might be related to the use of social networking. The limited amount of research on links between attachment and social networking has been

conducted mostly with college-aged and adult populations. For example, Oldmeadow, Quinn, and Kowert (2013) created a measure for Facebook activity with six subscales: *Usage*, *Comfort Seeking*, *Evaluation Concern*, *Attachment* (to their Facebook account), *Openness*, and *Positivity*. The study found that among college and community participants, anxious attachment was positively correlated with *Usage*, *Comfort Seeking*, and *Evaluation Concern*—suggesting that individuals with anxious attachment frequently use Facebook, particularly when they are emotionally distressed, and tend to be highly concerned about how others view their Facebook page. Avoidant attachment was also significantly positively correlated to *Comfort Seeking* and *Evaluation Concern*, but to a much lesser degree than anxious attachment. Additionally, avoidant attachment was negatively correlated with *Attachment*, *Openness*, and *Positivity*, suggesting that avoidant individuals were more likely to think about removing their Facebook page, were less happy with parents or employers viewing their Facebook, and had more generally negative views toward Facebook.

In another study with a community sample of adults, Hart, Nailling, Bizer, and Collins (2015) developed a measure for Facebook usage and found that anxious attachment positively predicted *Feedback Sensitivity*, *Feedback Seeking*, *General Activity*, and *Attention Received*, and negatively predicted *Privacy*. These results indicate that individuals who are anxiously attached frequently use Facebook in general and often use it to gain attention. The results also suggest that these individuals are very concerned about receiving attention, are the most likely to receive it, and have low privacy settings, allowing others more access to the personal information on their Facebook accounts. Avoidant attachment negatively predicted *Feedback Seeking*, *General Activity*, *Attention Received*, and positively predicted *Privacy*. However, results were not significant when the personality traits of extroversion and neuroticism were included in the

analysis. This suggests that Facebook behaviors for individuals with avoidant attachment may be better explained by their personality traits than their attachment-related characteristics.

Researchers have conducted several studies on the relationships between Facebook usage, attachment, relationship surveillance and jealousy (Fleuriet, Cole, Guerrero, 2014; Marshall, Benjanyan, Castro, & Lee, 2013). The results of these studies suggest that participants with an anxious attachment are most likely to check their romantic partner's page and become more jealous about their partners' postings. The inverse was found for individuals who had an avoidant attachment. Fleuriet et al. also specifically examined college students' perception of nonverbal cues on Facebook, particularly those that might provoke jealousy--such as an attractive picture, capitalization, punctuation, or winking emoticon face. Findings indicate that participants with an anxious attachment tend to exhibit high levels of negative emotion when presented with jealousy-provoking nonverbal cues, whereas participants with an avoidant attachment exhibited low levels of negative emotion when presented with the same nonverbal cue.

Other literature suggests that OSN serves as a medium to build on current relationships for college students (Ellison, Steinfield & Lampe, 2011). Individuals with secure attachment are more likely to use OSN sites to enhance current relationships, whereas those with an avoidant attachment did not use OSN sites to improve their relationships (Lee, 2013). Individuals with higher attachment security also have reported higher social competence both online and offline (Jenkins-Guarnieri, Wright & Johnson, 2013). In another study with college students, Nitzburg and Farber (2013) found an association between higher attachment anxiety and higher levels of intimacy experienced when engaging with friends through OSN. The authors speculated that individuals with high attachment anxiety use OSN to connect with others in a non-threatening

environment, allowing them to avoid face-to-face meetings that may engender fear of negative in-person interactions. Other researchers report that college students with an anxious attachment disclose just as much online as offline, compared to secure and avoidant attachment individuals who self-disclose more offline than online (Buote, Wood & Pratt, 2009).

Only one research study on attachment and social networking among adolescents has been published, and it was conducted with a sample of Chinese high school students (Lei & Wu, 2007). In this study, the researchers used the IPPA's three attachment scales of *Trust*, *Communication* and *Alienation* and measured problematic internet use, defined as usage that results in negative consequences in academic, social, and professional situations (Caplan, 2001). The authors found that adolescents with higher Alienation scores in reference to attachment to father had higher problematic internet use, while high levels of *Trust* and *Communication* (i.e. greater security) in reference to their father was associated with lower problematic internet use. Given high usage rates and uncertainty regarding its effects, further research on links between OSN and attachment among adolescents is warranted.

Online Social Networking and Well-Being

Due to concerns regarding the possible negative effects of OSN, recent studies have investigated links between OSN and mental health outcomes. Findings to date have been inconclusive. Some studies indicate that OSN can negatively impact mental health (Sagioglou & Greitemeyer, 2014; Neira & Barber, 2013), while others have found that OSN does not affect or may even improve mental health (Feinstein, Bhatia, Hershenberg, & Davila, 2012; Jelenchick, Eickhoff, & Moreno 2013). These studies have investigated both depression and anxiety-related variables with mixed results.

In terms of mood-related outcomes, Wright et al. (2013) reported an overall increase of depression symptoms among college students when Facebook use increased. Similarly, Sagioglou and Greitemeyer (2014) surveyed 70 male, German-speaking Facebook users and found that the longer a participant spent online, the lower their mood. In contrast, a study with Australian high school students, conducted by Neira and Barber (2014), concluded that frequency of OSN did not increase depressed mood but investment in OSN did have a positive relationship with depressed mood. Relatedly, Jelenchick, Eickhoff, and Moreno's study (2013) provided evidence that college students' Facebook use was not significantly related to depression.

Wright et al. (2013) hypothesized that the discrepancy in literature regarding OSN and depression is related to how people were spending their time on OSN sites. If a person is using OSN sites to engage and build relationships, then OSN use might lessen depression. However, if an individual is using OSN passively and isn't engaging with other users on OSN sites, greater use may increase depressive symptoms. The quality of interactions on OSN sites may also affect depression outcomes. Davila et al. (2014) found that quality of OSN use predicted depression symptomology in college students, whereas quantity of time spent on OSN sites did not. Similarly, Wright et al. found that if there were high levels of social network satisfaction, depression scores actually decreased. In addition, longitudinal research on depression and OSN, conducted with a sample of college students, indicated that negative OSN interactions--but not frequency of time spent on OSN—increased depression symptomology (Feinstein, Bhatia, Hershenberg, & Davila, 2012).

Anxiety-based disorders make up another mental health variable studied in reference to OSN. There are multiple disorders considered to be anxiety-related disorders but social anxiety

and generalized anxiety are most often studied in relation to OSN use. Davis (2001) suggested that there is a transactional relationship between anxiety and OSN, such that people with social anxiety may replicate their in-person difficulties online. Results of a study with college undergraduates indicated that the more time a participant spent on Facebook, the greater their social anxiety symptoms were (Shaw, Timpano, Tran, & Joormann, 2015). Shaw et al. also found that participants with higher social anxiety symptoms spent more time passively viewing other's Facebook pages—suggesting that how socially anxious participants interacted online may influence negative outcomes. In contrast, another study on college students' OSN experiences found that there is no relationship between global and social anxiety symptoms and time spent on OSN websites (Feinstein, Bhatia, Hershenberg, & Davila, 2012).

Social support is one of the benefits OSN users believe they gain from their use and several studies have found results supporting a significant relationship between OSN use and perceived social support (Park, Kee, & Valenzuela, 2009). Nabi, Prestin, and So (2013) conducted a study on college student's use of Facebook and found that participants who had more Facebook friends perceived higher social support. In contrast, Vitak and colleagues (2011) found, when assessing quantity of Facebook Friends and time spent on Facebook there was no significant relationship. These two studies suggest that quality is more important than quantity and this is supported by a recent study where direct user-to-user communication, which is presumably higher quality than more indirect impersonal posts or passive browsing, was found to have a significant correlation with social support (Subrahmanyam, Reich, Waechter, & Espinoza, 2008). In addition, a longitudinal study with college students analyzed how participant's perceived social support was affected after speaking with other anonymous participants in a chat room five separate times (Shaw & Gant, 2002). The participant's perceived social support

significantly increased, indicating that using the Internet, even to connect with someone anonymously, could potentially increase a person's perceived social support. The literature on social support and OSN use suggests that the use of OSN to connect with others bolsters social support, but when OSN users are not using sites to directly interact with others it has little to no affect on perceived social support.

Current Study

In recent years, the literature on OSN has grown substantially. However, as OSN use continues to increase more research is needed. In particular, a recent review by Howard and Jayne (2015) found 900 different scales measuring OSN. These scales typically measure fairly narrow concepts, such as the use of one website or a specific OSN activity, making it difficult to compare findings across studies. Consequently, one purpose of the current study is to examine a newly developed scale to measure different aspects of social networking. The measure assesses overarching, universal concepts that can meaningfully contribute to the literature on OSN and allow for a more reliable, replicable assessment of OSN. Recent studies have identified that quantity is not as important as quality of OSN use, so this measure focuses on active OSN behaviors that incorporate peer interactions online (Shaw & Grant, 2002). In addition, to test the construct validity of the scale, we looked at associations to perceived social support.

