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The Variations of Facebook Usage and Social Well-Being in Emerging Adults with Symptoms of ADHD

Shanna Deasley
University of Windsor

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By

Shanna Deasley

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by

Shanna Deasley

APPROVED BY:

_____

Dr. Debra Hernandez Jozefowicz
Social Work

_____

Dr. Rosanne Menna
Psychology

_____

Dr. Kimberley Babb, Advisor
Psychology

September 15, 2016

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ABSTRACT

The popularity of Facebook as an extension to the social lives of emerging adults has led to research examining how individuals with social impairments use the site. Social challenges are often experienced by individuals with ADHD; therefore, the present study examined the patterns of Facebook use for emerging adults with varying levels of ADHD symptoms. A total of 241 emerging adults completed online questionnaires about their level of ADHD symptoms, as well as Facebook use patterns. Higher ADHD symptoms were found to be related to using the active and communication features of Facebook, having companionship motivations, and having more responsive Facebook friends. Despite these factors being related in previous research to improved social well-being, the current study did not find evidence that any aspects of Facebook use reduced levels of social distress reported by people with higher ADHD symptoms.

Keywords: ADHD, Facebook, social well-being, social distress

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CHAPTER 1

INTRODUCTION

Attention-Deficit / Hyperactivity Disorder (ADHD) is characterized by a persistent pattern of inattention and/or hyperactivity and impulsivity (American Psychiatric Association, 2013). It is commonly diagnosed in childhood, during which time it often causes impairments in children's abilities to focus in school. A great deal of research also suggests that many individuals with this disorder have significant social impairments (for a review, see Nijmeijer et al., 2008). They can be viewed by others as pushy, loud, irresponsible, or insensitive (Barkley, 2006) and their peer relationships are often characterized by rejection, neglect, or conflict (APA, 2013; Barkley, 2006).

As children with this disorder age, symptoms – especially hyperactivity – appear to lessen; however, it is estimated that 2-8% of young adults in the general population show some symptoms of the disorder and many of these individuals have significant social difficulties (DuPaul, Weyandt, O'Dell, & Varejao, 2009; Weyandt & DuPaul, 2013). Ultimately, by the time individuals with ADHD reach young adulthood many have had numerous failed social interactions and generally have fewer friendships (Barkley, 2006), receive less social support (Weyandt & DuPaul, 2006; Young, 2005), experience greater social concerns (Blase et al., 2009), and have lower social self-esteem (Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005) compared to peers without ADHD.

Over the past decade, the evolution and increasing popularity of social networking sites have allowed people to extend their social lives to the online world. The most common social networking site is Facebook, a website where people post pictures and information about themselves and interact with other users (Duggan, Ellison, Lampe,

Lenhart, & Madden, 2015). With 87% of 18 to 29 year olds using Facebook to extend their social relationships (Duggan et al., 2015), the ability to appropriately use these networks has become a key aspect of everyday social functioning. Prior research has suggested that other groups with social difficulties may use social networking sites to improve their poor offline relationships (Baker & Oswald, 2010; Forest & Wood, 2012; Mazurek, 2013; Szwedo, Mikami, & Allen, 2012). Given the social challenges of individuals with ADHD, features of social networking sites, such as reduced audiovisual cues and the asynchronous components of online communication, may allow people with ADHD to compensate for their inadequate offline social functioning.

This study examined how people higher in ADHD symptoms use Facebook, their motivations and others' responsiveness to their Facebook activity, and how this relates to levels of loneliness and social support.

CHAPTER 2

REVIEW OF LITERATURE

Attention-Deficit / Hyperactivity Disorder

ADHD is an externalizing disorder characterized by consistently high levels of inattention, and/or hyperactivity and impulsivity that interfere with functioning or development (APA, 2013). Typical inattentive behaviours associated with ADHD include easily getting off-task, lacking persistence, and difficulty staying organized and focused. Hyperactivity manifests as excessive motor behaviours, talkativeness, and restlessness. Impulsive behaviours occur without forethought, and often reflect an inability to delay gratification. All of the symptoms of this disorder occur on a continuum and therefore are present to some degree in the general population (Levy, Hay, McStephen, Wood, & Waldman, 1997). However, what defines ADHD as a disorder is that these behaviours are developmentally inappropriate and have a negative impact on functioning (APA, 2013).

ADHD is most commonly diagnosed in childhood when symptoms disrupt school performance (APA, 2013). In the past, it was believed that the disorder remitted in adolescence, likely because overt symptoms of hyperactivity appear to lessen and instead manifest as feelings of tension and restlessness. However, at least half of children who have ADHD continue to show symptoms into adulthood (Resnick, 2005), with overall prevalence rates in the population being about 5% in children compared to 2.5% in adults (APA, 2013). Researchers have found that 60% of 18 to 20 year old boys with childhood ADHD continue to show clinically significant symptoms and impairment – even if they are not meeting full diagnostic criteria – with common symptoms being inattention, impulsivity, procrastination, disorganization, poor planning, and forgetfulness (APA,

2013; Biederman, Mick, & Faraone, 2000). Therefore, although rates appear to drop off, as high as 8% of young adults in the general population show clinically significant levels of symptoms (DuPaul et al., 2009).

Social Impairments in ADHD. With ADHD continuing throughout the lifespan, it is important to understand difficulties that people with the disorder have as they enter adulthood. A key feature of ADHD at all ages is that the symptoms and associated features of the disorder are linked to impairments in social functioning (APA, 2013). These social deficits were the main area of interest for this study.

Many of the ADHD symptoms listed in the *Diagnostic and Statistical Manual 5th Edition* (DSM 5) refer to behaviours that would be socially intrusive (APA, 2013). For example, "often interrupts or intrudes on others," "cannot wait turn in conversation," and "often talks excessively" are all manifestations of hyperactive and impulsive symptoms that may be perceived as negative intrusive social behaviours (APA, 2013, p. 60). Symptoms of inattention are more likely to lead to missing important social cues, rather than outwardly behaving in a socially inappropriate way. Associated features of ADHD may include low frustration tolerance, irritability, and mood lability, all of which further inhibit social functioning (APA, 2013).

Research has demonstrated social skill deficits among children and adolescents with ADHD, such as having trouble making and keeping friends and having poorer quality friendships (Mikami, 2010; Nijmeijer et al., 2008). These individuals can be viewed by others as unpopular, rude, insensitive, irresponsible, or obnoxious, and are "less likely to share, cooperate, and keep promises" compared to their peers (Barkley, 2006, p. 320; Mikami, 2010).

In adolescence and young adulthood, friendships increase in importance, and strong peer relationships are a vital part of functioning (Way & Silverman, 2012). Social impairments continue into young adulthood for many individuals with ADHD. Adults with ADHD often have difficulty maintaining friendships because of impulsivity, inattentiveness, forgetfulness, mood lability, difficulty reading social cues, and intrusiveness (Barkley, 2006). They tend to have difficulties with interpersonal relationships and accessing social support (Weyandt & DuPaul, 2006). In a comparison study of 21 undergraduate students with ADHD and 20 undergraduate students without ADHD, the students with ADHD had lower self-reported social adjustment to college, social skills, and social self-esteem (Shaw-Zirt et al., 2005). Other researchers have found a similar relationship between lower levels of social adjustment and higher ADHD symptoms among 147 college students in the U.S. and 273 in China (Norvilitis, Sun, & Zhang, 2010). Self-reported inattention symptoms were a primary predictor of poor social adjustment (Norvilitis et al., 2010). Additionally, in a comparative study 44 adults with ADHD and 34 adults without ADHD that asked participants to describe the coping strategies they used when faced with stressful situations over the past month, adults with ADHD were found to respond aggressively or completely avoid the situation compared to controls (Young, 2005) These maladaptive styles of coping and responding likely contribute to difficulties maintaining social relationships for people with ADHD.

It is worth noting that not all studies consistently find that ADHD symptoms are related to poorer social outcomes. For example, in a sample of 321 university students, Norwalk, Norvilitis, and MacLean (2009) reported a negative correlation between self-reported ADHD symptoms and social adjustment, however the effect size was very small,

and ADHD symptoms were not a significant predictor of social adjustment in the researchers' final model of social adjustment. This suggests that ADHD symptoms may have only a minor influence on social adjustment. Another study, which compared 24 students with ADHD and 26 students without ADHD, found that students with ADHD reported greater difficulties with social adjustment only related to their role as a student, but not in social activities or family relationships (Weyandt et al., 2013). One potential reason for these inconsistent results is that much of the research comparing social deficits among young adults has been conducted with college and university students. Although an increasing number of people with ADHD are finishing high school and attending post-secondary education (Wolf, 2001), it is likely that these individuals are doing better than others with ADHD who do not go on to attend further education. Considering these findings, the present study aimed to recruit a sample of university students, as well as individuals with ADHD in the general population.

Different symptoms of ADHD tend to manifest as different social deficits. Individuals with primarily inattentive symptoms appear to be shy and withdrawn, and experience higher anxiety in social situations (Milich, Balentine, & Lynam, 2001; Nijmeijer et al., 2008). Symptoms of inattention are closely related to peer neglect (APA, 2013), as well as difficulties forming and maintaining friendships (Kawabata, Tseng, & Gau, 2012). By contrast, individuals with hyperactive and impulsive symptoms are more likely to be actively rejected by peers because their disruptive, aggressive, and sometimes immature behaviours elicit negative reactions from others (APA, 2013; Barkley, 2006; Milich et al., 2001).

Another explanation for social deficits among young adults with ADHD is that

when they were children they may not have had positive peer interactions and, as a result, missed key socialization experiences that made it more difficult for them as adults in social settings (Mikami, 2010). Research by Blase and colleagues (2009) of 3379 undergraduate students supports this conclusion. Participants who reported having childhood ADHD, but who no longer met the criteria, expressed greater social concerns and less social satisfaction than people who had never had a diagnosis of ADHD. Therefore, differences in social skills between these groups may be related to the childhood ADHD group having ADHD during the time frame when social skills develop and therefore missing important socialization experiences.

Overall, it is clear that the majority of emerging adults with a formal diagnosis of ADHD or high levels of self-reported ADHD symptoms demonstrated social deficits. These individuals also reported poorer quality friendships, and higher levels of loneliness than their peers without ADHD. It is therefore important to identify factors that may help to improve or alleviate the social impairments experienced by individuals with ADHD.

Facebook

In recent years, increasing access and popularity of the Internet and social networking sites have led to the online world becoming a part of people's social lives. Boyd and Ellison (2008) describe social networking sites as online services that involve (1) creating a public profile, (2) listing other users that one shares a connection with, and (3) viewing one's own and others' profiles and connections within the site. A recent survey in the United States showed that Facebook is currently the most popular social networking site, with 58% of the general population and 71% of Internet users having an active Facebook account (Duggan et al., 2015). Facebook was developed in 2004 and the

number of users has been steadily increasing since then. As of June 2016, Facebook has 1.71 billion active users, monthly (Facebook Newsroom, 2016).

Description of Facebook. The specific features and capabilities of Facebook are constantly changing. However, key, ongoing features include: (1) creating a profile webpage, which includes personal information about the user, and (2) connecting and interacting with other users, known as "Facebook friends" (Buffardi & Campbell, 2008). A profile page is created by each user and it contains basic and personal information about the user, a profile picture, a cover photo, and Facebook wall. A profile picture is typically a picture of the user that is uploaded by the user, and it is displayed at the top of the profile page beside the user's name. Also at the top of the profile page, positioned behind the user's name and profile picture is a cover photo. Each of these photos can be changed and updated by the user as frequently as the user wants. The Facebook wall is below the user's name and profile picture and displays all of the user's previous Facebook activity. Typical Facebook activities include posting pictures, articles, videos, or messages. Users can post on their own or other users' walls. If users post a message on their own wall then it is called a status update. Users can respond to the posting activity of others by "liking" it (a one-click sign of endorsement), leaving a comment underneath the post, or sharing the post (re-posting it on their own wall). Recently, Facebook added multiple reaction options, such that participants can select "like," "love," "haha," "wow," "sad," or "angry." If the profile is publicly viewable, then these exchanges can be viewed by other Facebook users. Private messaging and chat features, allow users to interact with one or more other users in a private rather than public sphere. Another common feature of Facebook is the newsfeed, which presents all of the user's friends' recent activity. Studies

have found that looking at the newsfeed and observing other users' activity may actually be more common than posting (Pempek, Yermolayeva, & Calvert, 2009). Other activities, which are not the focus of the present study, include creating events, which invite people to and provide information about events that typically occur offline; playing games, which can be done with other users or independently; and joining or creating Facebook groups with other users that share common interests.

Facebook Use Among Young Adults. A great deal of the Facebook research has focused primarily on young adults. This is likely because they are the age group that shows the highest percentage of users (Duggan et al., 2015), and they commonly use Facebook as an extension of their offline friendships (Kuss & Griffiths, 2011). Therefore, examining Facebook and its influence on relationships gives valuable information in understanding the social functioning of young adults.

A large-scale survey in the U.S. collected data in September 2014 on Internet and social media usage patterns from a random sample of over 2000 participants (Duggan et al., 2015). The study found that among young adults, ages 18 to 29 years, 87% reported using Facebook, with 70% of users engaging with the website, daily. The next highest using age group was adults, ages 30 to 49 years, with 73% of Internet users in this age group having a Facebook account. Other smaller scale studies have used samples of university students and shown similarly high usage rates (Baker & Oswald, 2010; Ellison, Steinfeld & Lampe, 2007; Pempek et al., 2009).

Not only is a large proportion of young adults online, but those who use Facebook typically do so as part of their daily routine (Pempek et al., 2009; Shaw, Timpano, Tran, & Joormann, 2015). Studies have shown that among samples of undergraduate students,

Facebook users typically spend around 25 to 30 minutes, total, on the site every day (Junco, 2014; Pempek et al., 2009), and around 3.5 hours per week (Yang & Brown, 2013). It is common for users to sign on around two to four times each day for about 10-15 minutes each time (Shaw et al., 2015), and they most commonly go on the site in the evening and night (Pempek et al., 2009). Additionally, young adults report that they typically maintain the same Facebook habits regardless of how busy they are with other activities, suggesting that Facebook is fully integrated as part of their daily routine (Pempek et al., 2009).

Because of its nearly ubiquitous popularity, simply knowing how much an individual uses Facebook no longer provides a great deal of valuable information. Instead, researchers now also examine the types of activities in which people engage on Facebook and their motivations for using the site.

Facebook Activity. Many Facebook users are active on the site, with 65% reporting that they frequently or sometimes share, post, or comment on Facebook (Duggan et al., 2015). However, multiple studies seem to find that users more commonly are passively using the site, with reading the newsfeed and browsing friends' profile pages being reported as the most frequent activities (Pempek et al., 2009, Reich, 2010; Utz, 2015). Beyond this similarity in passive Facebook use, results seem to be inconsistent in terms of what other specific activities are most common among users. This is likely due to different methodologies, locations, and times that data were collected.

In terms of active Facebook use, Abell and Brewer (2014) asked a sample of 243 British university students how frequently they engage in different Facebook activities in

a day, and found that the most frequent Facebook activities were posting status updates, posting photos, changing profile pictures, and updating profile information. Pempek and colleagues (2009) had a sample of 92 American undergraduate students track their Facebook activity in a diary over the course of a week. Based on responses to open-ended questions, the majority of participants used Facebook to interact with their offline friends, with "inside jokes" and "catching up" reported as being the most common sources of conversation. Publicly posting on walls was used twice as frequently as one-on-one private messaging. Alternatively, focus group and survey data analyzed by Reich (2010) showed minimal difference between use of private messaging (44%) and writing public comments (39%). A recent study by Utz (2015) with a sample of 60 German university students, found that writing private messages and reading the newsfeed occurred daily or several times a day, clicking the "like" button was done several times a week, writing comments occurred one to two times a week, and posting status updates was least common, occurring several times a month. Based on the inconsistency of results in terms of specific feature use, one of the goals of the present study was to help clarify what current Facebook users are most commonly doing on Facebook by using a more comprehensive Facebook activity measure and a broader time frame in which the activities may occur.

Motives for Using Facebook. In addition to measuring the features that are being used on Facebook, researchers have also examined young adults' motivations for using the site. Across a wide range of studies, it is evident that there is a large social aspect to the motivations for Facebook use, in addition to non-social motivations (see Kuss & Griffths, 2011 for a review). One of the top motivations consistently reported by young

adults is to interact and communicate with offline friends (Kuss & Griffiths, 2011; Pempek et al., 2009; Reich, 2010). Analysis of focus group and survey data from a sample of American high school and college students showed that many of the students felt that Facebook provided a way to share what was happening in their own lives and also to keep up to date on what other people were doing (Reich, 2010).

Some studies have worked to develop large lists of potential Facebook motivations and then identify the underlying factor structure within these motivations. Orchard, Fullwood, Galbraith, and Morris (2014) had 244 British participants respond to a list of 53 different motivations and identified 10 factors: procrastination, freedom of expression, conformity, information exchange, new connections, ritual, social maintenance, escapism, recreation, and experimentation. A comparable study by Yang and Brown (2015) in an American sample used a smaller set of 27 items and identified four factors: seeking and sharing personal information (posting about the self and viewing others' posts), gaming, maintaining social connections, pursuing romantic or sexual relationships.

One of the more comprehensive factor structures of Facebook motivations, which will be used in the present study, was created by Smock, Ellison, Lampe, and Wohn (2011) in an American sample. Smock and colleagues (2011) identified nine factors: habitual pass time, relaxing entertainment, expressive information sharing, escapism, cool and new trend, companionship, professional advancement, social interaction, and meeting new people. These researchers then examined which motivations were related to the use of specific features on Facebook. Relaxing entertainment, expressive information sharing, and social interaction significantly predicted Facebook use in general. Expressive

information sharing also predicted use of communication features that enable users to communicate with many individuals at once (i.e., status updates and groups). Social interaction predicted use of commenting on others' posts, private messaging, chat, and wall posts; and habitual pass time also predicted use of wall posts. Companionship, which was identified as avoiding feelings of loneliness, predicted less use of comments. This seems to be an unexpected finding. Smock and colleagues (2011) suggested that the asynchronous aspects of the comments feature may mean users seeking companionship are less likely to engage in this activity, because it is less likely to receive an immediate response than using Facebook chat. The present study used Smock and colleagues' (2011) list of motivations to build on this area of research.

Factors Influencing Facebook Use and Social Wellbeing. Previous research suggests that a number of factors can influence the relation between Facebook use and social well-being. The importance of social motivations, active Facebook use, and the reactions of others will be reviewed as contributors to the social well-being of people who use Facebook.

Social motives and activities. Research among samples of emerging adults has highlighted the prevalence and positive social outcomes of having social motivations for using Facebook (Kuss & Griffiths, 2011; Pempek et al., 2009; Reich, 2010). An examination of Qzone, the Chinese equivalent of Facebook, among 337 Chinese undergraduate students indicated that individuals using the site for social communication reported higher well-being, whereas using the site for entertainment purposes did not show the same positive effects (Wang, Jackson, Gaskin, & Wang, 2014). In another study of self-reported Facebook use among 193 American undergraduate students, using

Facebook with the purpose of relationship maintenance was related to better social adjustment and less loneliness (Yang & Brown, 2013). The same researchers also found that making use of the communication features of Facebook was correlated with better social outcomes.

Active Facebook use. Equally important as having social motivations is being actively engaged with other users on Facebook. Pempek and colleagues (2009) suggested that a large proportion of Facebook users spend their time on the site browsing the activity of other users, without posting anything themselves. These types of activities have been shown to be associated with reduced social relationships and increased feelings of loneliness (Burke, Marlow, & Lento, 2010), and they are not related to the improved quality of relationships and well-being that exists when people engage in online social interactions (Valkenburg & Peter, 2009). Conversely, directed communication with another user is associated with increased feelings of social capital (i.e., networks of social relationships and connections and shared values and norms of behaviours) and lower loneliness (Burke et al., 2010). These types of activities would typically include wall posts, private messaging, or chat. Additionally, actively posting on Facebook is a way to receive social support from other users in the way of comments and likes left on the post. In a study that examined 269 adults' social relationships and the activity on their Facebook pages, people who posted more status updates reported receiving more emotional support from friends (Hampton, Goulet, Marlowe, & Rainie, 2012). Research has also suggested that time spent online and number of Facebook friends is a significant predictor of online social support (Liu & Yu, 2013).

Reactions of Others. The reactions of others to users' Facebook posts have been shown to be crucially important to the relationship between social networking site use and social well-being when people use the site for social reasons (Valkenburg, Peter, & Schouten, 2006). A study of 1244 Austrian university students by Greitemeyer, Mugge, and Bollerman (2014) examined the three most recent posts by participants, and the number of responses received from their Facebook friends. A greater number of responses from Facebook friends predicted lower levels of loneliness and higher levels of self-esteem. However, although people who post more on Facebook tend to report receiving more emotional support than those who post less (Hampton et al., 2012), research among people high in narcissism showed that as they posted more status updates they received fewer responses (Choi, Panek, Nardis, & Toma, 2015). This suggests that there may be a limit for how often people can post and receive positive feedback, and that if people are too active on Facebook, their friends become less responsive.

In summary, in the general population, better social outcomes and well-being have been shown to be related to having social motivations for using Facebook, actively engaging in the social features of Facebook, and having Facebook friends who are responsive and supportive.

Theories of Facebook Use and Social Well-being

Two hypotheses have emerged in relation to online communication and social outcomes (Valkenburg & Peter, 2007). The *social compensation hypothesis* proposes that lonely, socially anxious, or introverted individuals who have difficulty socializing offline turn to online communication for more successful interactions (Valkenburg & Peter, 2007). Alternatively, the *rich-get-richer hypothesis* states that it is extroverted and non-

lonely people who have successful online interactions, using online communication effectively as a way to extend their offline relationships (Valkenburg & Peter, 2007). Previous research on both of these theories will be reviewed.

Social Compensation Hypothesis. The social compensation hypothesis was proposed as a theory to explain how individuals with poor offline relationships benefit from interacting in an online environment. This theory has been primarily examined among samples of adolescents and young adults that are high in shyness, introversion, or social anxiety (Valkenburg & Peter, 2007). The following section will review studies that show that these young people can use online communication tools to compensate for poor offline interactions, and, in turn, experience the positive social outcomes that less shy individuals benefit from in typical social interactions.

The social compensation hypothesis is rooted in the idea that people who are shy or perform poorly in real-life social situations are able to show their true selves and develop more intimate relationships online because of the reduced social cues, which usually inhibit and overwhelm them in real life (McKenna, Green, & Gleason, 2002; Valkenburg & Peter, 2007). Decreased social cues in online interactions can therefore help people who are shy and overwhelmed in an offline social setting because they are less inhibited and can develop deeper connections. Individuals who have difficulty understanding, identifying, or attending to social cues would also benefit from decreased social cues online because this eliminates the area in which they have impairments.

Additionally, the asynchronous features of Facebook may also facilitate social compensation. Asynchronous communication that occurs on social networking sites

allows less socially skilled people more time to think about and compose their messages to others (Szwedo et al., 2012), thereby allowing for more successful social interactions.

Researchers have found that shy people who use Facebook had friendship patterns that were more similar to less shy people than those who do not use Facebook (Baker & Oswald, 2010). Specifically, when examining 207 American undergraduate students who completed a set of self-report measures, greater Facebook use among shy people was related to higher levels of satisfaction, importance, and closeness with Facebook friends, as well as greater feelings of social support (Baker & Oswald, 2010). Additionally, within a sample of 665 Dutch adolescents, a larger proportion of socially anxious individuals felt more comfortable interacting online than offline when talking about intimate topics and engaging in self-disclosure (Valkenburg & Peter, 2007).

People who feel disconnected from their peer group for whatever reason are more likely to use social networking sites to seek social companionship and to identify with others (Barker, 2009). Individuals with social deficits other than shyness seem to be compensating for poor offline relationships with online social interactions, as well. In a study of 108 American adults with Autism Spectrum Disorder, a larger percentage of participants who used social networking sites for social purposes had a best friend and had better relationship closeness than participants who did not use any social networking sites (Mazurek, 2013).

In another study by Forest and Wood (2012), individuals with low self-esteem, and who had poor social interactions related to insecurities, reported that Facebook was a safer place to express themselves than offline, offered opportunities to connect with other

people, and saw advantages to disclosing their thoughts and feelings on Facebook compared to in person self-disclosure (Forest & Wood, 2012).

Research by Szwedo and colleagues (2012) supported for the social compensation hypothesis in a study that examined the Facebook pages of 89 American emerging adults, as well as had them complete a number of self-report measures. Results demonstrated that people who were less socially accepted offline and had more "friends" and interactions on Facebook experienced more positive well-being. In contrast, among people who were socially accepted offline more Facebook interactions and "friends" was related to less positive well-being. This research shows support for the social compensation hypothesis, because individuals with social deficits experienced more positive outcomes, compared to people without social deficits.

It is worth noting that this hypothesis has primarily been used to describe how individuals seek and develop new relationships online (McKenna et al., 2002). However, with the prevalence of Facebook use among Internet users, the majority of young adults are using social networking sites to interact with people they already know offline (Kuss & Griffiths, 2011; Pempek et al., 2009; Reich, 2010). Therefore, the present study not only examined the social compensation hypothesis in terms of interacting with strangers, but rather how the unique features of online social networking may foster an environment where people with social deficits can compensate for their poor offline social functioning. In other words, they may be communicating online with people they have met offline, to further develop those relationships.

Rich-Get-Richer Hypothesis. The social compensation hypothesis does not always explain social outcomes of social networking site use. The rich-get-richer

hypothesis proposes that people with positive offline social relationships are most likely to turn to social networking sites as a way to extend their friendships (Valkenburg & Peter, 2007). With this hypothesis, rather than helping individuals with poor offline relationships, the Internet is an avenue that allows socially skilled individuals to build on their already positive social relationships. Fitting with this is the argument that the Internet is simply another medium where people display their long-standing social patterns (Mikami, Szwedo, Allen, Evans, & Hare, 2010). Mikami and colleagues (2010) conducted a longitudinal study that compared the social functioning of 92 American adolescents with the posts by others on their Facebook pages nine years later. The authors found that higher positivity in offline peer interactions during adolescence predicted more connection in online posts by friends in adulthood, and higher sociometric status in adolescence predicted more supportive posts by friends in adulthood. A review by Valkenburg and Peter (2009) suggested there is a great deal of support for the rich-get-richer hypothesis in examination of online usage patterns of adolescents and young adults.