A second purpose of this study is to expand on the limited literature base concerning links between OSN and attachment. Specifically, this study explored the relationship between OSN, attachment, and mental health among American high school students. There has been little research conducted concerning these variables with this population and the inconsistent results suggest further research is needed. We predict that insecure attachment will be related to higher depression and anxiety symptoms based on previous findings (Agerup et al., 2014; Bögels &

Brechman-Toussaint, 2006). OSN behaviors that are more active are predicted to positively influence mental health, and OSN behaviors that are more passive are predicted to negatively influence mental health.

A third goal of the study is to explore the possibility that attachment serves as a moderator of the relationship between OSN and mental health. Conflicting results in previous studies suggest that this link is complex and may be affected by other individual or contextual factors. Recent literature on OSN has revealed that more connection to peers is expected by online users and positively correlates with good mental health (Subrahmanyam, Reich, Waechter, & Espinoza, 2008). Given the interpersonal nature of OSN and research demonstrating strong associations of attachment to parents with adolescent's interpersonal interactions (Doyle, Lawford, & Markiewicz, 2009) and mental health (Agerup et. al, 2014), it seems likely that attachment strategies play a key role in how OSN affects mental health. Specifically, individuals with secure attachment are more likely to seek support and actively engage with peers (Feeney, Cassidy, & Ramos-Marcuse, 2008), whereas adolescents with an avoidant attachment may avoid seeking support and connection online and adolescents with an anxious attachment may seek too much of their connection online (Lee, 2013). In addition, based on previous findings suggesting that insecure individuals interpret interpersonal behaviors more negatively (Herzberg et al., 2002), adolescents with insecure attachments may misperceive their peer's behaviors online. Therefore, how OSN affects adolescent mental health may depend on whether they have secure or insecure attachment relationships with their parents. We hypothesize that secure attachments to parents will buffer the negative impact of OSN on the participant's mental health.

METHOD

Participants

The current study utilizes archival data that were part of a larger study designed to investigate social factors and adolescent functioning. The sample included 257 high school students in a small community in the Southwestern United States. The mean age of participants was 15.9 (SD = 1.07; Range 14 – 18) years, and the majority endorsed European-American (57.5%) or Hispanic/Latino (19.7%) ethnicity, which is similar to the ethnic distribution reported by the school district (European American = 62.7% and Hispanic/Latino = 21.8%). The remaining ethnic distribution was 5.8% African American, 3.9% Asian/Pacific Islander, 11.3% Multi-Racial/other, and 1.6% Native American. The average family income was \$39,000 and 59% of participants reported that their parents were currently married. Over 90% of participants reported having a Facebook account, 74% reported use on a different OSN account, and overall 94% had some type of OSN account. Table 1 presents demographic distributions.

Instruments

Background Information Questionnaire (Riggs, 2003; Riggs & Jacobvitz, 2002) requests information about basic demographics, including age, gender, ethnicity, grade level, relationship status, number of people living in their household, family income level. In addition, respondents provide family background information, such as number of siblings, adoption status, parental divorce, and death of family members.

Inventory of Parent and Peer Attachment (IPPA) (Armsden & Greenberg, 1987) is a 75-item scale created to measure attachment to parents and peers. Each item is rated on a 5-point Likert scale from “almost never” to “almost always.” Attachment can be measured on a total insecure/secure scale, or on the three subscales measuring attachment needs: Communication,

Trust, and Alienation. High Trust and Communication and low Alienation are indicative of a secure attachment. Armsden and Greenberg (1987) reported the internal consistency for the three subscales ranging from .86 to .91, and for the total scales attachment to mother's $\alpha = .87$ and attachment to father's $\alpha = .89$. The scale had a test-retest reliability score of .93, and construct validity established correlations to other measures related to family conflict, support, and cohesion. For the purpose of this study the 25-item mother and the 25-item father scale total scales were used. In this study, the alpha was .96 for total mother attachment and .98 for total father attachment.

Behavior Assessment System for Children Second Edition Self-Report of Personality (Reynolds & Kamphaus, 2004) is a 176-item scale designed to assess hyperactivity, aggression, conduct problems, anxiety, depression, somatization, attention problems, and learning problems. The scale has an overall .78 - .89 concurrent validity with the Minnesota Multiphasic Personality Inventory (MMPI), internal consistency of .80 - .82, and a test-retest reliability of .64 - .88 (Deighton et al., 2014). The current study used subscales measuring depression and anxiety, which contain 14 items rated on a 4-point Likert-type from "never" to "almost always." Higher scores indicate greater depression or anxiety symptomology.

The Multi-Dimensional Scale of Perceived Social Support (Zimet et al. 1988) is a 12-item scale used to assess perceived social support. The scale consisted of three subscales, Friend, Family, and Significant Other. The scales were rated on a 7-point Likert scale of "strongly disagree" to "strongly agree." Higher scores on the subscales indicate greater perceived social support. Zimet and colleagues (1988) reported internal reliability of .72 for the Friend subscale, .85 for the Family subscale, and .72 for the Significant Other subscale. In this study, the Friend

subscale had an alpha of .88, the Family subscale had an alpha of .83, and the Significant Other subscale had an alpha of .77.

The Social Networking Scale (SNS) scale was created in order to assess high school student's social networking use after two students committed suicide and several other students attempted suicide in a local school district. The Family Attachment Lab was invited by the district's school psychologist to assess OSN use after school officials expressed concern about how social networking may increase suicidal thoughts and behavior among students. Consistent with Friedenbergs (1995) definition of theoretical development, a small group of graduate students, led by Dr. Carly Heffel, collaborated and reviewed existing literature available at the time (2011 - 2012) to identify key constructs. Items were based on the current literature and designed to measure a broader range of OSN behaviors than previous instruments. For example, rather than just measuring Facebook use, questions related to texting and other online networking sites and behaviors were included. Subsequently, the items were presented to the full Family Attachment Lab research team for critique and revision.

After incorporating suggestions, the SNS included 70-items and assessed seven broad categories. The first category included six questions intended to gather general background information such as accounts used, time spent on OSN sites, and number of friends. The format of these questions varied from multiple choice, yes/no response styles, and Likert scaling. The second section asked questions about reactions received online and consisted of ten 5-point Likert questions. The third category assessed security settings and included two "check all that apply" items. The fourth grouping of questions measured concerns about online activity with eight 5-point Likert scale questions. The fifth category included ten questions describing a broad

range of OSN and cell phone behaviors with yes/no response options. The sixth section was composed of 23 questions regarding frequency of OSN use on a 7-point Likert scale. Finally the seventh section included 15 questions that assessed social networking preferences based on different social situations with a ranking response style. Specifically, there were seven response options (instant messaging, posting on my or my friend's wall, text, calling a friend on the phone, in person, updating my status, and send a private message) and the participants were instructed to rank their top three choices for each question. Refer to the Appendix (A) for the complete scale.

Procedure

Before data were collected, researchers obtained permission from the school's superintendent and the university Institutional Review Board (IRB). With the high school's cooperation, researchers recruited participants for the larger study over the course of one month by distributing a description of the study, student assent forms, and parental consent forms. Social studies classes were used because they were not based on academic achievement and included students in different grades. After obtaining parental consent, doctoral students in Counseling Psychology collected data during the high school student's normal class period. The student's were given the option to provide their contact information, which was immediately separated from the data and entered in a raffle for an 8GB iPod Touch, and two iTunes gift cards (worth \$20 each). Students who chose to not participate in the study or did not obtain parental consent were given an alternate activity such as a writing assignment directed by their teacher.

RESULTS

Preliminary Analysis

Demographic variables and the dependent variables (i.e. depression and anxiety) were examined to see if they were related. Age was not related to anxiety, $r(241) = -.070, p = .262$ or depression, $r(241) = -.039, p = .537$. Ethnicity was also not related to anxiety $f(4, 241) = .560, p = .692$ or depression $f(4, 241) = .452, p = .771$. However, sex was significantly related to anxiety $f(4, 241) = 3.047, p = .049$ and depression $f(4, 241) = 4.688, p = .010$. Based on these findings, sex was controlled for in the regression analyses.

SNS EFA and Reliability

SPSS Version 20.0 was used to perform the Exploratory Factor Analysis (EFA) of the Social Networking Scale (SNS). To insure that an EFA was appropriate for this data set, the following assumptions were tested: sample size, missing data, normality, linearity, absence of outliers, absence of multicollinearity, and factorability (Tabachnick & Fidell, 2007). Few outliers were identified (less than 3%) and excluded. Due to the items in this scale being scored zero or higher, the items were positively skewed. There were few missing data points (less than 5%) so mean substitution was used (Schlomer, Bauman, & Card, 2010). As shown in Tables 2-4, the correlation matrix for the three SNS scales had good factorability and the correlations ranged from close to 0 to .71. Bartlett's Tests of Sphericity was applied for all of the scales and all were significant, which indicates that the correlations are acceptable for analysis. The Kaiser-Meyer Olkin (KMO) test was also used to measure sampling adequacy to support factorability of the data due to Bartlett's Tests being sensitive to sample size. The KMO ranged from .611 to .826 for the SNS scale, which is in the acceptable range (.60 or higher) and supported factor analysis of the data.