Part of the rich-get-richer hypothesis is the idea that individuals with poor offline social patterns continue to have poor interactions online. Based on themes that emerged from focus groups with adolescents, Facebook has the ability to contribute to problems in friendships by the rapid spreading of rumors and by misunderstandings due to the nature of online communication (Reich, 2010). A study by Laghi and colleagues (2012) of 148 adolescents from Canada and Rome, showed that shy adolescents reported higher negative emotions and negative peer interactions online in daily content logs, and these negative interactions tended to exacerbate the positive relation between shyness and

loneliness. Research that examined the Facebook walls of 155 American undergraduate students, indicated people high in narcissism showed that when they posted more frequently the responsiveness of their peers decreased (Choi et al., 2015).

Mikami, Szwedo, Ahmad, Samuels, & Hinshaw (2015) examined 228 American, female participants in a longitudinal study of childhood ADHD and various aspects of Facebook use in emerging adulthood. The study assessed participants for ADHD between ages 6 and 12 years, and examined their Facebook use when they were between 17 and 24 years. Childhood ADHD did not seem to be related to the amount of time adult participants spent online. However, childhood symptoms of the disorder did predict a preference for online communication, having interactions with strangers online, having fewer Facebook friends, and less connection and support in the posts of Facebook friends. The same Facebook patterns were seen when comparing participants who had persistent ADHD into adulthood with those that remained consistently in the control condition. Based on research on other samples of young adults with social deficits, having interactions with strangers online rather than existing friends (Valkenburg & Peter, 2009) and poorer quality of online interactions (Laghi et al., 2012) has been linked to poorer social outcomes (i.e., higher loneliness).

Previous research has in fact shown support for both the rich-get-richer and social compensation hypotheses in different situations (Kuss & Griffiths, 2011). Although the results of Mikami and colleagues' (2015) study seem to indicate support for the rich-get-richer hypothesis, the present study aimed to extend the application of the social compensation hypothesis to people with ADHD by demonstrating how Facebook could provide an ideal social environment for young adults with the disorder. The social

compensation hypothesis is in effect because of the reduced social cues and asynchronous communication inherent in online interactions. These factors may allow people with ADHD to perform better socially online than offline, and therefore improve their social well-being.

Facebook and ADHD

There is very limited research examining Facebook use and ADHD, however a substantial body of research exists examining the Facebook usage patterns of a variety of groups that have social skill deficits. The research done with these groups can be used to inform what the Facebook use patterns of people with ADHD may look like. Autism Spectrum Disorder (Kuo, Orsmond, Coster, & Cohn, 2014; Mazurek, 2013; Mazurek & Wenstrup, 2013), social anxiety (Shaw et al., 2015), shyness and introversion (Ross et al., 2009; Ryan & Xenos, 2011), narcissism (Buffardi & Campbell, 2008; Ryan & Xenos, 2011), and low self-esteem (Forest & Wood, 2012) have all been looked at in relation to numerous Facebook related variables. The most relevant findings of these studies in relation to the expected Facebook usage of people with high ADHD symptoms will be discussed in this section.

Facebook Activity and Motives. In terms of time spent using Facebook, a study by Ryan and Xenos (2011) of 1324 Australian participants compared traits associated with Facebook users and non-users. Facebook users were more likely to be narcissistic and extraverted than Facebook non-users. In this case, people high in narcissism may be a group who is compensating for poor offline social relationships in the online environment because they are able to receive more validation in that environment. This study also

found that people who reported high levels of loneliness were also more likely to spend more time on Facebook per day than people who reported low levels of loneliness.

In a study of 75 American undergraduate students by Shaw and colleagues (2015), students with higher levels of social anxiety reported spending more time using Facebook compared to students without social anxiety. Reduced social cues and asynchronous communication foster an environment online that is more attractive than offline interactions because it is less likely to trigger feelings of anxiety. These studies suggest that people with various social deficits spend more time on Facebook than people without social deficits. The features of online social communication that make it attractive to people with social anxiety may also benefit individuals with ADHD.

The research on Facebook activity of people high in social anxiety, shyness, and loneliness seems to suggest that these people are more likely to use the passive features of Facebook. For example, Shaw and colleagues (2015) found that among the people with high levels of social anxiety, they were not only likely to spend more time on Facebook than people without social anxiety, but they were also more likely to spend their time on the site engaging in passive Facebook use. Another finding of the study by Ryan and Xenos (2011) was that reporting higher loneliness was related to reporting using the passive features of Facebook more than the active features.

Despite past research showing that people with social deficits generally use Facebook passively, research examining the influence of ADHD symptoms on social media use may suggest more active Facebook use. Levine, Waite, and Bowman (2013) researched a sample of 150 American undergraduate students, and found that higher levels of self-reported impulsivity and distractibility were related to more time spent

engaging in instant messaging and more immediate responding to instant messages. This research suggests that symptoms of ADHD may be related to more actively using social media.

Regarding motivations for Facebook use, much of the population uses Facebook as part of their daily routine and for the purposes of entertainment (Pempek et al., 2009; Smock et al., 2011). Mazurek (2013) examined the motivations for social networking site and Facebook use among 108 American adults with Autism Spectrum Disorder. The study found that the most common reason for using social networking sites in this group was for social engagement and connection, followed by entertainment (which included games and information seeking). Motivations for entertainment and passing time do exist among nearly all users of Facebook. Motivations around building and maintaining social relationships may be rated as more important by people with social impairments than people without social impairments, as a way to compensate for poor offline social functioning.

Given the social impairments of people with ADHD, this is another population whose Facebook use should be examined because it is possible that symptoms of the disorder will influence how much time is spent and what people are doing on the site. To the author's knowledge, one study (Mikami et al., 2015) has specifically examined Facebook activity among young adults with ADHD. The results of that study primarily focused on general Facebook use and the quality of interactions that occurred on Facebook among young women with ADHD. The present study adds to this previous research by describing the categories of Facebook activity and motivations among young men and women with varying levels of ADHD symptoms.

Social Well-being. The social compensation hypothesis is based on specific conditions that occur in an online setting (i.e., decreased external social cues and asynchronous interactions), which enable individuals with a range of social impairments to develop deeper connections (McKenna et al., 2002; Szwedo et al., 2012; Valkenburg & Peter, 2007). When extending the social compensation hypothesis to individuals with ADHD, they are likely to benefit socially from using Facebook for a number of reasons which will be reviewed here.

First, people with high ADHD symptoms are likely to have Facebook use patterns that are consistent with positive social outcomes in the general population. Specifically, given the research reviewed above, people with ADHD are more likely to spend more time on Facebook, actively rather than passively use Facebook, and have social motivations for using Facebook. All of these components of Facebook use have been shown to be related with improved social well-being (Burke et al., 2010; Greitemeyer et al., 2014; Hampton et al., 2012; Kuss & Griffiths, 2011; Pempek et al., 2009; Reich, 2010; Valkenburg et al., 2006; Wang et al., 2014; Yang & Brown, 2013).

Second, people with high ADHD symptoms will likely benefit from the reduced social cues that exist in online interactions. Research on the social information processing theory has indicated that children with ADHD have problematic interactions for two reasons (Dodge, 1986). First, when engaging in social situations, children with ADHD encode fewer situational cues. Second, when asked how they would react to a problem situation they generate fewer potential responses than typically developing children. Other research has also shown that people with ADHD have trouble in social situations because of their difficulty reading social cues (Barkley, 2006). The decreased social and

situational cues online therefore may help people with ADHD have more successful interactions because there is less information they need to process and pay attention to. In other words, there are fewer opportunities for them to miss important situational cues online than in face-to-face interactions.

Third, the asynchronous features of Facebook may help to reduce impulsive behaviours during social interactions. Given that Facebook interactions occur in an online environment, many of the exchanges occur in asynchronous time. Although children with ADHD tend to generate fewer potential responses to a problematic interaction than do children without ADHD, when given more time and the opportunity to withdraw and think about their response, children with ADHD have the capability to generate and choose appropriate responses (Dodge, 1986). Even when few responses are generated, the ability to select an appropriate response does not seem to be impaired among children with ADHD (Dodge, 1986). There are a number of therapies that capitalize on people with ADHD's ability to think of solutions to problems when not in the immediate situation and when given enough time. A number of social skills training programs for children and adults with ADHD rely on the individual coming up with their own solutions to problems and practicing using the better solutions (for examples of programs see Barkley, 2006; Hodsman, 2010; Webster-Stratton, Reid, & Hammond, 2001). Other researchers have made similar suggestions that the asynchronous communication that occurs on social networking sites allows less socially skilled people more time to think about and compose their messages with others (Szwedo et al., 2012), thereby allowing for more successful social interactions.

Fourth, individuals with ADHD may benefit socially from using Facebook, because the site provides a situation where their symptoms are likely to be less prominent, thereby interfering less with social interactions. The DSM 5 states that symptoms lessen when individuals are "engaged in especially interesting activities, having consistent external stimulation (e.g., via electronic screens), or interacting one on one" (APA, 2013, p. 61). Facebook is an electronic medium and offers a wide range of features and activities; therefore, it may provide an environment in which symptoms are less prominent. The chat and private messaging features that allow people to engage with one or a small group of users at a time may also be conducive to reducing the prominence of symptoms in this social context because one-on-one interactions have also been shown to be a setting where symptoms are reduced.

In summary, the social compensation hypothesis is likely to explain the consequences of Facebook use of people with higher levels of ADHD symptoms because they are likely to use Facebook in ways that have been shown to be positively related to higher levels of social well-being. Additionally, people with higher ADHD symptoms are likely to perform better socially in an online context because of reduced social cues, asynchronous interactions, and the engaging nature of interacting online.

The Present Study

Use of social networking sites, and Facebook in particular, has become nearly ubiquitous among young adults, and a major aspect of their social lives. Given that many of the features of Facebook involve social interactions, research has begun to examine how individuals with various social deficits use Facebook and whether their activity is related to their social well-being. One group that researchers have only just started to

examine is people with ADHD, who often are rejected or neglected by their peers because of symptoms of hyperactivity, impulsivity and inattention, which cause problems in interpersonal interactions. The purpose of the present study was to compare people with different levels of ADHD symptoms on their Facebook usage patterns, examine other users' responsiveness to participants' Facebook postings, and examine whether these factors interact to predict social well-being.

Young adults from a Southern Ontario university and the community completed a number of self-report measures online of Facebook activity, Facebook motives, and social well-being, as well as logging into their Facebook page and answering questions about their recent activity. ADHD symptoms were assessed on a continuum, rather than the requirement of meeting full diagnostic criteria.

Hypotheses

Hypothesis 1: ADHD symptoms and general Facebook use. Previous research has indicated that young adults with social deficits, such as narcissism, social anxiety, and loneliness, tend to spend more time on Facebook, than those without social deficits (Ryan & Xenos, 2011; Shaw et al., 2015). This may be related to the social compensation hypothesis, as people who have less positive social relationships in their everyday lives may spend more time seeking these relationships online. Additionally, symptoms of ADHD may lead people to be more drawn to the site as a distraction tool. Therefore, it was hypothesized that people higher in ADHD symptoms would spend more time on Facebook than people lower in ADHD symptoms.

Hypothesis 2: ADHD symptoms and Facebook activity. People higher in ADHD symptoms were expected to actively use Facebook more frequently than people

lower in ADHD symptoms. Although past research has indicated that people in the general population (Pempek et al., 2009) and people with social anxiety symptoms (Ryan & Xenos, 2011; Shaw et al., 2015) tend to engage in predominantly passive use of Facebook (e.g., looking at newsfeed and friends' pages without actively engaging), it is unlikely that this relationship would extend to people with symptoms of ADHD. Self-reported symptoms of impulsivity and distractibility have been shown to be positively related to time spent engaging in social media conversations, which is an active use of Facebook (Levine et al., 2013). Given the nature of ADHD symptoms, individuals high in inattention, impulsivity, and hyperactivity would likely use active features, such as posting content or leaving comments, more frequently than people with lower ADHD symptoms.

Hypothesis 3: ADHD symptoms and Facebook motivations. All Facebook motivations were examined in relation to ADHD symptoms, however hypotheses specifically focused on four motivations: entertainment, passing time, social interactions, and companionship.

Hypothesis 3a: Regarding motivations for Facebook use, it was expected that regardless of level of ADHD symptoms, participants would be motivated to use Facebook for passing time and entertainment. Previous research on Facebook motivations in the general population has shown that the majority of emerging adults use Facebook routinely to pass time and for the purposes of entertainment (Pempek et al., 2009; Smock et al., 2011). Therefore, there would be no difference in the amount that people higher in ADHD symptoms and people lower in ADHD symptoms are motivated to use Facebook for passing time and entertainment.

Hypothesis 3b: Other common motivations for Facebook use are building and maintaining social relationships. In research among other groups with social deficits (e.g., Autism Spectrum Disorder) engaging in social relationships is often the highest rated motivation (Mazurek, 2013), likely because Facebook provides a way to compensate for poor offline social functioning. Additionally, Mikami and colleagues (2015) found that childhood ADHD was related to a preference for online communication over offline, which is likely to be reflected in their social motivations for using Facebook. Therefore, people higher in ADHD symptoms were expected to report being more heavily motivated to use Facebook because of social reasons (i.e., social interactions and companionship), than people lower in ADHD symptoms.

Hypothesis 4: Facebook posting and responsiveness of others. There are mixed findings about whether people with social impairments extend their offline social patterns on Facebook (rich-get-richer hypothesis) or improve their social functioning and compensate for poor offline interactions through online communication (social compensation hypothesis). The above literature review indicates that Facebook may provide an ideal environment for people with ADHD to have more successful interactions online. However, the one previous research study that examined childhood ADHD and Facebook use (Mikami et al., 2015) suggests that Facebook friends' posts showed less connection and support than a control group. Because of the lack of research in this area, this was an exploratory hypothesis. A relation was expected to exist between offline social skills and online social success where the two would be highly correlated. Within this hypothesis responsiveness of Facebook friends was used as an indicator of online social success. Therefore it was hypothesized that the relation between social skills and

relative level of responsive of Facebook friends (i.e., number of likes and comments) would be moderated by ADHD symptoms. This was expected because people with lower ADHD symptoms were expected to have similar levels of social success regardless of whether they occur online or offline, whereas people with higher ADHD symptoms were expected to have relatively poor social skills offline but relatively higher levels of social interactions online.

Hypothesis 5: Relation between ADHD symptoms, Facebook use, and social well-being.

Hypothesis 5a: The relation between ADHD symptoms and social well-being would be moderated by frequency of Facebook use. It is expected that, in general, people with higher ADHD symptoms would report lower social well-being than people with lower ADHD symptoms. Online communication gives people with ADHD a chance to have more successful social interactions due to the engaging nature of the site, decreased social cues, and asynchronicity of interactions. Additionally, the above hypotheses all reflect Facebook behaviours that have been related to improved social well-being. Therefore because the Facebook activity of people with ADHD is likely to be characterized by factors that are associated with greater social well-being, those individuals with higher ADHD symptoms who use Facebook more frequently would receive more of the social benefits of Facebook use, providing support for the social compensation hypothesis. It was expected that individuals higher in ADHD symptoms who use Facebook for a longer duration per day would have higher social well-being than people higher in ADHD symptoms who use Facebook less. Individuals with lower

ADHD symptoms should have high levels of social well-being regardless of how much time they spend on Facebook. See Figure 1 for a graphical depiction of this hypothesis.

Hypothesis 5b: Researchers have shown that the reactions and responsiveness of other users is extremely important to the social well-being of Facebook users (Greitemeyer et al., 2014; Valkenburg et al., 2006). Therefore, it was hypothesized that the relation between ADHD symptoms and social well-being would be moderated by responsiveness of Facebook friends, as defined by number of likes and comments received on posts by participants. For people with lower ADHD symptoms it was hypothesized that they would likely have consistently high levels of social well-being regardless of responsiveness of Facebook friends. This is because they are likely to already have strong social relationships offline, and therefore are less likely to rely on and be influenced by online interactions for social success. In contrast, people with higher ADHD symptoms and who have responsive Facebook friends would have higher social well-being than people with higher ADHD symptoms with less responsive Facebook friends. See Figure 2 for a graphical depiction of this hypothesis.

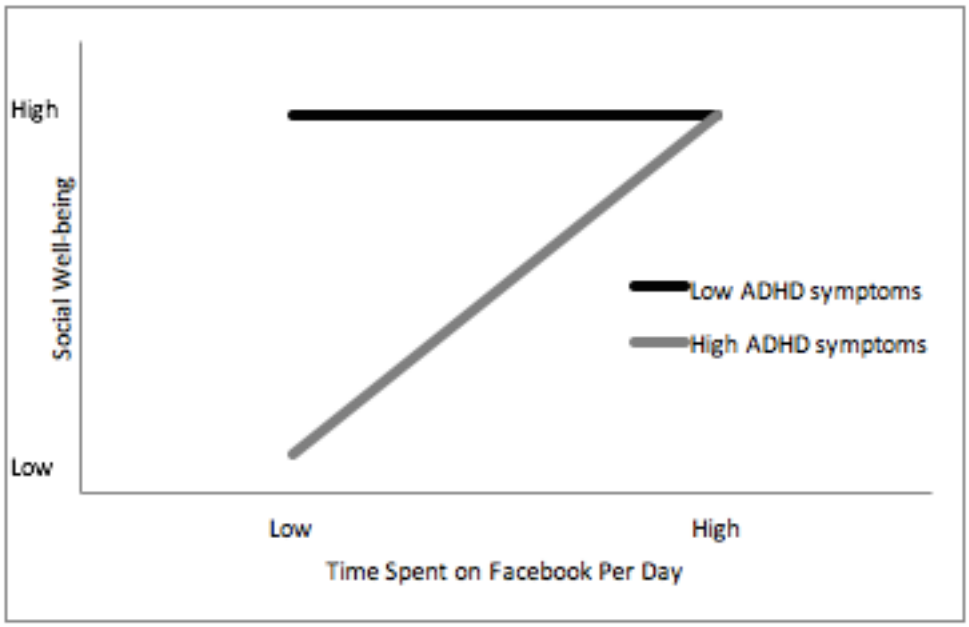

Figure 1. Hypothesized relation between ADHD symptoms and social well-being, moderated by time spent on Facebook

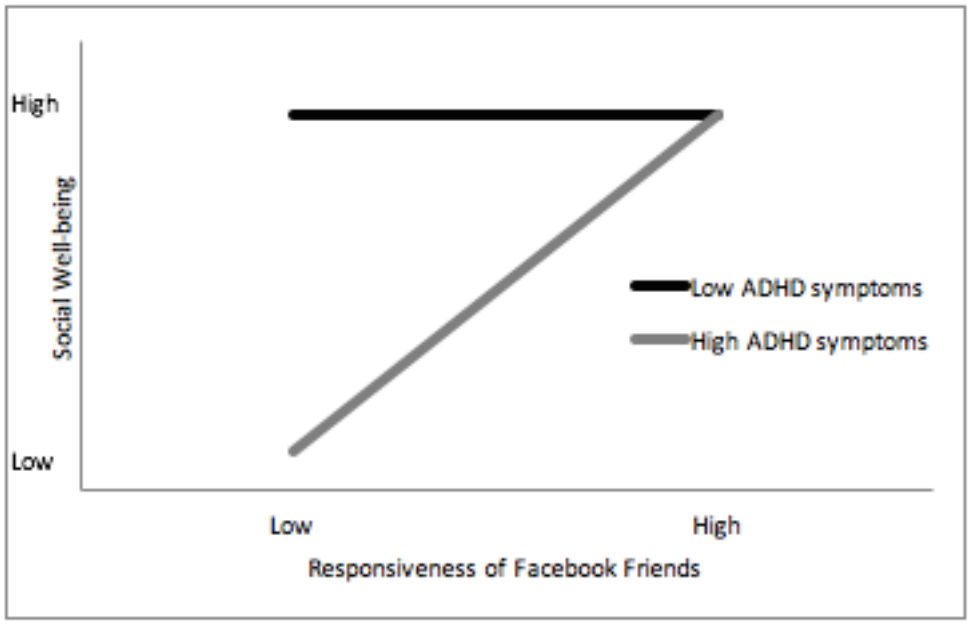

Figure 2. Hypothesized relation between ADHD symptoms and social well-being, moderated by responsiveness of Facebook friends

CHAPTER 3

METHODOLOGY

Participants

A power analysis was conducted using a small effect size and suggested that approximately 196 participants would be needed. A total of 271 emerging adults participated in the study and were recruited through the Psychology Department participant pool at a mid-size university in Southwestern Ontario, as well as a Canada-wide recruitment of individuals with and without ADHD. Participants were required to be between the ages of 18 and 25 years and to use their Facebook account at least once per week. Participants recruited through the participant pool were compensated with course credit, and participants recruited outside were compensated with a $5 gift card to a nation-wide coffee chain. The methodology for the present study was approved by the university's Research Ethics Board and participants were treated in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans.

Of the original 271 participants that were collected, 26 participants were removed from the final dataset because of invalid responding. This included nine participants who failed three validity checks, nine who failed four validity checks, seven who failed five validity checks, and one because she indicated in her write-in answers that she was not able to properly view the questions on one of the measures and therefore had simply put the same answer for every item. An additional two participants were removed because they were above the maximum age of 25 years. Further, two participants were deleted because of extreme values on responsiveness of Facebook friends that indicated they were

unrepresentative of the population. A total of 30 participants were removed, making the final sample size 241 participants.

Table 1 shows demographic information regarding participants' gender, ethnicity, and previous diagnoses. Participants ranged in age from 18 to 25 years (M = 20.31 years, SD = 1.74 years). Of the 241 participants, 223 were recruited through the participant pool and 18 were recruited through the Canada-wide recruitment strategy. For the participants recruited through the University participant pool, 49 were in first year, 63 were in second year, 63 were in third year, 43 were in fourth year, and five were in fifth year or above. Participants recruited through the Canada-wide recruitment strategy were asked to state their highest level of education completed. Four had high school certificates, two had college diplomas, three were currently completing university, and nine had completed a university degree.

The psychological disorders that participants reported as having been diagnosed with included: Anxiety or Generalized Anxiety Disorder, Depression or Major Depressive Disorder, Social Anxiety, Obsessive Compulsive Disorder, Post Traumatic Stress Disorder, Bipolar Disorder, Separation Anxiety Disorder, Substance Abuse Disorder, Borderline Personality Disorder, Panic Disorder, Reading Disability, Specific Phobia, and Eating Disorder. In table 1, these psychological disorders are presented as comorbid diagnoses experienced by participants.

Participants were also asked how often they smoked cigarettes, smoked marijuana, and drank alcohol. The majority of participants indicated that they did not smoke cigarettes (83.4%) or marijuana (68.5%). Participants ranged in how frequently they drank alcohol with 8.3% using few times a week, 27.4% using a few times a month,

Table 1

Frequency of Demographic Information as Reported by Participants (N = 241)

Demographic	Frequency	Percent of Total Sample
Gender		
Female	188	78.0%
Male	53	22.0%
Ethnicity		
White/Caucasian	147	61.0%
Arab/West Asian	30	12.4%
Asian	22	9.1%
Black	14	5.8%
Latin American	4	1.7%
Aboriginal	1	0.4%
Other	23	9.6%
Psychological Disorder	44	18.3%
ADHD only	4	1.7%
ADHD and 1 comorbid disorder	1	0.4%
ADHD and 2 comorbid disorders	2	0.9%
1 disorder (excluding ADHD)	16	6.6%
2 comorbid disorders (excluding ADHD)	12	5.0%
3 comorbid disorders (excluding ADHD)	6	2.4%
4 comorbid disorders (excluding ADHD)	3	1.3%
Physical Disability	5	2.0%

19.9% using once a month, 20.3% indicated they had drank a few times, and 23.7% did not currently drink.

Participants were also asked to report on their daily Internet and social media site usage. Participants reported spending an average of 326.76 minutes (*SD* = 192.05, Range = 0-1440) on the Internet each day. More than half of the participants (57%) stated they spend at least two hours each day on social media sites, and an additional 30% spend one to two hours each day on these sites. Table 2 shows the average and range of times (in minutes) that people used various sites each day. As expected, Facebook was the most frequently used social media site, with participants spending an average of 95 minutes per day on the site. The majority of participants reported that they log on to Facebook multiple times per day, with 10% logging on once a day, 46% logging on two to five times per day, 20% logging on 5 to 10 times per day, 22% logging on more than 10 times per day. Additionally, nearly all participants (98%) stated they had a smartphone that allowed them to log on to Facebook when away from a computer. Finally, Facebook appears to be an important part of the social lives of emerging adults with 97% of participants reporting that Facebook played at least some part in their social lives.

Measures

Participants completed a total of 13 measures that assessed demographics, social well-being, ADHD symptoms, and Facebook activity, motives, anxiety, posting and responsiveness of friends, as well as social desirability, social anxiety, social skills, and substance use as potential control variables. Appendix A includes a summary of all measures.

Table 2

Frequency of Social Media Site Usage in Minutes

Social Media Site	*M*	*SD*	Min	Max
Facebook	95.46	102.08	0	720
Instagram	61.16	78.53	0	600
Twitter	30.86	65.11	0	720
Vine	2.57	9.98	0	60
Pinterest	11.40	43.47	0	600
Tumblr	14.88	59.47	0	720
Snapchat	59.51	125.18	0	1200
LinkedIn	1.12	5.73	0	60
YouTube	93.76	194.76	0	1800
Buzzfeed	6.79	22.79	0	180
Redditt	5.65	26.43	0	240
Google+	13.72	41.52	0	360
Skype	13.10	44.92	0	390
WhatsApp	45.89	191.23	0	1800

Background Information. This measure included items regarding demographic information, experience with any psychological disorders and treatment, and average time spent on numerous social media sites (Appendix B). Participants were asked to select the appropriate choice from a set of options or fill in the space provided with their response. The first four items collected information regarding gender, age, ethnicity, and level of education. Participants then reported whether or not they had ever been diagnosed with a psychological disorder, and if they had, who diagnosed them and what treatments, if any, they received. Participants were then asked to report physical disabilities that they may have, and educational supports they receive. Finally, participants were asked to report the average time they spend online each day, in general, and then how much time they spend on specific social media sites. The time in minutes that participants reported spending on the Internet, and specifically on Facebook, were used in the final data analysis as the time online and time on Facebook variables. The information from this measure was collected for descriptive purposes and to be used as potential control variables (e.g., time online, previous diagnosis).