Extraction of EFA factors was conducted using examination of eigenvalues and scree plot analysis (Tabachnick & Fidell, 2007). However, use of only these extraction methods can lead to

underextraction or overextraction (Velicer & Jackson, 1990), so two additional predetermined extraction methods were used: eliminating items with factor loadings less than .40 or with cross loadings greater than 1.5, and excluding factors with fewer than three items. Principal axis factoring (PAF) was used rather than maximum likelihood extraction, because maximum likelihood is more sensitive to the violation of normality (Fabringer, Wegener, MacCallum, & Strahan, 1999). The correlation matrix indicated that the factors were correlated so the oblique rotation promax was used.

Prior to the EFA analysis, the SNS was re-evaluated based on the most recent literature because the scale was developed in 2011 - 2012 and there has been a substantial increase in OSN scales over the past few years. Items that did not examine broader OSN use ($n = 10$) or were not continuous variables ($n = 19$) were not included in the EFA. The section of questions assessing social networking preferences based on social situation was also excluded from the analysis ($n = 15$) due to faulty instructions and varying response styles from participants. Because the subsections of the SNS utilized different Likert scales, separate EFA's were conducted for the first scale containing 10 items, the second scale containing 6 items, and the third scale containing 9 items. Pairwise deletion was used for participants who reported not having any social networking account or did not fill out the Social Networking Scale. The final participant total was $N = 242$.

An EFA conducted on the first group of 10 items resulted in four factors that had Eigenvalues greater than 1. Analysis of the scree plot suggested either a 2- or 3-factor solution. Based on pre-established criteria for factor retention, the third and fourth factor for this scale were not retained because less than three items loaded on the factors. Using predetermined item retention criteria, seven items had a .40 factor loading or higher and were retained resulting in a

2-factor solution for the final model (See Table 5). The first factor, labeled Online Social Support, measured how much of the participant's social support is online. This factor consisted of three questions using a 5-point Likert-type scale from one "None" to five "All." The questions that comprise this scale were "how many friends do you interact with online," "how much of your overall social interaction occurs online," and "how much of your social support is online." A higher sum of item scores for this scale indicates greater levels of online support. The Cronbach's alpha for this factor was .69. Most literature suggests that a scale must have .70 or above alpha for a scale to be reliable (Kline, 1999), but scales with fewer items may have a lower alpha than scales with a higher number of items and still have better reliability. Cornita (1993) suggested that Cronbach's alpha alone is not a good measure of reliability and that the number of items in the scale also needs to be considered. The variance explained in this factor was 21.68% and the Eigenvalue was 2.405.

The second factor, labeled Positive Social Networking Interactions, measured the participant's negative or positive interactions, receiving and/or posting, on OSN sites. This scale is comprised of four questions using a 5-point Likert-type scale from one "None" to five "All." The questions in this scale were "How many of the reactions you receive online are positive" and "How many of the reactions you post are positive," and reversed scored items such as "How many of the reactions you receive online are negative," and "How many of the reactions you post are negative." A higher sum of item scores for this scale indicates higher levels of positive online socialization. The Cronbach's alpha for this factor was $\alpha = .67$, which again due to the low number of items may not accurately depict reliability. The variance explained by this factor was 17.95% and the Eigenvalue was 1.935.

An EFA was conducted on the second group of 6 items and there were two factors that had Eigenvalues greater than 1. A one or two factor solution was supported by the analysis of the scree plot, but the second factor was not retained because only two items loaded on the factor (see Table 6). Using a cutoff of .40 for inclusion criteria eliminated two of six items for this scale. The remaining four items measured the level of concern individuals experience about OSN interactions, such as worrying about what they post or what others post about them on OSN sites, so it was labeled Concern about Social Networking. The four questions used a 5-point Likert-type scale from one “Not at all” to five “Extremely,” and included: “How concerned are you about what other people think about your online profile,” “Based on what people see on your social networking profile, are you concerned about what they think of you as a person,” “How much do you worry about how you look in pictures that you post,” and “How concerned are you about whether other people respond to comments you make online.” A higher sum of item scores for this scale indicates greater concern about online socialization. The Cronbach’s alpha for this scale was .78, which falls in the acceptably reliable range (Kline, 1999). The variance explained using a one-factor model was 42.95% and the Eigenvalue was 2.577.

An EFA was conducted on the third group of 9 items and there were two factors that had Eigenvalues greater than 1. The scree plot for this scale supported either a 1- or 2-factor solution, but the second factor was eliminated because only two items loaded on that factor (see Table 7). However, four of the nine items had factor loadings less than .40, so they were dropped from the one-factor model. This subscale, labeled Frequency of Social Networking Use, measures how often participants interact online and contains five questions using a 7-point Likert-type scale from one “Less than once per week” to seven “More than 10 times a day.” The five items included in this scale were “Update your status,” “Browse other people’s pages,” “Post on a

friends wall,” “Comment on a friend’s status,” and “Post videos or pictures.” A higher sum of item scores for this scale indicates higher frequency of online socialization. The Cronbach’s alpha for this scale was $\alpha = .83$ in the acceptably reliable range (Kline, 1999). The variance explained using a one-factor model was 59.66% and the Eigenvalue was 4.053.

Construct Validity

To assess the construct validity of the Social Networking Scale (SNS), Pearson’s correlations were run between the four SNS subscales (i.e., Online Social Support, Positive Social Networking Interactions, Concern about Social Networking, and Frequency of Social Networking Use) and the three MSPSS subscales (i.e., Friend, Family, and Significant Other). As shown in Table 8, Positive Social Networking Interactions was significantly negatively correlated to perceived social support of a friend, $r(241) = -.205, p = .002$, perceived social support of family, $r(241) = -.191, p = .004$, and perceived social support of a significant other, $r(241) = -.240, p < .000$. This indicates that more positive online interactions are associated with less perceived social support. Frequency of Social Networking Use was significantly positively correlated with perceived social support of a friend, $r(241) = .165, p = .013$ and perceived social support of significant other, $r(241) = .189, p = .004$, but was not significantly correlated with perceived social support of family, $r(241) = .012, p = .932$. These results suggest that more frequent use of OSN is related to more perceived support from friends and significant others but is not related to perceived support of family. Correlations for Online Social Support approached significance for perceived support of a friend, $r(241) = -.117, p = .077$ and significant other, $r(241) = -.126, p = .058$, but was not correlated with perceived social support of family, $r(241) = -.062, p = .350$. This indicates that online social support was weakly linked to perceived social support of friends and significant others but not linked to perceived social support of family.

Concern about Social Networking was not significantly correlated with any MSPSS subscale, including perceived social support of family, $r(241) = .073, p = .273$, friend, $r(241) = .071, p = .284$, and significant other, $r(241) = .114, p = .087$. These correlations suggest that concern about OSN presence is not related to perceived social support.

Hypothesis Testing

Pearson's correlations for social networking scales, attachment, and mental health are presented in Table 9. Online Social Support was not significantly related to attachment to mother, $r = -.052, p = .437$, attachment to father, $r = .013, p = .850$, depression $r = -.075, p = .261$, and anxiety, $r = -.012, p = .856$. This indicates that online support is not related to parental attachment or symptoms of depression and anxiety. Positive Social Networking Interactions was significantly negatively correlated with attachment to mother, $r = -.201, p = .002$, and attachment to father, $r = -.154, p = .020$, as well as significantly positively correlated with depression, $r = .207, p = .002$, but not significantly correlated with anxiety, $r = .055, p = .409$. This indicates that the perception of more positive interactions online is related to lower parental attachment security and more depression symptoms. Concern about Social Networking was not significantly related to attachment to mother, $r = -.022, p = .743$, attachment to father, $r = -.031, p = .644$, and depression, $r = .128, p = .054$, but was significantly positively correlated with anxiety, $r = .206, p = .002$. These results indicate that concern regarding OSN presence is not related to parental attachment and depression but increased concern is related to higher anxiety levels. Frequency of Social Networking was not significantly related to attachment to mother, $r = -.033, p = .621$, attachment to father, $r = -.026, p = .695$, depression, $r = .026, p = .698$, and anxiety, $r = .110, p = .099$.