National Institute of Health Toolbox Adult Social Relationship Scale (NIH-ASRS; Cyranowski et al., 2013). The NIH-ASRS is a 45-item self-report measure that assessed social support, companionship, and social distress all of which have been shown to be impaired among individuals with ADHD (e.g., Barkley, 2006; Weyandt & DuPaul, 2006; Young, 2005). This measure was used as the measure of social well-being in the present study. It was developed as part of the National Institute of Health Toolbox for the Assessment of Neurological and Behavioral Function. There are six subscales in the measure which fit under three underlying concepts: Social Support (includes Emotional

Support and Instrumental Support subscales), Companionship (includes Friendship and Loneliness subscales), and Social Distress (includes Perceived Rejection and Perceived Hostility subscales). Each subscale has eight items, with the exception of the Loneliness subscale, which has only five items. Participants were asked to reflect on the past month and rate how frequently each of the items occurred or how often people in their life behaved in a specified way. Items were rated on a five-point Likert-type scale of 1 (*never*) to 5 (*always*). Some examples of items are, "I have someone who understands my problems" (Emotional Support), "There is someone around to help me if I need it" (Instrumental Support), and "I feel left out" (Loneliness). High scores on the Emotional Support, Instrumental Support, and Friendship subscales indicated the presence of these positive aspects of social well-being. In contrast, high scores on the Loneliness, Perceived Rejection, and Perceived Hostility subscales indicated more loneliness and negative interactions. A composite score can be created by reverse-coding the latter three scales and summed with the former three scales to create a composite score of social well-being. Cyranowski and colleagues (2013) indicated that there was very high reliability for each of the subscales, with Cronbach's alpha values ranging from .93 to .97. The measure shows strong concurrent validity with other, more established, measures of social support, loneliness, and social distress (Cyranowski et al., 2013). In the present study, the Cronbach's alpha for the overall measure was .96, and alphas ranged from .93 to .97 for each of the individual subscales. The reliability for the three underlying concepts was also high, with Cronbach alphas of .95 for Social Support, .95 for Companionship, and .95 for Social Distress. The present study used the three underlying concepts as the

outcome variables for social well-being because they captured different aspects of social well-being, not just an overall general score.

Caterino Scale (Caterino et al., 2009). The Caterino Scale is a 72-item self-report measure that assessed current ADHD symptoms in adulthood in a variety of settings, as well as recall of childhood ADHD symptoms, based on DSM-IV diagnostic criteria for the disorder. There are three subscales that assess different symptoms of the disorder: Inattention, Hyperactivity, and Impulsivity. Participants were asked to report to what extent they have experienced each symptom over the past six months and as a child on a Likert-type scale of 0 (*a little*) to 2 (*a lot*). Some example items are, "I am disorganized" (Inattention), "I seem to talk all the time" (Hyperactivity), and "I cannot stand to wait for things" (Impulsivity). An ADHD current score (summed inattention and hyperactivity-impulsivity across settings, excluding "as a child" responses), and a childhood ADHD score were calculated, with higher scores indicating higher ADHD symptoms. Caterino and colleagues (2009) indicated that reliability for the total ADHD score was .95, and ranged from .81 to .91 for the subscales of current symptoms. Construct validity, discriminant validity, and criterion validity, are reported to be satisfactory (Caterino et al., 2009). In the present study, the Cronbach's alpha was .94 for the ADHD current score and .89 for childhood ADHD score. The present study used the ADHD current score as the ADHD symptoms variable and did not use the childhood ADHD score.

Facebook Use. Due to the relative lack of descriptive research in how people with ADHD use Facebook, the present study included a range of Facebook measures. Four

measures assessed Facebook activity, motivations, posting and responsiveness of friends, as well as anxiety on the site.

Facebook Activity Measure (FAME; Shaw, Timpano, Tran & Joormann, 2015). The FAME is a self-report questionnaire designed to assess general Facebook use, and Facebook use following the end of a relationship and during different moods. The current study only used questions that assessed general Facebook use, which included questions regarding time spent on Facebook and how frequently participants use various features of the site. Upon recommendation of the authors of the original scale (A. Shaw, September 16, 2015, personal communication), which was created in 2009, and in consultation with research group members who are active Facebook users, the FAME was updated to fit current Facebook features as of Fall 2015. The first ten items assessed time spent on Facebook, participants were asked to select from a set of options, such as less than 15 minutes to more than two hours, or less than 25% to 76-100%. With regard to the items assessing specific Facebook feature use, there are 3 subscales from the original measure: Passive Use (e.g., viewing other's profiles, viewing the newsfeed), Content Production (e.g., updating profile, uploading photos), and Interactive Communication (e.g., chatting with friends, commenting on other users' activity). New items were added to the original subscales based on the type of feature they were.

For the remaining part of the scale participants were asked on average how often they engaged in each Facebook activity on a nine-point Likert-type scale ranging from 1 (*never*) to 9 (*more than 15 times per day*). Higher scores on these items indicated using that feature of Facebook more frequently. The internal consistency of the original Passive Use and Interactive Communication scales was adequate (α = .77 to .80) and low for the

Content Production scale (α = .52). In the present study, the Cronbach's alpha was .82 for the Passive Use scale, .74 for the Interactive Communication scale, and .85 for the Content Production scale. A score for active Facebook use was created by averaging individual's responses across all of the FAME items which assess use of active Facebook features. The Cronbach's alpha was .85 for Active Use.

Facebook Motivation Scale. The Facebook Motivation Scale is a 30-item self-report measure of reasons for using Facebook. It was developed by Papacharissi and Mendelson (2011) and reported by Smock and colleagues (2011). The measure contains nine subscales: Relaxing Entertainment, Expressive Information Sharing, Escapism, Cool and New Trend, Companionship, Professional Advancement, Social Interaction, Habitual Pass Time, and To Meet New People. Each item begins with "I use Facebook…" followed by a reason for using the site. Participants were asked to indicate how much they agree with each potential motivation on a five-point Likert scale of 1 (*strongly disagree*) to 5 (*strongly agree*). Scores on the nine subscales were obtained by averaging participants' responses to the items on each subscale. Higher scores indicated that someone is more likely to be motivated to use Facebook for that reason. Examples of motivations include, "Because it's entertaining" (Relaxing Entertainment) "So I won't have to be alone" (Companionship), "To keep in touch with friends and family" (Social Interaction), and "When I have nothing better to do" (Habitual Pass time). The internal consistency of the subscales was found to be adequate to strong, with alpha values ranging from .67 to .88 among a sample of undergraduate students (Smock et al., 2011). Items showed good convergent validity, with motivations correlating with engaging in

conceptually related Facebook activities (Smock et al., 2011). In the present study the Cronbach's alpha values ranged from .80 to .90.

Facebook Posting. This set of questions entailed participants reporting on their most recent Facebook posts and the responsiveness of their Facebook friends to those posts (Appendix C). Other researchers have similarly asked participants to report on their actual Facebook posting and responsiveness of friends (e.g., Forrest & Wood, 2012; Utz, 2015). These studies have asked participants to give varying numbers of responses (e.g., 7 to 10 posts) and also gave participants an option to describe what each post was about. This is done to provide an objective measure of the responsiveness of Facebook friends, as research has indicated there may be a positive illusory bias regarding friendships in people with ADHD (Ohan & Johnston, 2011). It also gave another indication of how active people with ADHD symptoms are on Facebook (i.e., do they post everyday or less frequently). Participants were asked to log onto Facebook and go to their own profile page and answer the questions based on their five most recent posts. For each post, participants were asked to report the date, what they posted (e.g., status, article, photo, video), whether the post was made before or after new response options were created[1], and the number of likes, loves, hahas, wows, sads, angrys, and comments received. The number of responses were summed to create a measure of responsiveness of Facebook friends.

[1] This question was asked because the new Facebook response options of "love," "haha," "wow," "sad," and "angry" were rolled out through the end of February 2016, toward the beginning of data collection. Some of the participants' five Facebook posts reported on in this study may have had "like" as the only response option.

Facebook-Social Interaction Anxiety Scale (F-SIAS; McCord, Rodebaugh, & Levinson, 2014). The F-SIAS is a seven-item self-report questionnaire designed to measure social anxiety experienced during interactions that occur on Facebook. The measure was modeled after the SIAS (Mattick & Clarke, 1998). Participants responded to items based on how characteristic each statement is of them on a five-point Likert-type scale of 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*), which is consistent with the original SIAS. Higher scores indicated higher levels of anxiety when using Facebook. Examples of items include: "When sending someone a Facebook message, I worry that I will not get a reply," and "I feel tense communicating with someone on Facebook chat." The scale shows good internal consistency with an alpha value of .86, and good convergent validity with measures of general social anxiety and social phobia (McCord et al., 2014). In the present study, the scale had a Cronbach's alpha value of .92.

Facebook and Extreme Relationships Questionnaire. This measure was developed by the researcher to assess the use of Facebook in romantic and negative interactions (Appendix D). It contains two items that asked participants to rate the degree to which they have used Facebook in romantic relationships and the degree to which they experienced negative interactions on Facebook. Participants answered on a five-point Likert-type scale of 1 (*not at all*) to 5 (*all the time*). This measure was used descriptively to determine the frequency with which participants were engaging in extreme relationships on Facebook.

Potential Control Variables. Social anxiety, social skills, social desirability, and substance use were measured as potential control variables. Social anxiety and social

skills have been shown to be related to social well-being and to Facebook use (e.g., Baker & Oswald, 2011; Ross et al., 2009; Ryan & Xenos, 2011). Therefore, these concepts were assessed to see if ADHD symptoms had any influence above and beyond these factors. Additionally, social desirability was measured to account for this type of biased responding, which may influence how participants reported their social well-being, as well as ADHD symptoms.

Social Interaction Anxiety Scale – 6 (SIAS-6; Peters, Sunderland, Andrews, Rapee, & Mattick, 2012). The SIAS-6 is a six-item self-report measure that assessed feelings of anxiety during interactions with other people. It is a short-form version of the original Social Interaction Anxiety Scale (Mattick & Clarke, 1998). Participants rated how characteristic each statement is of them on a five-point Likert-type scale of 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). High scores indicated higher levels of social anxiety. Items include: "I have difficulty making eye contact with others," and "I tense up if I meet an acquaintance on the street." Peters and colleagues (2012) reported that the scale shows strong test-retest reliability and alpha coefficients ranging from .88 to .92. The short-form is highly correlated with the original and shows similar levels of sensitivity to change over time. It has strong convergent validity, correlating moderately with measures of general anxiety, depression, stress, and fear of negative evaluation. Additionally, the SIAS-6 is able to discriminate between people who have a diagnosis of social phobia and people who do not have social phobia. In the present study, the Cronbach's alpha was .87.

Abridged Social Skills Inventory (Abridged SSI; Oldmeadow, Quinn, & Kowert, 2013). The Abridged SSI is a 24-item self-report measure designed to assess social

competency, specifically related to the ability to communicate both verbally and non-verbally. It is a short-form of the original SSI (Riggio, 1986), created by selecting the four highest loading items from each of the six subscales. The six subscales are Emotional Expressivity, Emotional Sensitivity, Emotional Control, Social Expressivity, Social Sensitivity, and Social Control. Participants were asked to rate to what extent each of the statements are like them on a five-point Likert-type scale of 1 (*not at all like me*) to 5 (*exactly like me*). High scores indicated strong social skills. *Z*-scores were obtained for each of the six subscales on the Abridged SSI, and then were averaged to create an average social skills score. Oldmeadow and colleagues (2013) reported that Cronbach's alpha values were all above .80, with the exclusion of the Emotional Expressivity scale which has an alpha value of only .53. This is consistent with the present study, which found that each of the subscales, with the exception of the Emotional Expressivity scale, showed strong reliability, with Cronbach's alpha values ranging from .80 to .99. The reliability of the Emotional Expressivity subscale was .59.

Social Desirability Scale – 17 (SDS-17; Stober, 2001). The SDS-17 is a 16-item self-report measure that assessed participants' biases in presenting themselves in an overly positive way. The scale was evaluated as a possible control variable during data analyses. This true/false measure asked participants to decide if the statements describe them (*true*) or not (*false*). Example items include, "I always eat a healthy diet," and, "In traffic I am always polite and considerate of others." Higher scores indicated that a participant was responding in a socially favourable way. According to Stober (2001), the SDS-17 has adequate reliability, with a Cronbach's alpha of .78 among 18 to 29 year olds. It has good convergent validity based on moderate to large correlations with the Lie

Scale of the revised Eysenck Personality Questionnaire, the Sets of Four Scale, and the Marlowe-Crowne Scale. It has nonsignificant correlations with unrelated aspects of personality (neuroticism, extraversion, psychoticism, and openness to experience), indicating good discriminant validity. The SDS-17 also has high sensitivity to instructions that provoke social desirability. In the present study, the Cronbach's alpha was .73.

Substance Use Measure (Wills & Stoolmiller, 2002). This measure is a three-item self-report measure that assessed the frequency of smoking cigarettes, drinking alcohol, and smoking marijuana. The response options were adapted from Wills and Stoolmiller (2002) to better measure the frequency with which these behaviours may occur. This scale had eight response options regarding the frequency of use of various substances ranging from 0 (*never used or used, but do not currently use*) to 7 (*usually use everyday*).