Hierarchical regressions were conducted to test the hypothesis that mother or father attachment moderates the relationship between OSN and depression and anxiety. Frazier and colleagues (2004) identified hierarchical multiple regression as the ideal way to identify moderating effects. According to Baron and Kenny (1986) a moderation is supported when the interaction term explains a significant amount of variance. The macro program Process in SPSS was used to conduct a simple slopes analysis to assess the direction of the moderation for any significant moderations identified. To account for multicollinearity all variables were centered. Four sets of four hierarchical regressions were conducted with either depression or anxiety as the dependent variable, and attachment to either mother or father as the moderator. Results indicated that attachment to father was not a significant moderator in any analyses, but attachment to mother was a significant moderator in three regressions (see Tables 10-17).

Analyses for Attachment to Father

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Positive Social Networking Interactions and attachment to father to anxiety symptoms. The full model was significant, $F(4,238) = 4.78, p = .001$, accounting for 8.0% of the variance in anxiety. After controlling for sex in the first step of the regression, Positive Social Networking Interactions was entered into the regression and was not significant. In the third step attachment to father was added and was significant, increasing the variance explained by 5.1%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Frequency of Social Networking Use and attachment to father to anxiety symptoms. The full model was significant, $F(4,238) = 5.06, p = .001$, accounting for 8.4% of the variance in anxiety. After controlling for sex in the first step of the regression, Frequency of

Social Networking Use was entered into the regression and was not significant. In the third step attachment to father was added and was significant, increasing the variance explained by 5.6%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Concern about Social Networking and attachment to father to anxiety symptoms. The full model was significant, $F(4,238) = 6.47, p < .001$, accounting for 10.5% of the variance in anxiety. After controlling for sex in the first step of the regression, Concern about Social Networking was entered into the regression and was significant, explaining 2.8% variance. In the third step attachment to father was added and was significant, increasing the variance explained by 5.6%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Online Social Support and attachment to father to anxiety symptoms. The full model was significant, $F(4,238) = 5.02, p = .001$, accounting for 8.3% of the variance in anxiety. After controlling for sex in the first step of the regression, Online Social Support was entered into the regression and was not significant. In the third step attachment to father was added and was significant, increasing the variance explained by 5.5%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Positive Social Networking Interactions and attachment to father to depressive symptoms. The full model was significant, $F(4,238) = 6.56, p < .000$, accounting for 10.6% of the variance in depression. After controlling for sex in the first step of the regression, Positive Social Networking Interactions was entered into the regression and was significant, explaining

an additional 5.2% variance. In the third step attachment to father was added and was significant, increasing the variance explained by 4.4%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Frequency of Social Networking Use and attachment to father to depression symptoms. The full model was significant, $F(4,238) = 4.26, p = .002$, accounting for 7.2% of the variance in depression. After controlling for sex in the first step of the regression, Frequency of Social Networking Use was entered into the regression and was not significant. In the third step attachment to father was added and was significant, increasing the variance explained by 6.0%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Concern about Social Networking and attachment to father to depression symptoms. The full model was significant, $F(4,238) = 4.92, p = .001$, accounting for 8.2% of the variance in depression. After controlling for sex in the first step of the regression, Concern about Social Networking was entered into the regression and was not significant. In the third step attachment to father was added and was significant, increasing the variance explained by 6.0%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Online Social Support and attachment to father to depression symptoms. The full model was significant, $F(4,238) = 4.54, p = .002$, accounting for 7.6% of the variance in depression. After controlling for sex in the first step of the regression, Online Social Support was entered into the regression and was not significant. In the third step attachment to father was

added and was significant, increasing the variance explained by 6.0%. In the final step, the interaction term was not significant, indicating no moderation effect.

Analyses for Attachment to Mother

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Positive Social Networking Interactions and attachment to mother to anxiety symptoms. The full model was significant, $F(4,238) = 9.20, p < .001$, accounting for 14.3% of the variance in anxiety. After controlling for sex in the first step of the regression, Positive Social Networking Interactions was entered into the regression and was not significant. In the third step attachment to mother was added and was significant, increasing the variance explained by 10.5%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Frequency of Social Networking Use and attachment to mother to anxiety symptoms. The full model was significant, $F(4,238) = 9.75, p < .001$, accounting for 15.0% of the variance in anxiety. After controlling for sex in the first step of the regression, Frequency of Social Networking Use was entered into the regression and was not significant. In the third step attachment to mother was added and was significant, increasing the variance explained by 11.0%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Concern about Social Networking and attachment to mother to anxiety symptoms. The full model was significant, $F(4,238) = 11.81, p < .001$, accounting for 17.6% of the variance in anxiety. After controlling for sex in the first step of the regression, Concern about Social Networking was entered into the regression and was significant, explaining 2.8% variance. In the third step attachment to mother was added and was significant, increasing the

variance explained by 10.6%. In the final step, the interaction term was significant, indicating a moderation effect. A subsequent simple slope analysis indicated that the positive relationship between Concern about Social Networking and anxiety symptoms was weakened by a secure attachment to mother (See Figure 1). Specifically in the context of secure attachment to mother, the level of concern about social Networking made very little difference in anxiety symptoms, but in the context of insecure attachment to mother, higher concern was associated with higher anxiety.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Online Social Support and attachment to mother to anxiety symptoms. The full model was significant, $F(4,238) = 9.91, p < .001$, accounting for 15.2% of the variance in anxiety. After controlling for sex in the first step of the regression, Online Social Support was entered into the regression and was not significant. In the third step attachment to mother was added and was significant, increasing the variance explained by 11.1%. In the final step, the interaction term was significant indicating a moderation. A subsequent simple slope analysis confirmed a significant moderation (See Figure 2). Although online social support did not directly predict anxiety, in the context of a secure relationship to mother, appeared to protect teens against anxiety when online social support was low.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Positive Social Networking Interactions and attachment to mother to depressive symptoms. The full model was significant, $F(4,238) = 16.08, p < .000$, accounting for 22.5% of the variance in depression. After controlling for sex in the first step of the regression, Positive Social Networking Interactions was entered into the regression and was significant, explaining an additional 5.2% variance. In the third step attachment to mother was added and was

significant, increasing the variance explained by 15.2%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Frequency of Social Networking Use and attachment to mother to depression symptoms. The full model was significant, $F(4,238) = 13.17, p < .001$, accounting for 19.3% of the variance in depression. After controlling for sex in the first step of the regression, Frequency of Social Networking Use was entered into the regression and was not significant. In the third step attachment to mother was added and was significant, increasing the variance explained by 18.2%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Concern about Social Networking and attachment to mother to depression symptoms. The full model was significant, $F(4,238) = 14.10, p < .001$, accounting for 20.3% of the variance in depression. After controlling for sex in the first step of the regression, Concern about Social Networking was entered into the regression and was not significant. In the third step attachment to mother was added and was significant, increasing the variance explained by 17.8%. In the final step, the interaction term was not significant, indicating no moderation effect.

A hierarchical regression was conducted to test the main effect and interaction effect's contributions of Online Social Support and attachment to mother to depression symptoms. The full model was significant, $F(4,238) = 17.53, p < .001$, accounting for 24.1% of the variance in depression. After controlling for sex in the first step of the regression, Online Social Support was entered into the regression and was not significant. In the third step attachment to mother was added and was significant, increasing the variance explained by 18.5%. In the final step, the interaction term was significant indicating a moderation. A subsequent simple slope analysis

confirmed a significant moderation (See Figure 3). Although online social support did not independently predict depression, a secure relationship to mother appeared to protect teens against depression when online social support was low. Specifically, secure adolescents who reported low online social support endorsed fewer depressive symptoms than insecure adolescents with low online social support.

DISCUSSION

The current study examined a newly developed Social Networking Scale and explored the role of attachment in links between OSN and mental health among high school adolescents. Four one-factor subscales were obtained with alphas ranging from poor to good. Construct validity results for the subscales indicated that the subscales Positive Social Networking Interactions and Frequency of Social Networking Use were significantly related to MSPSS social support scales, while the subscales Online Social Support and Concern about Social Networking were not. Findings provided mixed support for hypotheses about the moderating role of attachment. Specifically, attachment to mother moderated the relationship between some OSN behaviors and mental health outcomes, but attachment to father did not significantly moderate the relationship between any measured OSN behaviors and mental health outcomes. These findings are discussed below.

The exploratory factor analysis of the three SNS sections yielded one-factor or two-factor models. The Cronbach alpha's for the Online Social Support and the Positive Social Networking Interactions subscales were just below the commonly used "acceptable" cutoff of .70 (Kline, 1999). However, Cortina (1993) argued that the Cronbach alpha is greatly affected by number of items, so a strict cut off of .70 might eliminate reliable measures that have fewer items. Cortina reported that a Cronbach alpha for scales with few items might not accurately depict scale

reliability. Further examination of the correlation matrices (Table 2) also showed significant correlations for the items in these two scales. These considerations suggest that these 4-item subscales could be deemed acceptable and analyses proceeded accordingly.

The construct validity of this scale was tested using the MSPSS Friend, Family, and Significant Other scales. Surprisingly, Online Social Support was not significantly correlated with any traditional form of perceived social support, but it was approaching a significant negative correlation with perceived support of friends and significant other. The negative direction of this relationship suggests that when adolescents report most of their social support occurs online, they will also report lower traditional social support from family, friends, and significant other. Similarly, there was a significant negative relationship between Positive Social Networking Interactions and all three MSPSS subscales. These findings are counterintuitive and may reflect poor construct validity if we assume that OSN operates similarly to in-person social networking. However, teens with high levels of traditional social support may not utilize OSN in the same way as those with lower traditional social support, who might purposefully seek out these positive online interactions to compensate for the absence of traditional social support. Frequency of Social Networking Use was positively correlated to social support from Friend and Significant other, suggesting that high frequency of posting, commenting and other interactive behaviors online may foster perceived connectedness for adolescents. Concern about Social Networking was not correlated with perceived social support but this is not surprising since Concern about Social Networking assessed more internal beliefs about self rather than external support.

In the current study, the bivariate correlation results were mostly similar to previous research but some results were new and contradictory to literature. For example, frequency of

Social Networking Use was not significantly correlated with attachment or mental health. A few studies have found that higher use of OSN is significantly associated with poor mental health outcomes (Wright et al., 2013), but more current research suggests that rather than the amount of time spent on OSN sites, it's what the individual is doing on OSN sites that affects mental health (Subrahmanyam et al., 2008). In contrast, the Positive Social Networking Interactions scale was significantly correlated with attachment and depression. Specifically, participants who reported posting and receiving more positive comments were more likely to report less secure attachment to their parents and more depression symptoms. Similar to its association with social support, this finding at first appears counter intuitive because positive social interactions are typically associated with secure attachment (Mikulincer, & Shaver, 2015) and mental health (Wentzel, Filisetti & Looney, 2007; Zimmer-Gembeck, Hunter, & Pronk, 2007). It is possible that participants whose parents were not meeting the adolescents' attachment needs used OSN to find positive support, but the more they use OSN to achieve positive social interactions the more likely they were to also have more depression symptoms. One explanation for the discrepancy between current results and previous research suggesting traditional in-person positive social interactions are related to secure attachment and good mental health (Mikulincer, & Shaver, 2015; Wentzel, Filisetti & Looney, 2007; Zimmer-Gembeck, Hunter, & Pronk, 2007), may be the nature of in-person versus online interactions. Online positive interactions may feel less intimate (i.e. commenting on a picture versus telling someone they are beautiful to their face) and could be less immediate than in-person interactions (i.e. waiting for someone to message you back versus having an in-person conversation), which could change how those interactions affect the individual. These differences could negate or make more superficial any positive interactions online. Past OSN research found that individuals with either an anxious and avoidant attachment

used OSN for comfort seeking (Oldmeadow, Quinn, & Kowert, 2013), but demonstrated less online social competency (Jenkins-Guarnieri, Wright & Johnson, 2013). Thus, insecure adolescents in the current study may be seeking relational connection online but might not have the online social skills to achieve their goal.

In addition, adolescents who endorsed greater Concern about Social Networking reported higher levels of Anxiety. Although no previous research has reported this link, items that comprise this SNS subscale are consistent with DSM-V criteria for General Anxiety (e.g. worry) and Social Anxiety Disorder (e.g. fear of scrutiny of others). Additional research is needed regarding the relationship between concern about OSN use and anxiety symptoms to replicate the findings in this study and develop a more in depth understanding of the relationship.

Consistent with hypotheses and previous research (Bögels & Brechman-Toussaint, 2006; Lee & Hankin, 2009), attachment to mother and father significantly predicted depression and anxiety symptoms. Attachment to mother predicted more variance in mental health outcomes than attachment to father and was a significant moderator, whereas attachment to father did not significantly moderate the relationship between social networking and mental health. Research on the attachment hierarchy suggests that adolescents rely on their mothers for most of their attachment needs (Bowlby, 1973; Main & Weston, 1981; Fraley & Davis, 1997; Trinke & Bartholomew, 1997), so it is possible that only attachment to mother has the necessary influence to protect adolescents from potentially harmful effects of OSN on mental health. This finding is important because the only other study that assessed online social networking and attachment with adolescents examined attachment to father but not to mother (Lei & Wu, 2007). In today's world, more fathers are staying home to raise children and appear to be more involved with their children than in the past (Lam, McHale, & Crouter, 2012). Yet current findings suggest that

mothers continue to serve as a buffer against their children's negative mental health outcomes. Even though attachment to father may not protect adolescents from the negative effects on OSN use, this relationship is still very important for developing positive mental health outcomes.

Moderation results indicated that secure attachment to mother interacted with Online Social Support to predict depression and anxiety. Specifically, insecure participants with low support online reported more depression and anxiety symptoms than secure participants with low online support. Interestingly, while depression and anxiety decreased for insecure teens when they reported high online support, the level of online support did not appear to significantly affect symptom levels among secure teens. Individuals with more secure attachments are more socially competent (Fuller et al., 2002) and more comfortable with seeking traditional in-person support (Feeney, Cassidy & Ramos-Marcuse, 2008), which may partially explain lower symptoms among secure teens in our sample. An important implication of our findings is that online social support may benefit the mental health of adolescents with insecure attachments to their mothers. Although security of attachment is optimal and a target for intervention, insecure adolescents might be able to use OSN to gain support they lack from their mothers and consequently reduce their risk for depression and anxiety.

A secure attachment to mother may also be a protective factor against the negative effects of Concern about Social Networking on anxiety levels. The positive correlation between concern about online interactions and anxiety symptomology decreased when adolescents enjoyed a secure attachment to their mother. Adolescents who have high anxiety symptoms are likely to be concerned about social interactions online and offline. However, a secure attachment to mother may prevent an increase in anxiety symptoms even if adolescents do report more concern about OSN. Overall secure attachment to mother seemed to protect the adolescents in this study from

anxiety and depression symptoms related to social networking behaviors. Conversely, insecure adolescents were at risk for anxiety and depression, but may benefit from OSN use, which can be used to build strong connections with peers (Ellison, Stienfield & Lampe, 2007) that might alleviate anxiety related symptoms (Barlow 2002).

Results of the current study suggest that rather than amount of social networking use, the more important factor related to adolescent mental health seems to be proportion of their social interactions that are online versus in-person. An adolescent who has positive in-person relationships may be able to use OSN as a way to build and foster in-person relationships, but if an adolescent has mainly online interactions with limited in-person interactions, they may be at more of a risk for anxiety and depression. Adolescents with secure attachment to their mothers seem to use OSN in a manner that does not negatively affect their mental health. Adolescents who have insecure parent-child attachments may use OSN to compensate for their lack of connection to their parents and in some cases this may benefit their mental health. An important implication for clinicians is that the links between OSN use and mental health depends on the quality of the attachment relationship between adolescent and parent. Clinicians and school counselors may fruitfully focus on strengthening the attachment relationship between the adolescent and their primary caregiver, as well as monitoring the adolescent's OSN and possibly providing social skills training for both online and in-person interactions. As future research is conducted about positive social interactions online it may also be helpful to encourage all, but specifically adolescents with insecure attachments, ways to bond and create intimacy with their online community. OSN should not be seen as a barrier to good mental health but a potential intervention tool to aid adolescent's social connection.

Several important limitations should be considered when interpreting the results of this study. The measures used in this study were self-report instruments measuring participant's perception of OSN use, attachment, and mental health. Distortions in perceived and actual OSN use, attachment, and mental health may have influenced the results. Furthermore the IPPA measures attachment to parents on a continuum from secure to insecure but does not measure anxious and avoidant attachment separately. Individuals who have an insecure attachment style have much higher rates of depression and anxiety than individuals with a secure attachment style (Hankin, 2005; Irons & Gilbert, 2005), but the type of insecure attachment influences coping styles and outcomes. For example, individuals who have high attachment anxiety have much higher rates of OSN use than individuals with high attachment avoidance (Hart et al., 2015; Oldmeadow et al., 2013). The inability to distinguish these forms of attachment insecurity may have contributed to some discrepancies in the results. In the future, an attachment measure yielding both anxious and avoidant attachment scales should be used. Finally, due to the cross-sectional design, causal inferences are not possible. It was assumed that OSN use was predicting negative mental health outcomes but the reverse may be true too. For example, an adolescent who is depressed or anxious may use OSN differently than a more mentally healthy adolescent.

Due to rapidly changing technology and proliferation of different types of social media, it is difficult to create a scale that accurately measures adolescent's current OSN use. The SNS was developed four years ago when the literature on OSN was still quite new and incomplete. Currently, there are many more OSN instruments and research findings that may have enhanced the reliability and validity of the SNS. Another difficulty with the SNS was the structure of the instrument. The subsections of the SNS used different response styles ranging from yes/no questions to varying lengths of Likert scales. This made it difficult to test how many factors the

SNS contained and which questions loaded on the factors. The above limitations may have contributed to some subscales being slightly below the acceptable reliability cut off, which in turn yielded a few counterintuitive and inconsistent results. Future research should include additional measures to further examine construct validity and confirmatory factor analysis should be conducted to support these exploratory findings.