Validity Checks. Five validity check questions were interspersed within five of the measures in order to determine if participants were dedicating their full attention toward the task. An example item was, "If you are paying attention please choose response 5." Other than the specific validity check questions, another check of validity of participants' data included seeing if participants spent more than 10 minutes completing the study.

Procedure

The entire study was conducted online through the completion of computer-based measures. Data for the present study were collected online for three reasons. First, research suggests that individuals with ADHD (the population of interest in the present study) have difficulties keeping appointments, and therefore may cancel in-person

appointments made to complete measures. Second, given that the present study proposes that individuals with ADHD symptoms are likely more competent and comfortable interacting online, completing the study in this format will ideally help to collect more accurate information. Third, because part of the study (reporting five most recent Facebook posts) requires that participants access the Internet, this allows the data collection process to be more efficient.

Individuals interested in the present study viewed an electronic or paper flyer containing information about the study, including a brief outline of what they would be asked to do, the amount of time it would take, and the compensation that would be provided. Individuals who then chose to participate were provided the web link and password (if recruited from outside the participant pool) to complete the study. Participants first read and electronically signed a consent form. Then they completed the Background Information questionnaire and the Caterino Scale (used to measure ADHD symptoms), followed by the rest of the measures presented in a randomized order. This was done to ensure that if participants withdrew from the study before completing, data were collected on their demographics and ADHD symptoms. All measures were the same for participants recruited through both methods, with the exception of the Background Information questionnaire. The version of the Background Information questionnaire for the participant pool participants asked them to report their current year in university, whereas the version for non-participant pool participants asked them to report the highest level of education completed.

Two questions were provided at the end of the study asking participants about the most positive and negative aspects of their participating in the study. Specifically,

participants were asked to write in their answers to the following questions: “Was there anything that made you feel uncomfortable while completing this study? If yes, please explain,” and “What was the most positive aspect about participating in this study?” This was done to determine if there were any particularly distressing aspects to participating in the study.

After completion of the study, participants were thanked for their participation and provided compensation. Participants from the University of Windsor were provided course credit, and participants recruited outside of the University were provided their $5 gift card compensation via e-mail.

CHAPTER 4

RESULTS

Preliminary Data Analyses

Missing Data. Missing data were analyzed using Missing Value Analysis (MVA) in IBM SPSS Statistics version 22. Overall, there was a very small amount of missing data as there was only 2% of total data missing across all participants and variables and no patterns of missing data emerged. The MVA indicated that 70% of the variables had some level of missingness; however, most variables were missing less than 4% of values and no variable was missing more than 12% of data. At the participant level, 30% of cases had some missing data, but there were no patterns of missing cases. Little's MCAR test revealed that the data were missing completely at random, $\chi^2(1420, N = 241) = 1241.132$, $p > .999$. Due to the small amount of missing data, and because the data were missing completely at random, the maximum likelihood technique was used to impute missing values.

Assumptions. All assumptions of linear regression and correlation were assessed. Prior to running analyses, the assumptions of outliers, normality, linearity, and reliability were tested. Univariate outliers were assessed by examining standard values outside of +/-3.29 on all variables. Any outlying values were winsorized and brought within 3 standard deviations of the mean. This included one value on each of inattention, hyperactivity/impulsivity, total ADHD symptoms, social well-being, active Facebook use, interactive communication Facebook use, and social interaction motivation, two values on responsiveness of Facebook friends, and social support scale of social well-being, three values on negative extreme relationships, four values for time online, and

five values for time on Facebook. The assumption of normality was assessed after the aforementioned scores had been winsorized. To check for this assumption, histograms of all variables were viewed to see if they looked normally distributed. Most variables showed slight skews (mixed in direction of skewness), but skewness and kurtosis values were within normal limits for all variables (i.e., +/- 2 for skewness and +/- 3 for kurtosis). Therefore, the assumption of normality was met. For the assumption of linearity, scatter plots of predictor and outcome variables were examined. Linear relationships were determined to be the best fit for the data.

The remaining assumptions pertained to the regression analyses and therefore were tested while the regression analyses were conducted. To assess for influential observations, Cook's Distance values were assessed for each regression, and no influential data points were found. The assumption of multicollinearity was met as tolerance and VIF values were within acceptable limits (i.e., tolerance > .1 and VIF < 10). Durbin-Watson values were also within the acceptable range (i.e., between 1.5 and 2.5), suggesting the assumption of independence of errors observation was met. Finally, examination of plots of standardized residuals by standardized predicted values, showed that the assumption of homoscedasticity was violated for all regression analyses. Therefore, all regressions were run using bootstrapping because this technique does not assume that data are homoscedastic.

Descriptives. Table 3 shows means and standard deviations for all variables included in the analyses, as well as additional Facebook variables that were collected in order to provide a complete picture of the current Facebook patterns of participants. Participants reported engaging in passive Facebook use more frequently than active

Table 3

Descriptive Statistics of All Study Variables (N = 241)

Variable	*M*	*SD*	Participant Scores	
			Lowest	Highest
ADHD Symptoms	82.62	17.61	54	139
Social Well-being	177.77	28.31	97	225
Social Support	65.24	12.70	23	80.83
Companionship	49.17	10.59	17	65
Social Distress	63.38	11.66	27	80
Time on FB	90.85	81.87	0	360
Active FB Use	2.72	0.79	1	5
Interactive Communication	3.09	0.94	1	5.86
Content Production	2.49	1.03	1	5.6
Passive FB Use	4.59	1.79	1	9
Facebook Motivations				
Relaxing Entertainment	3.40	0.86	1	5
Habitual Pastime	3.51	0.86	1	5
Companionship	2.38	1.06	1	5
Social Interaction	4.19	0.82	1.5	5
Escapism	2.95	1.00	1	5
Expressive Information Sharing	3.24	0.81	1	5
Hot and New Trend	2.48	1.02	1	5
Professional Advancement	2.07	0.93	1	5
Meet New People	2.29	1.15	1	5
Facebook Anxiety	15.01	7.11	7	35
Romantic Relationships	1.88	1.11	1	5
Negative Relationships	1.48	0.70	1	4
Responsiveness of FB friends	85.52	76.51	0	333
Average Responsiveness per Post	17.27	23.49	0	185
Social Skills	0.00	0.47	-0.96	1.51
Social Anxiety	11.83	5.08	6	26
Social Desirability	23.50	3.30	16	32

Note. Values are winsorized. ADHD = Attention-Deficit / Hyperactivity Disorder. FB = Facebook.

Facebook use, and using the interactive communication features (e.g., posting on someone else's wall, liking or commenting someone else's post, using chat or private messaging) more frequently than content production features (e.g., posting photos or status updates on the user's own wall). In terms of motivations for Facebook use, social interaction was the most highly endorsed motivation, followed by habitual pastime, relaxing entertainment, and expressive information sharing. Participants were the least motivated to use Facebook for professional advancement and to meet new people.

Covariates. Potential covariates, including gender, age, previous diagnosis (excluding ADHD), total time online, social skills, social desirability, and social anxiety were analyzed to see if they were correlated with predictor and outcome variables. Table 4 shows these correlations. Based on these results, social anxiety was included in the regression analysis for hypothesis 4; and previous diagnosis, social desirability, and social anxiety were included as control variables in the regression analyses for hypothesis 5, as well as additional analyses which test for the moderation of other Facebook variables in the relation between ADHD symptoms and social distress.

Main Data Analyses

Hypothesis 1. The first hypothesis was that people higher in ADHD symptoms would spend more time on Facebook than people lower in ADHD symptoms. Time on Facebook and ADHD symptoms did not show a significant positive correlation, $r = .065$, $p = .313$. The relation between ADHD symptoms and the number of times people logged on to Facebook per day was also not significant, $r_s = .123$, $p = .058$.

Hypothesis 2. The second hypothesis was that people higher in ADHD symptoms would use active Facebook features, such as posting content or leaving comments, more

Table 4

Correlation Table of Main Outcome and Predictor Variables with Potential Covariates

	1	2	3	4	5	6	7	8	9	10	11
1. ADHD		-.355**	-.028	.043	.236**	.101	.035	.309**	.205**	.242**	.156*
2. Social distress			.012	-.077	-.217**	-.134*	.138*	-.408**	-.211**	-.379**	.027
3. Gender				-.008	-.043	-.033	.023	.018	<.001	.088	-.138*
4. Age					.019	-.105	-.003	.026	.096	-.034	.102
5. Previous diagnosis						.125	.055	.213**	.095	.212**	-.104
6. Time online							-.071	.161*	.055	.132*	-.087
7. Social skills								-.319**	-.106	-.153*	.189**
8. Social anxiety									.151*	.572**	-.163
9. Social desirability										.088	-.066
10. FB social anxiety											-.086
11. Responsiveness of FB friends											

Note. ADHD = Attention-Deficit / Hyperactivity Disorder. FB = Facebook.

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

frequently than people with lower ADHD symptoms. Consistent with this hypothesis, participants who had higher ADHD symptoms also reported using the active features of Facebook more than those who had lower ADHD symptoms, $r = .158$, $p = .014$. Further analyses were conducted to determine specifically what type of active Facebook use people with higher ADHD symptoms were using. Active Facebook use was further broken down into Content Production and Interactive Communication. Participants with higher ADHD symptoms reported using interactive communication features of Facebook more frequently than did people with lower ADHD symptoms, $r = .143$, $p = .026$, but no association was found between ADHD symptoms and Content Production, $r = .122$, $p = .059$. In contrast, no significant correlation was found between ADHD symptoms and Passive Facebook use, $r = -.042$, $p = .512$.

Hypothesis 3. The third hypothesis examined the association between ADHD symptoms and different motivations for using Facebook. Table 5 shows correlations between ADHD symptoms and Facebook motivations.

Hypothesis 3a was that ADHD symptoms would not be significantly related to passing time and entertainment motivations. Consistent with this hypothesis, ADHD symptoms were not significantly correlated with the Habitual Pastime or Relaxing Entertainment subscales.

Hypothesis 3b was that people higher in ADHD symptoms would report being more heavily motivated to use Facebook because of social reasons, compared to people lower in ADHD symptoms. Higher ADHD symptoms were significantly correlated with

Table 5

Correlations between ADHD symptoms and Facebook motivations (N = 241)

Motivation Subscale	*r*	*p*
Relaxing Entertainment	-.081	.209
Habitual Pastime	.067	.299
Companionship	.184	.004
Social Interaction	.062	.340
Escapism	.171	.008
Expressive Information Sharing	.020	.753
Hot and New Trend	.072	.268
Professional Advancement	-.037	.565
Meet New People	.072	.268

higher Companionship motivations, but Social Interaction motivations was not associated with ADHD symptoms, which indicated partial support for this hypothesis.

Although not initially included in the hypotheses, another interesting significant correlation that emerged was between ADHD symptoms and Escapism, in which higher ADHD symptoms were significantly related to greater endorsement of escapism motivations.

Hypothesis 4. The fourth hypothesis assessed whether ADHD symptoms moderated the relation between offline social skills and responsiveness of Facebook friends (i.e., number of likes and comments). Social anxiety was entered as a covariate in the regression. Hayes (2008) PROCESS macro was used to run the regression because of its use of bootstrapping.

The overall model for the regression was found to be significant, $R^2 = .095$, $F(4, 236) = 6.159$, $p < .001$. The final model accounted for 9.5% of the variance in responsiveness of Facebook friends, with lower social anxiety, $B = -2.940$, $SE = 1.048$, $t(236) = -2.806$, $p = .005$, 95% CI [-5.004, -0.876], and higher ADHD symptoms, $B = .874$, $SE = .287$, $t(236) = 3.042$, $p = .003$, 95% CI [0.308, 1.441], as significant predictors of more responsiveness of Facebook friends. Social skills was not a significant predictor of responsiveness of Facebook friends in the model, $B = 18.046$, $SE = 10.894$, $t(236) = 1.657$, $p = .099$, 95% CI [-3.416, 39.508]. There also was not a significant moderation effect, as the interaction term between social skills and ADHD symptoms was not found to be a significant predictor in the final model, $B = 0.866$, $SE = 0.599$, $t(236) = 1.446$, $p = .149$, 95% CI [-0.314, 2.045].

Given that ADHD symptoms were a significant predictor of how many likes and comments participants received from their Facebook friends, additional analyses were conducted to determine why this might be occurring. First, an ANOVA was conducted to determine what type of post had the highest level of responsiveness. The results of the ANOVA indicated that there was a significant difference in responsiveness based on type of post across all five posts, $F(4, 1142) = 45.878$, $p < .001$. Tukey's post hoc analysis showed that posting photos got significantly more likes and comments ($M = 25.32$, $SD = 0.92$) than did status updates ($M = 16.62$, $SD = 1.78$, $p < .001$), videos ($M = 6.04$, $SD = 1.58$, $p < .001$), articles ($M = 5.98$, $SD = 1.98$, $p < .001$), and other types of posts ($M = 5.34$, $SD = 2.46$, $p < .001$). Additionally, status updates had the second highest level of responsiveness, significantly more than videos ($p < .001$), articles ($p = .001$), or other ($p = .002$).

Next, ADHD symptoms were categorized into low and high based on a median split, and chi-square analyses were used to determine if there was a significant difference in what was being posted based on level of ADHD symptoms. This analysis was used to determine if participants' levels of ADHD symptoms were related to type of post in their five most recent Facebook posts. However, across all five posts, there was no significant difference found between low and high ADHD symptoms in type of posts made, $\chi^2 = 1.246$ to 4.910, $ps = .297$ to $.817$. This suggests that the higher level of responsiveness for people with higher ADHD symptoms is not accounted for by the types of posts for their five most recent posts.