The results of the study support previous literature suggesting that OSN may not have the negative mental health effects that it was first assumed to have (Shaw & Grant, 2002). Novel findings emerged about associations among OSN, attachment, and mental health in an adolescent population. One important finding was that an adolescent's attachment to their mother was more highly related to their OSN use and mental health than attachment to their father. This finding supports earlier research highlighting the importance of secure attachment to mother in children's mental health (Demby, Riggs & Kaminski, 2015; Main & Weston, 1981; Fraley & Davis, 1997; Trinke & Bartholomew, 1997), but current results also demonstrate the important role of a secure attachment to father in an adolescent's mental health. Another key finding was that, similar to older populations, there were significant relationships between OSN and mental health, although overall general frequency of OSN use did not negatively affect the participant's mental health. The results suggest that even if the participant engaged in social networking activities, a secure attachment to their mother lessened any negative effects. Findings suggest that the relationship between OSN and negative mental health symptoms for an adolescent may be influenced by the adolescent's perception of interpersonal connectedness. Based on this information, a greater focus on youth's interpersonal connection and social skills both online and offline may be beneficial when treating adolescents experiencing anxiety or depression.

Table 1
Demographics of Adolescents

	<i>M</i>	<i>SD</i>
Age (in years)	15.93	1.07
	<i>n</i>	%
Sex		
Male	107	41.6
Female	148	57.6
Other/Prefer not to answer	2	.8
Race/Ethnicity		
White	149	58.0
Hispanic/Latino/Mexican American	51	19.8
African-American	15	5.8
Asian/Pacific Islander	9	3.9
Bi- or Multi-Racial/ Other	29	11.3
Native American	4	1.6
Social Networking		
Facebook Account	233	97.1
Other OSN Account	189	78.8
Does not use OSN	17	6.6

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

Table 2

Correlation Matrix For Online Social Support and Positive Social Networking Interactions Online

Variables	1	2	3	4	5	6	7	8	9	10
1. How many friends do you interact	1									
2. Online friends interact in person	.257***	1								
3. Online friends you've never met	-.010	-.224**	1							
4. Online friends you parents know	.065	.119	.038	1						
5. Overall social interaction is online	.445***	.223**	.127	.006	1					
6. Social support from online	.267***	.213**	.018	.095	.569***	1				
7. Reactions received are positive	.007	.063	-.084	.032	.38	.097	1			
8. Reactions received are negative	.098	.040	.095	-.124	-.138*	.074	-.458***	1		
9. Reactions you post are positive	-.097	-.084	-.071	.153*	-.112	-.041	.298**	-.315**	1	
10. Reactions you post are negative	.244	.086	-.043	-.052	.241**	.131	-.147*	.490***	-.410***	1

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

Table 3
Correlation Matrix for Concern About Social Networking

Variables	1	2	3	4	5	6	7
1. Concerned what others think about profile	1						
2. Concerned what others think about you	.546***	1					
3. Think about something before you post	.200**	.119	1				
4. Worry about pictures	.483***	.323***	.209**	1			
5. Worry about Comments	.538***	.429***	.167*	.521***	1		
6. Concerned about security	.142*	.094	.302**	.211***	.119	1	
7. Concerned about who views	.217**	.098	.316***	.264***	.169**	.714***	1

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

Table 4

Correlation Matrix For Frequency of Social Networking Use

Variables	1	2	3	4	5	6	7	8	9
1. Update your status	1								
2. Browse other peoples pages	.533***	1							
3. Post on a friend's wall	.508***	.546***	1						
4. Comment on a friend's status	.565***	.500***	.707***	1					
5. Post videos or pictures	.510***	.366***	.397***	.287***	1				
6. Engage in SN while doing homework	.473***	.488***	.358***	.350***	.436***	1			
7. Get reactions from people you know in person	.565***	.551***	.489***	.504***	.409***	.472***	1		
8. Elicit support from friends	.361***	.336***	.385***	.367***	.330***	.341***	.361***	1	
9. Use SN instead of texting a friend	.422***	.307***	.378***	.309***	.296***	.395***	.464***	.400***	1

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

Table 5

*Four Factor Online Social Support and Positive Social Networking Interactions Exploratory
Factor Analysis*

Item	Factor 1	Factor 2	Factor 3	Factor 4
How many friends do you interact with online	.640			
How much of your overall social interaction is online	.874			
How much of your social support is online	.792			
How many of the reactions you receive online are positive		-.719		
How many of the reactions you receive online are negative		.880		
How many of the reactions you post online are positive		-.585		
How many of the reactions you post online are negative		.600		
How many of you online friends have you never met in person			.829	
How many online friends do you interact with in person			.688	
How many of your online friends do your parents know				.937

Table 6

Two Factor Concern about Social Networking Exploratory Factor Analysis

Item	Factor 1	Factor 2
How concerned are you about what other people think about your online profile	.821	
Based on what people see on your social networking profile, are you concerned about what they think of you as a person	.782	
How much do you worry about how you look in picture that you post	.682	
How concerned are you about whether other people respond to comments you make online	.812	
How concerned are you about online security		.873
How concerned are you about who views the content of your online profile		.884

Table 7

Two Factor Frequency of Social Networking Use Exploratory Factor Analysis

Item	Factor 1	Factor 2
Update your status	.782	
Browse other people's pages	.777	
Post on a friends wall	.771	
Comment on a friend's status	.769	
Post videos or pictures	.622	
Engage in social networking when doing homework	.332	
Get reactions from people you know in person	.261	
Use a site to elicit support from friends		.885
Use site instead of texting friend		.763

Table 8

Correlations for Social Networking Scale, and Multidimensional Scale of Perceived Social Support

Variables	1	2	3	4	5	6	7
1. Online Social Support	1						
2. Positive SN Interactions	-.100	1					
3. Concern about SN	-.120	.100	1				
4. Frequency of SN	-.379***	.004	.125	1			
5. Friend SS	-.117	-.205**	.071	.165*	1		
6. Family SS	-.062	-.191**	.073	.012	.377***	1	
7. Significant Other SS	-.126	-.240**	.114	.189**	.632***	.444***	1

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

Note: SN = Social Networking; SS = Social Support

Table 9
Correlations for Social Networking Scale, Attachment, and Mental Health

Variables	1	2	3	4	5	6	7	8
1. Online Social Support	1							
2. Positive SN Interactions	-.100	1						
3. Concern about SN	-.120	.100	1					
4. Frequency of SN	-.461***	.004	.125	1				
5. Attachment to Mother	-.052	-.201**	-.022	-.033	1			
6. Attachment to Father	.013	-.154**	-.031	-.026	.324***	1		
7. Depression	-.075	.207**	.128	.026	-.419***	-.255**	1	
8. Anxiety	-.012	.055	.206**	.11	-.323***	-.249***	.639***	1

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

Note: SN = Social Networking

Table 10
Hierarchical Regressions for Depression and Attachment

Predictor	Attachment Figure			
	Mother		Father	
	R^2	β	R^2	β
Step 1	.01		.01	
Control Variable Sex		.10		.10
Step 2	.02		.02	
Control Variable Sex		.10		.10
Online Social Support		-.07		-.07
Step 3	.20		.08	
Control Variable Sex		.12*		.07
Online Social Support		-.10		-.07
Attachment		-.43***		-.25***
Step 4	.24		.08	
Control Variable Sex		.10		.07
Online Social Support		-.12*		-.07
Attachment		-.43***		-.25***
Interaction Term		.20**		.02

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

Note: SN = Social Networking

Table 11
Hierarchical Regressions for Depression and Attachment

Predictor	Attachment Figure			
	Mother		Father	
	R^2	β	R^2	β
Step 1	.01		.01	
Control Variable Sex		.10		.10
Step 2	.06		.06	
Control Variable Sex		.14*		.14*
Positive SN Interactions		.23**		.23**
Step 3	.21		.11	
Control Variable Sex		.15*		.11
Positive SN Interactions		.15*		.19**
Attachment		-.40***		-.21**
Step 4	.23		.11	
Control Variable Sex		.13*		.11
Positive SN Interactions		.12		.20**
Attachment		-.40***		-.21**
Interaction Term		-.11		.02

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

Note: SN = Social Networking

Table 12
Hierarchical Regressions for Depression and Attachment

Predictor	Attachment Figure			
	Mother		Father	
	R^2	β	R^2	β
Step 1	.01		.01	
Control Variable Sex		.10		.10
Step 2	.02		.02	
Control Variable Sex		.07		.07
Concern about SN		.11		.11
Step 3	.20		.08	
Control Variable Sex		.10		.04
Concern about SN		.10		.11
Attachment		-.42***		-.24***
Step 4	.20		.08	
Control Variable Sex		.10		.04
Concern about SN		.10		.10
Attachment		-.43***		-.25***
Interaction Term		-.07		-.03

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

Note: SN = Social Networking

Table 13
Hierarchical Regressions for Depression and Attachment

Predictor	Attachment Figure			
	Mother		Father	
	R^2	β	R^2	β
Step 1	.01		.01	
Control Variable Sex		.10		.10
Step 2	.01		.01	
Control Variable Sex		.10		.10
Frequency of SN Use		.01		.01
Step 3	.19		.07	
Control Variable Sex		.13*		.08
Frequency of SN Use		.01		.02
Attachment		-.43***		-.25***
Step 4	.19		.07	
Control Variable Sex		.13*		.08
Frequency of SN Use		.01		.01
Attachment		-.43***		-.25***
Interaction Term		.02		-.03

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

Note: SN = Social Networking

Table 14
Hierarchical Regressions for Anxiety and Attachment

Predictor	Attachment Figure			
	Mother		Father	
	R^2	β	R^2	β
Step 1	.02		.02	
Control Variable Sex		.14*		.14*
Step 2	.02		.02	
Control Variable Sex		.14*		.14*
Online Social Support		-.01		-.01
Step 3	.13		.08	
Control Variable Sex		.16*		.12
Online Social Support		-.02		.00
Attachment		-.33***		-.24***
Step 4	.15		.08	
Control Variable Sex		.15*		.11
Online Social Support		-.04		.00
Attachment		-.34***		-.23***
Interaction Term		.15*		.09

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

Note: SN = Social Networking

Table 15
Hierarchical Regressions for Anxiety and Attachment

Predictor	Attachment Figure			
	Mother		Father	
	R^2	β	R^2	β
Step 1	.02		.02	
Control Variable Sex		.14*		.14*
Step 2	.03		.03	
Control Variable Sex		.16*		.16*
Positive SN Interactions		.08		.08
Step 3	.13		.08	
Control Variable Sex		.16*		.13
Positive SN Interactions		.02		.04
Attachment		-.33***		-.23**
Step 4	.14		.08	
Control Variable Sex		.14*		.13
Positive SN Interactions		-.02		.05
Attachment		-.34***		-.22**
Interaction Term		-.11		.05

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

Note: SN = Social Networking

Table 16
Hierarchical Regressions for Anxiety and Attachment

Predictor	Attachment Figure			
	Mother		Father	
	R^2	β	R^2	β
Step 1	.02		.02	
Control Variable Sex		.14*		.14*
Step 2	.05		.05	
Control Variable Sex		.09		.09
Concern about SN		.18*		.18*
Step 3	.15		.10	
Control Variable Sex		.11		.06
Concern about SN		.16*		.18**
Attachment		-.33***		-.24***
Step 4	.18		.11	
Control Variable Sex		.10		.06
Concern about SN		.16*		.17*
Attachment		-.33***		-.24***
Interaction Term		-.15*		-.02

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

Note: SN = Social Networking

Table 17
Hierarchical Regressions for Anxiety and Attachment

Predictor	Attachment Figure			
	Mother		Father	
	R^2	β	R^2	β
Step 1	.02		.02	
Control Variable Sex		.14*		.14*
Step 2	.03		.03	
Control Variable Sex		.14*		.14*
Frequency of SN Use		.08		.08
Step 3	.14		.08	
Control Variable Sex		.16*		.11
Frequency of SN Use		.08		.09
Attachment		-.33***		-.24*
Step 4	.15		.08	
Control Variable Sex		.15*		.11
Frequency of SN Use		.11		.09
Attachment		-.33***		-.24***
Interaction Term		.12		-.03

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

Note: SN = Social Networking

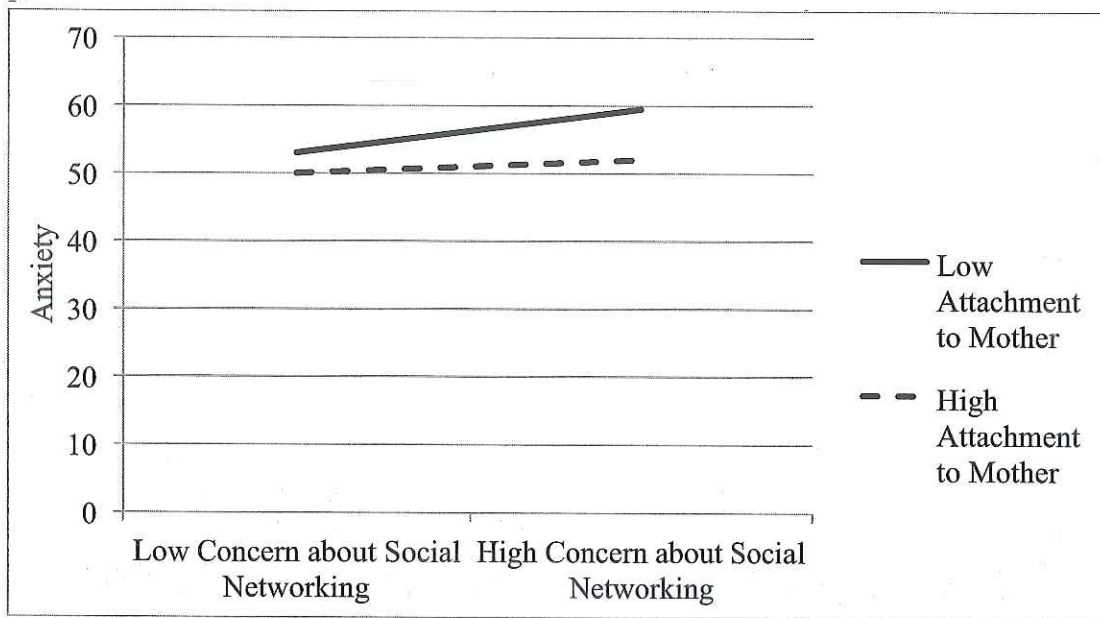


Figure 1. Mother attachment moderation on concern about SN and anxiety.

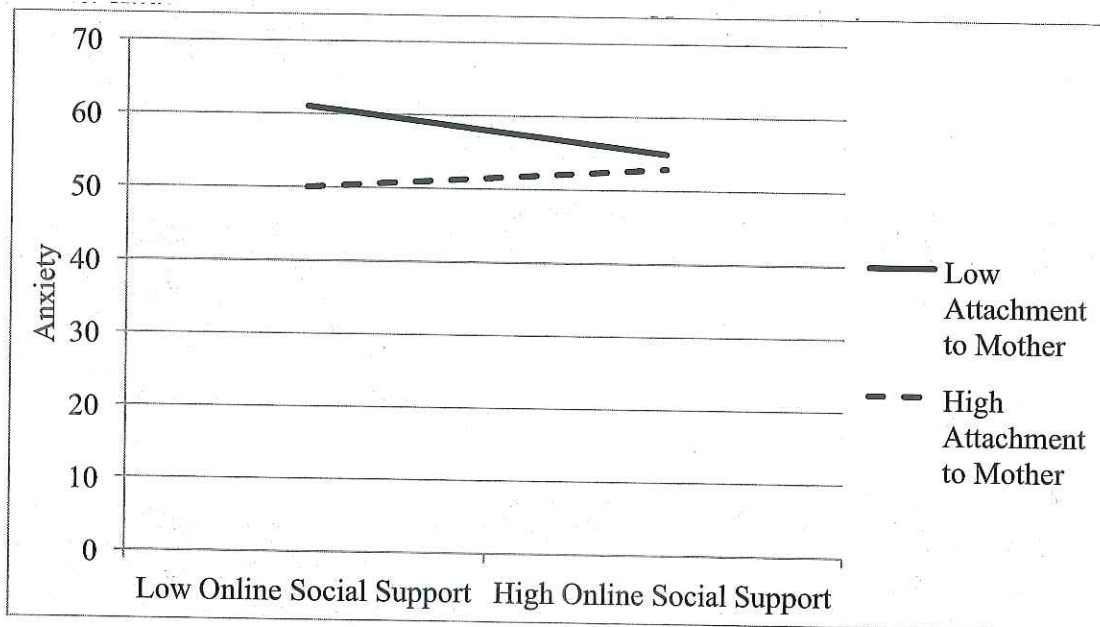


Figure 2. Mother attachment moderation on online social support and anxiety.