Finally, it was thought that participants with higher ADHD symptoms may be posting more frequently and therefore appear in their friends' newsfeeds more often. This

frequent posting may potentially account for why ADHD symptoms were a predictor of responsiveness in the regression analysis. A significant positive correlation was found between frequency of posting status updates and ADHD symptoms (r = .141, p = .029); however, ADHD symptoms were not significantly correlated to the frequency of making any other types of posts (e.g., pictures, videos, articles), rs = .081 to .123, ps = .056 to .211.

Hypothesis 5. Hypothesis 5 examined the moderation of different aspects of Facebook use (i.e., time spent on Facebook and responsiveness of Facebook friends) in the relation between ADHD symptoms and the three social well-being concepts. Higher ADHD symptoms were significantly related to higher levels of social distress, r = -.355, p < .001. ADHD symptoms were not significantly correlated with social support, r = -.043, p = .502, or companionship, r = -.124, p = .055. Therefore, the final hypotheses examined the moderation of aspects of Facebook use in the relation between ADHD symptoms and social distress, while controlling for social anxiety, social desirability, and previous diagnosis. Hayes (2008) PROCESS macro was again used to run the regression because of its use of bootstrapping.

Hypothesis 5a. Hypothesis 5a assessed whether time spent on Facebook per day moderated the relation between ADHD symptoms and social distress. Social anxiety, social desirability, and previous diagnosis were entered as covariates. The overall model was significant, R^2 = .250, F(6, 234) = 13.012, p < .001, and it accounted for 25% of the variance in social distress. Social anxiety, B = -0.682, SE = 0.141, t(234) = -4.824, p < .001, 95% CI [-0.961, -0.404], and ADHD symptoms, B = -0.145, SE = 0.041, t(234) = -3.561, p < .001, 95% CI [-0.225, -0.065], were found to be significant predictors of social

distress, in which greater social anxiety and higher levels of ADHD symptoms predicted higher levels of social distress. However, the interaction term consisting of ADHD symptoms and time spent on Facebook was not a significant predictor, $B < 0.001$, $SE = 0.001$, $t(234) = .134$, $p = .894$, 95% CI [-0.001, 0.001]. Therefore, time spent on Facebook was not a significant moderator of the relation between ADHD symptoms and social distress. Additionally, time spent on Facebook, social desirability, and previous diagnosis were all not significant individual predictors of social distress, all $ps > .05$.

Hypothesis 5b. Hypothesis 5b assessed whether responsiveness of Facebook friends moderated the relation between ADHD symptoms and social distress, controlling for social anxiety, social desirability, and previous diagnosis. The overall model was significant, $R^2 = 0.250$, $F(6, 234) = 13.028$, $p < .001$, accounting for 25% of the variance in social distress. Similar to hypothesis 5a social anxiety, $B = -0.716$, $SE = 0.142$, $t(234) = -5.042$, $p < .001$, 95% CI [-0.996, -0.436], and ADHD symptoms, $B = -0.135$, $SE = 0.042$, $t(234) = -3.197$, $p = .002$, 95% CI [-0.219, -0.052], were found to be the only significant predictors of social distress, in which higher social anxiety and higher ADHD symptoms each predicted higher levels of social distress. Responsiveness of Facebook friends was not a significant moderator, as the interaction term between ADHD symptoms and time spent on Facebook was not a significant predictor, $B = -0.001$, $SE > 0.001$, $t(234) = -1.308$, $p = .192$, 95% CI [-0.001, 0.000]. Responsiveness of Facebook friends, social desirability, and previous diagnosis were also not significant individual predictors of social distress, all $ps > .05$.

Additional moderation analyses. Given that there were significant correlations with ADHD symptoms and Social Interaction, Companionship, and Escapism

motivations, as well as Active and Interactive Communication features, additional analyses were run to determine if these aspects of Facebook use significantly moderated the relation between ADHD symptoms and social distress. No Facebook motivations or Facebook activity use patterns were significant moderators in the relation between ADHD and social distress, all *ps* > .05.

Social anxiety and ADHD. In an effort to compare the social experience of people with varying levels of ADHD in an online and offline context, social anxiety was examined. Offline social anxiety was significantly positively correlated with Facebook social anxiety (see Table 4). ADHD symptoms were found to be significantly positively correlated with social anxiety in everyday life and on Facebook (see Table 4). Therefore, higher ADHD symptoms were related to higher levels of social anxiety, both online and offline.

CHAPTER 5

DISCUSSION

Facebook Use

The purpose of the present study was to examine emerging adults with different levels of ADHD symptoms on Facebook usage patterns, other users' responsiveness to participants' Facebook posting, and examine whether these factors interact to predict social well-being. Given that the landscape of social media site use is ever changing, the general Facebook use patterns across all participants were examined. The emerging adults in the present study reported spending, on average, more than five hours per day online. Nearly 90% of participants reported that of the time they spend online each day, at least one hour of it was spent on social media sites. As expected, Facebook was the most highly used social media site, with participants reporting spending an average of 95 minutes on the site, everyday. This number is much higher than previous research which placed estimates for daily Facebook use around 30 minutes (Junco, 2014; Pempek et al., 2009). Similar to previous research by Shaw and colleagues (2015) the majority of participants reported checking their Facebook accounts multiple times per day. This increase in time may be related to social media becoming of increasing importance and prevalence in the lives of young people.

Additionally, nearly all of the participants in the present study reported that they had a smartphone that allowed them to access Facebook when away from their computers. This may further lead to more frequent usage of the site because there are fewer restrictions on when participants can access the site. This explanation could explain inconsistencies of the current findings with previous research studies which typically do

not assess time spent on Facebook on a smartphone. It could also be a sampling bias in which the present study attracted heavy Facebook users, given that the main topic of interest was Facebook use. However, the majority of previous studies also report that nearly all of their participants are active Facebook users, making this explanation less likely. The method of data collection may also play a contributing role, given that previous studies have used both daily diary measures (Pempek et al., 2009) and software that tracks participants' usage (Junco, 2014).

Because of its nearly ubiquitous popularity, the present study also examined the types of activities that people engage in on Facebook and their motivations for using the site. Participants reported using the passive features of Facebook use more frequently than the active features. These passive features include activities such as reading the newsfeed and browsing friends' profile pages without leaving likes or comments. This finding is consistent with a large body of previous research that shows that users tend to engage in passive Facebook use most frequently (Pempek et al., 2009; Reich, 2010; Utz, 2015). When looking at active feature use, it appears that participants are using the social and communication features (e.g., liking, commenting, and posting on friends' walls) more frequently than content production features, which include activities like posting photos or status updates. This supports research by Utz (2015) indicating that Facebook users tend to post likes and comments and use private messaging, which are all components of interactive communication use, more frequently than posting status updates, which is a type of content production use. The higher level of interactive communication feature use also suggests that Facebook remains an active social context for many users.

Looking at the motivations for Facebook use indicated in the present study, the social aspect of this social networking site is further supported, with social interaction being the most highly endorsed motivation for using Facebook. Previous research has also indicated interaction and communication as one of the top motivations for Facebook use consistently reported by young adults (Kuss & Griffiths, 2011; Pempek et al., 2009; Reich, 2010). The social aspect of Facebook was further evidenced by 97% of participants in the current study indicating that Facebook played at least some role in their social lives. Other motivations that participants reported as important for their Facebook use were passing time, relaxation, entertainment, and sharing information with their friends. Interestingly, individuals do not appear to be motivated to use Facebook to meet new people, something that was previously a top motivation for engaging in online interactions (McKenna et al., 2002). This suggests that the type of user found on social media sites has changed over the past 15 years. Because of its widespread use, social media is now much more likely to be an avenue for keeping in contact with and extending offline social relationships, rather than forming new relationships (Kuss & Griffiths, 2011; Pempek et al., 2009; Reich, 2010). These findings provide evidence that Facebook is an integral piece of the social worlds of its users, in which social networking sites are another environment for interacting with existing friends, similar to the social environments of school, home, or work.

In summary, there appears to be a very high level of Facebook use within the present sample, particularly passive Facebook use and motivations, and a highly social aspect to Facebook, as well. Emerging adults reported being most strongly motivated to

use Facebook to keep in touch and communicate with their existing social networks, and when they engage in active feature use it is very likely to be social in nature.

ADHD Symptoms and Facebook Activity Use

One of the main goals of the present study was to examine how ADHD symptoms were related to different patterns of Facebook use in a sample of emerging adults and whether these Facebook use patterns could help compensate for the social deficits experienced by people with high ADHD symptoms in an offline context. The first hypothesis was that higher ADHD symptoms would be related to reporting spending more time on Facebook per day. Inconsistent with this hypothesis and previous research on young adults with social deficits (Ryan & Xenos, 2011; Shaw et al., 2015), no significant correlations were found between ADHD symptoms and either time spent on Facebook per day or the number of times participants logged on to Facebook per day. This is likely a result of the high level of Facebook use throughout the entire sample, which may be a problem of restricted range.

Interestingly, this non-significant finding is consistent with research by Mikami and colleagues (2015) in which no significant relations were found between childhood ADHD or ADHD in adulthood and the amount of time spent online as an adult. Mikami and colleagues (2015) suggested that time spent on Facebook is often not related to social impairments; rather, it is the quality of online interactions that are impacted by social deficits. The widespread use of Facebook in the majority of emerging adults (Baker & Oswald, 2010; Duggan et al., 2015; Ellison et al., 2007; Pempek et al., 2009), suggests that Facebook is a well-integrated aspect of their social world, regardless of the presence of social impairments.

Next, the frequency of using different Facebook features was examined in relation to level of ADHD symptoms. Support was found for the second hypothesis, with individuals with higher ADHD symptoms using the active features of Facebook more frequently compared to people with lower ADHD symptoms. Furthermore, when looking more in depth at the different types of active Facebook use, ADHD symptoms were also positively correlated with more frequent use of interactive communication features of Facebook, such as posting on other people's walls, commenting on friends' posts, and using private messaging. Both of these findings are consistent with research by Levine and colleagues (2013), who found that symptoms of impulsivity and distractibility were related to spending more time engaging in conversations on social media. This finding is contrary to research examining other groups with social deficits (e.g., social anxiety, shyness) that tend to suggest these individuals would engage primarily in passive Facebook use (Ryan & Xenos, 2011; Shaw et al., 2015). This finding also suggests higher levels of communication feature use among participants with higher ADHD symptoms is consistent with the social compensation hypothesis, which suggests that people with social deficits are more likely to use these social features as they aim to compensate for poor offline social interactions (Barker, 2009; Forest & Wood, 2012).

ADHD Symptoms and Facebook Motivations

The relation between levels of ADHD symptoms and motivations for using Facebook was also tested. Given that previous research has shown support for the majority of emerging adults using Facebook for entertainment and passing time (Pempek et al., 2009; Smock et al., 2011), these were expected to be highly endorsed motivations by all participants but not specifically related to level of ADHD symptoms. Results were

consistent with this first part of the third hypothesis, with no significant correlation found between ADHD symptoms and habitual pass time or relaxing entertainment motivations. Additionally, these were the second and third highest rated motivations, further supporting that these are important motivating factors in Facebook use of emerging adults.

The second part of the third hypothesis was partially supported. Higher ADHD symptoms were found to be significantly related to companionship motivations, as expected, but not social interaction motivations. Despite both being socially oriented, further examination of these two scales shows that they are rather different. Companionship motivations focus on using Facebook because of loneliness or having no one else to talk to, whereas social interaction motivations focus on keeping in touch with friends and family (Smock et al., 2011). Given that a key aspect of the companionship motive is a lack of offline friendships, it follows that individuals with higher ADHD symptoms, who tend to have overall lower social well-being, may be turning to Facebook to engage in social interactions and form deeper relationships in an environment that does not emphasize their social deficits as heavily as offline social situations. Using social networking sites to seek social companionship has also been indicated in previous research among other groups with social deficits (Barker, 2009). This relation also gives further support for the social compensation hypothesis among individuals with higher ADHD symptoms, which suggests that people with social deficits who use social networking sites for social reasons have improved social outcomes compared to those without social motivations (Wang et al., 2014; Yang & Brown, 2013). It is important to note that social interaction motivations were highly endorsed by all participants;

therefore, despite not being related to higher ADHD symptoms, it is likely that individuals with higher ADHD symptoms are still highly motivated to use Facebook to maintain existing social relationships.

Although not specifically hypothesized, another interesting finding regarding Facebook motivations was that higher ADHD symptoms were correlated with higher levels of the escapism motivation. These motivations tend to focus on using Facebook to avoid people or tasks of everyday offline life (Smock et al., 2011). This finding is likely to be a function of symptoms of ADHD, in which individuals with high levels of impulsivity or inattention regularly log on to Facebook when they are bored or distracted from other tasks. It is important to note that while escapism motivations and habitual pastime motivations appear similar, they are actually different. The habitual pastime motivation centers on spending time on Facebook because of boredom or when there is nothing else to do, whereas escapism has an added layer of wanting to avoid or escape aspects of offline life. The two findings of higher ADHD symptoms being significantly related to higher levels of companionship and higher levels of escapism motivations suggest that people with higher ADHD symptoms are turning to Facebook as an alternative to their offline lives, whether they are trying to improve social relationships or to escape everyday tasks.