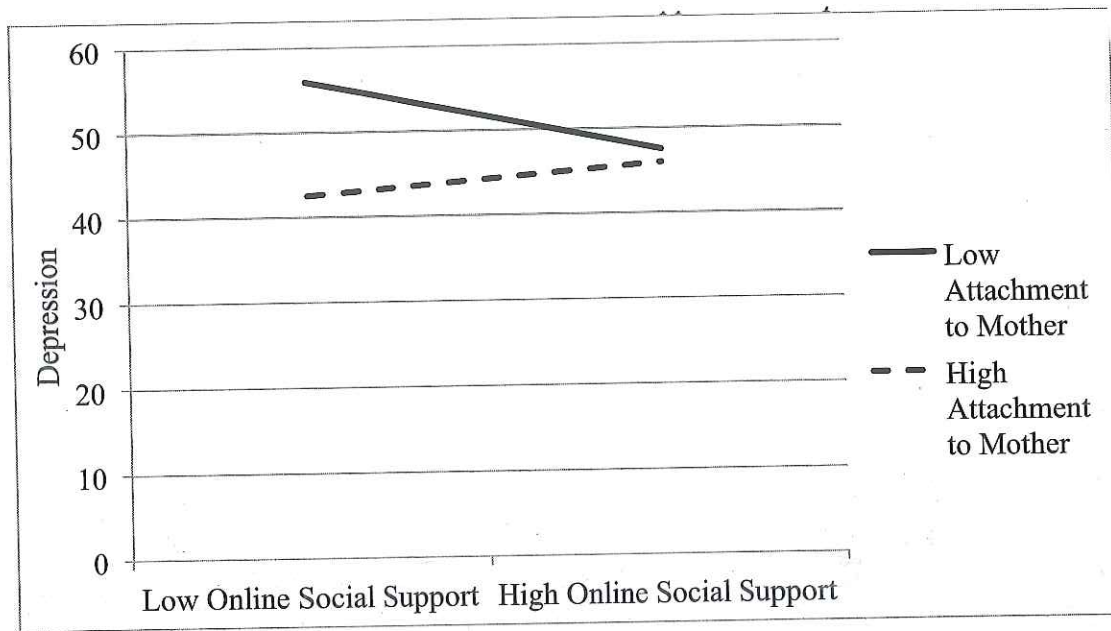


Figure 3. Mother attachment moderation on online social support and depression.

APPENDIX
SOCIAL NETWORKING SCALE

1. How long have you had an online social networking account or profile?
 - 0 to 6 months
 - 7 to 11 months
 - 1 year to 1 year 11 months
 - 2 years to 2 years 11 months
 - 3 years to 3 years 11 months
 - 4 years or more
2. Indicate what social networking accounts you have. Check all that apply
 - Twitter
 - Facebook
 - MySpace
 - linkedIn
 - YouTube
 - Other: _____
3. How many days per week do you usually visit a social networking site?
 - 0-1
 - 2-3
 - 4-5
 - 6-7
4. On an average day, how many times do you check your online social networking site(s)?
 - None
 - 1-2
 - 3-4
 - 5-6
 - 7-8
 - 9-10
 - More than 10

If more than 10, please estimate: _____
5. If you visit a social networking site, how long do you typically spend on the site?
 - Less than 30 minutes
 - 30 minutes to less than 1 hour
 - 1-1.5 hours
 - 1.5-2 hours
 - 2-2.5 hours
 - 2.5-3 hours
 - More than 3 hours

If more than 3 hours, please estimate: _____
6. Approximately how many friends do you have online
 - Less than 50
 - 51-100
 - 101-200
 - 201-300

- 301-400
- 401-500
- 501-600
- More than 600

If more than 600, please estimate: _____

For questions 7-16, the responses ask about your friends and the reactions you receive online.
The Responses include:

- All = 80-100% of friends or reactions
- Most = 60-80% of friends or reactions
- About Half = 40-60% of friends or reactions
- Some = 20-40% of friends or reactions
- None = 0-20% of friends or reactions

	All	Most	About Half	Some	None
7. In a typical week, how many of your online friends do you regularly interact with on a social networking site (Ex. posting on their wall, commenting on pictures or status)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Approximately how many of your online friends do you interact with in person during an average week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Approximately how many of your online friends have you never met in person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. How many of your online friends do your parents know in person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. How much of your overall social INTERACTION occurs through social networking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. How much of your social SUPPORT do you receive from social networking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. How many of the reactions you receive online (Ex. Comments, wall posts, ect.) are POSITIVE?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. How many of the reactions you receive online are NEGATIVE?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. How many of the reactions you post online are POSITIVE?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. How many of the reactions you post online are NEGATIVE?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. What type of security settings do you have on your social networking page(s)?					
	<input type="checkbox"/> None, my profile is public. Anyone can see my entire profile				
	<input type="checkbox"/> I have some privacy restrictions, and my profile is not public				

- I have several privacy restrictions, and I monitor who can see my profile. Friends, friends of friends, and networks (ex. School, clubs, ect.) can still view my profile
- My profile is private; only people I have accepted as friends can view it.
- I do not know what my privacy settings are

18. Who do you think views your social networking page? (check all that apply)

- My Friends
- My Parents
- Other people in my family
- Other people's parents
- Acquaintances
- People at my school I do not know
- My teachers
- Coaches
- My employer
- My future employer(s)
- Strangers
- Other: please specify: _____

	Not at all	A little	Somewhat	Very	Extremely
19. How concerned are you about what other people think about your online profile?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Based on what people see on your social networking profile, are you concerned about what they think of you as a person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. How much do you think about something before you post it on a friends wall?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. How much do you worry about how you look in picture that you post?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. How concerned are you about whether other people respond to a comment you, make online?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. How concerned are you about online security?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. How concerned are you about who views the content of your online profile?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. How concerned are you about your					

Facebook profile to you?

- | | Yes | No |
|--|--------------------------|--------------------------|
| 27. Do your parents or legal guardians know you have a social networking page(s)? | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. Do your parents or legal guardians monitor the content on you social networking page(s)? | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. Have you ever taken sexually explicit pictures of yourself or someone else on a cell phone? | <input type="checkbox"/> | <input type="checkbox"/> |
| 30. Have you ever SENT sexually explicit picture of yourself or someone else via text on a cell phone? | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. Have you ever RECIEVED sexually explicit picture of yourself or someone else via text on a cell phone? | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. Have you ever POSTED sexually explicit picture of yourself or someone else on an internet site? | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. Has anyone ever been excessively mean to you online? | <input type="checkbox"/> | <input type="checkbox"/> |
| 34. Have you ever done something mean to someone online? | <input type="checkbox"/> | <input type="checkbox"/> |
| 35. Have you ever been the victim of online rumors or gossip? | <input type="checkbox"/> | <input type="checkbox"/> |
| 36. Has your use of social networking ever positively changed a face-to-face relationship? | <input type="checkbox"/> | <input type="checkbox"/> |
| 37. Has using a social networking ever negatively changed a face-to-face relationship? | <input type="checkbox"/> | <input type="checkbox"/> |

Please identify how often you do each of the following

- | | Less than
Once per
Week | Once per
week | 2-6 times
per week | Once
daily | 2-5 times
a day | 6- 10
times
a day | More than
10 times
a day |
|--|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------------|
| 38. Update your status | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 39. Browse other peoples pages | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40. Post on a friend's wall | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 41. Comment on a friends status | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 42. "Like" a friend's Facebook status | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 43. Use FaceBook chat or other chat room | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 44. Use Facebook to Create an event | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 45. Post videos or pictures | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 46. Browse unknown people's | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- Facebook profiles
47. Join Facebook social network interest groups
48. Play online games on Facebook
49. Post something on Facebook you would not want your mother or father to see
50. Post something on Facebook you would not want your teacher to see
51. Post something on Facebook you would not want your future employer to see
52. Engage in social networking while doing homework
53. Get reactions to your Profile from people you know in person
54. Use social networking site to elicit support from friends
55. Use social networking site instead of texting a friend

Fill out the chart below by ranking the first three forms of communication you'd be most likely to use. For example, if instant messaging were my first choice, followed by talking to my friend in person, and my third choice was calling my friend on the phone, the chart would look like this:

	Instant messaging	Posting on my or my friend's wall	Text	Calling a friend on the phone	In person	Updating my status	Send a private message
To confront a friend who is mad at you	1			3	2		

Rank which form of communication you would use (from 1-3) in each of the following circumstances:

- 1—The first type of communication you would try (my preferred choice for this circumstance)
- 2—The next best type of communication
- 3— The last form of communication I would try in this situation

	Instant messaging	Posting on my or my friend's wall	Text	Calling a friend on the phone	In person	Updating my status	Send a private message
56. To confront a friend who is mad at you							
57. To confront a friend you are mad at							
58. To ask friends about gossip being spread about you							
59. To share gossip about other people							
60. To share about a good day							
61. To seek help solving a problem							
62. To share about a bad day							
63. To relieve stress							
64. Tell a friend about your weekend							
65. Invite people to your birthday party							
66. Keep in touch with a friend that goes to your school							
67. Keep in touch with a friend that does not go to your school							
68. To break up with a boyfriend or girlfriend							
69. Meet new people							
70. Overall, my favorite form of communication is							

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