Responsiveness of Facebook friends

The fourth hypothesis was that people with lower ADHD symptoms would have similar levels of social skills offline and responsiveness of friends online, whereas people with higher ADHD symptoms would have relatively poor social skills offline but relatively higher levels of responsiveness of Facebook friends (i.e., getting more likes and

comments from friends on their five most recent posts). The present findings did not support the fourth hypothesis, as ADHD symptoms did not moderate the relation between social skills and responsiveness of Facebook friends.

However, on its own, level of ADHD symptoms was a significant predictor of having more responsive Facebook friends. Looking at this finding more in depth, posting photos was found to get the highest number of likes and comments, followed by status updates. Although there was no difference between the type of post made by people with high and low ADHD symptoms in their last five posts, a positive correlation was found between ADHD symptoms and frequency of posting status updates. This is supported by research by Hampton and colleagues (2012), which found that people who posted more status updates reported receiving more emotional support from friends, which the authors suggested was related to a higher level of feedback received from Facebook friends when these posts are made. The frequency of posting is also relevant because people who post more frequently tend to appear in their Facebook friends' newsfeeds more often and as a result may receive more likes and comments on their posts. These findings suggest that people with higher ADHD symptoms receive more likes and comments for two reasons. The first is that they post status updates more frequently, and therefore appear in their friends' newsfeed more frequently, which has been shown to lead to higher responsiveness. The second is that people with higher ADHD symptoms are more likely to post status updates than people with lower ADHD symptoms, and this is a type of post that is likely to get a high number of likes and comments.

This finding is somewhat inconsistent with Mikami and colleagues' (2015) finding that persistent ADHD from childhood was related to less connection and support

in the posts of Facebook friends. These findings may be dissimilar for a number of reasons related to the design of the two studies. Specifically, their sample consisted of women with a childhood diagnosis of ADHD, whereas the present study's sample consisted of men and women with varying levels of current ADHD symptoms, many of them not diagnosed with ADHD. Mikami and colleagues (2015) looked specifically at women who met diagnostic criteria of ADHD, because they expected that social demands placed on women would be higher than for men, and therefore social impairments of ADHD are more impactful in the social interactions of women over men. By looking at both men and women the present study did not tap into the specific social impairments presumed to be experienced by women, however gender was not found to be a significant covariate in the present study. Further, the present study did not require participants to have a formal ADHD diagnosis; therefore, it is possible that Mikami and colleagues' (2015) sample of women had more severe symptomology and as a result more severe social impairments that were then seen in their online social interactions. Additionally, Mikami and colleagues (2015) examined posts made by friends to participants, whereas the present study examined the response of friends to participants' own posting. Having to write a post on another person's wall is a much more intimate form of Facebook interaction than simply liking or commenting on a post that appears in users' newsfeeds. Therefore, it appears that despite both looking at the action of posting, the present study and Mikami and colleagues' (2015) study were likely tapping into different types of interactions on Facebook, with posts made by friends in the latter study requiring more commitment than responding to friends' posts.

Social anxiety was also a significant predictor of responsiveness of Facebook friends, but it was found to predict lower levels of responsiveness. Higher ADHD symptoms and lower social anxiety each predicted higher Facebook friend responsiveness. This is a somewhat surprising finding given the positive correlation that was found between ADHD symptoms and social anxiety. It suggests that the social experiences of people with ADHD are different than those with social anxiety, which supports continuing research on the Facebook usage of individuals with ADHD.

To continue examining this area, a possible future research direction would be to look at participants' Facebook pages or get more specific information about what they are posting to determine if the content of posts is related to responsiveness rather than simply the type of post. Additionally, the present study only required participants to report on things they had posted on their own walls, it would be beneficial to use a similar procedure to examine responsiveness of Facebook friends to material posted by other users on participants' walls or posts by participants on other users' walls.

ADHD, Social Well-being, and Facebook Use

The final goal of the present study was to determine if Facebook usage would influence the social well-being of individuals with higher ADHD symptoms. In the present sample, three aspects of social well-being were examined, social distress, social support, and companionship. Participants with higher ADHD symptoms reported higher levels of social distress in particular, which can also be described as negative social well-being. By comparison, the experience of social support and companionship were not predicted by level of ADHD symptoms. The relation between ADHD symptoms and higher social distress is consistent with previous research which suggests that people with

ADHD experience a higher level of negative social experiences and rejection by their peers (APA, 2013; Barkley, 2006). Given its relation with ADHD symptoms, social distress was used as the outcome variable of social well-being in the analyses for the fifth hypothesis. Results indicated that higher ADHD symptoms predicted higher social distress. Therefore, the study examined several potential moderators in the relation between ADHD symptoms and social distress, including time spent on Facebook; responsiveness of Facebook friends; social interaction, companionship, and escapism motivations; as well as active and interactive communication feature use.

Despite the Facebook use patterns demonstrated by individuals with higher ADHD symptoms being consistent with what previous research has stated predicts better social outcomes (i.e., being engaged in social activities, having social motivations, and having responsive Facebook friends; Burke et al., 2010; Greitemeyer et al., 2014; Hampton et al., 2012; Kuss & Griffiths, 2011; Pempek et al., 2009; Reich, 2010; Valkenburg et al., 2006; Wang et al., 2014; Yang & Brown, 2013), no aspect of Facebook use or motivations for Facebook use acted as a moderating variable between ADHD symptoms and social distress. Therefore, the present study was not able to find full support for the social compensation hypothesis among individuals with higher ADHD symptoms. However, given that many of the Facebook usage patterns of individuals with higher ADHD symptoms are associated with better social outcomes in previous literature, future research should continue to examine support for the social compensation hypothesis among individuals with ADHD symptoms.

The first possible explanation for this finding is that people with higher ADHD symptoms are not actually behaving or interacting in a different manner on Facebook and

therefore still experience rejection and hostility from others during their time interacting on the site. It was suggested here that Facebook would allow individuals with higher ADHD symptoms to perform better socially because the online context has reduced social cues that they are required to attend to, has asynchronous interactions which allow for less impulsivity in social exchanges, and provides an engaging environment which might reduce overall expression of symptoms. However, these factors were not tested in the present study design; therefore, it is possible that the individuals with higher ADHD symptoms were not demonstrating better social skills and having better social interactions online. Future research, could examine these factors as potential reasons why individuals with higher ADHD symptoms do not benefit socially from using Facebook.

The second aspect to consider when interpreting this finding is the high level of passive Facebook use that all participants exhibited. Despite reporting using active social features more frequently than individuals with lower ADHD symptoms, people with higher ADHD symptoms are still spending the majority of their time on Facebook engaging in passive use. Engaging in passive Facebook use is not related to the improved social well-being that exists when people engage in online social interactions (Valkenburg & Peter, 2009). Further, Burke and colleagues (2010) found that engaging in passive Facebook activities is associated with reduced social relationships and increased feelings of loneliness. Therefore, it is possible that people with higher ADHD symptoms are not using the social communication features of Facebook enough to get the full social benefit of these features.

The third potential reason for this finding could be related to the overall pervasiveness of Facebook in the lives of all emerging adults. When online

communication was first established, many individuals were not spending time online. Therefore, there was an opportunity for people with poor social functioning to gain an advantage online, and build new or different relationships from those that they had offline. However, with the large majority of emerging adults now online and using social media sites (Duggan et al., 2015), Facebook has become a component part of their social lives. It is such a well-integrated piece of the social world that there is little difference in social patterns in an online versus offline context.

Further support for why Facebook use may not influence social well-being for individuals with higher ADHD symptoms is due to the high level of social anxiety they reported experiencing on Facebook. Results from the present study indicated that social anxiety was similarly high in online and offline contexts for people with higher ADHD symptoms. This provides more support that social relationships and interactions are similar on Facebook and offline, because Facebook has become such an integrated part of the social lives of emerging adults. Therefore, there is not an opportunity to compensate for poor offline social functioning in an online environment, because there is ultimately little difference between these two contexts, and people with higher ADHD symptoms are experiencing social anxiety and social impairments in both places. Future research could look further into this finding to explore whether social functioning and social skills online and offline are, in fact, similar.

By not fully supporting the social compensation hypothesis, the present findings seem to instead support the rich-get-richer hypothesis, in which online interactions are an avenue for socially skilled individuals to build on their already positive social relationships (Valkenburg & Peter, 2007). However, despite supporting the idea that the

"socially rich" get richer online, the present study did not support the other side to this hypothesis which is that the poor get poorer. Contrary to Mikami and colleagues (2015) finding, the present study did not find maladaptive Facebook use patterns among people with higher ADHD symptoms. Rather, they are using Facebook in a social way and receiving responsive Facebook friends. Therefore, although there seems to be little social benefit to using Facebook for emerging adults with higher ADHD symptoms in the present study, further research is warranted, given that many of the current findings provided some support for the social compensation hypothesis.

Limitations and Future Directions

One limitation of the present study that has been noted as a limitation of multiple Facebook research projects is the method of collecting information about Facebook use. Specifically, previous research (Pempek et al., 2009) has indicated that it is difficult for people to retrospectively estimate their frequency of Facebook use. Therefore, these estimates may be unreliable or inaccurate representations of what people are actually doing. This could be addressed by collecting in-the-moment data on Facebook use by using a diary-type study design. This type of study design could also allow researchers to examine how individuals with ADHD integrate their online and offline social lives. For example, by having participants track offline social interactions in conjunction with their online habits, it could indicate whether people with ADHD turn to online communication and Facebook after specific offline incidents occur (e.g., to escape their daily lives or to seek more positive social interactions).

One of the interesting aspects of this study's methodology was to ask participants to log on to their Facebook pages and answer questions about their most recent posts.

Due to privacy limitations and ethical concerns, the present study did not have access to participants' actual pages or obtain any information about the actual content of the post beyond what type of post was made. Obtaining information about the content of posts would allow future researchers to study the quality of Facebook interactions of people with varying levels of ADHD symptoms. Additionally, it will be valuable to examine the relation between the content of Facebook interactions and motivations for using Facebook. Understanding how various motivations correspond to what individuals are posting and how they use certain features will allow for a better understanding of the reasons why individuals with higher ADHD symptoms may not experience the benefits from Facebook that would be predicted by the social compensation hypothesis.

Given the high frequency of using multiple social media platforms, future research should also examine how individuals with ADHD use different sites (e.g., Twitter, Instagram, Snapchat, etc.). This will allow researchers to better understand the different ways people interact on different sites and how this may be influenced by their motivations for use. Additionally, the features of different sites may have different appeal for people with ADHD symptoms. For example, sites such as Twitter or Snapchat may foster more impulsive posting than other sites. This avenue of research may also allow a comparison of the difference between public and private communication platforms (e.g., Facebook and Instagram versus texting or Snapchat).

Despite the present study measuring and using ADHD symptoms as a variable, only seven participants reported actually being diagnosed with ADHD. The study was designed to not require participants to have a diagnosis because of the presumed distribution of symptoms in the general population. However, results may have been

different if there had been a larger representation of clinical ADHD diagnoses in the sample or greater variability in the ADHD symptoms.

In addition to the lack of participants meeting clinical diagnosis, the majority of participants were university students. Wolf (2001) indicated that individuals with ADHD who attend university are likely higher functioning than those who do not. Perhaps if participants had a wider variety of social functioning levels, a larger impact of Facebook on social well-being may have been found. Future research should examine the Facebook patterns of individuals outside of a university sample.

Another potential limitation of the current study was the use of self-report measures. Previous research has indicated that individuals with ADHD often exhibit a positive illusory bias (Sarno Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007). This bias leads to overly positive self-reports in a range of areas, such as symptomology and social skills, despite functional impairments in these domains. Therefore, the use of self-reports among individuals with ADHD may be somewhat unreliable. However, many of the participants in the current study did not have formal diagnoses of ADHD, which may limit the presence of a positive illusory bias in the present sample. By accessing the Facebook accounts of participants, future research could obtain more objective measures of social performance online. Additionally, the use of a second reporter of symptoms of ADHD, as well as social functioning, may help to temper the influence of this bias seen in self-reports.

Practical and Clinical Implications

The results of the present study have a number of practical and clinical implications for people with ADHD and the individuals who work with them (i.e., parents, teachers,

clinicians). First, it is important to be aware of the significant amount of time that young people spend on Facebook and other social networking sites each day. This is especially important for individuals with ADHD who may be logging on to Facebook as a distraction from other activities. For example, a student with ADHD who has access to Facebook during class or while completing homework may be more easily distracted and more likely to use Facebook instead of paying attention. That being said, the present study did not find evidence of Facebook use negatively affecting the relation between ADHD symptoms and social well-being. Facebook is highly integrated in the social lives of the majority of emerging adults therefore, it is likely not problematic for emerging adults with ADHD to use the site at appropriate times to engage in social interactions.

Second, given the high level of use of Facebook, and fitting with the need for future research to examine the quality of interactions that individuals with ADHD have on Facebook, it would be beneficial for clinicians and parents to help educate children and adolescents with ADHD about proper social behaviour in an online context. This could involve focusing on how impulsive responding may be perceived by others and the potential benefits and consequences of poor social interactions on Facebook. This could be accomplished by adding an online component to existing social skills interventions for people with ADHD, in which the programs would teach social skills for an online environment.

Third, it is important to consider other ways that people with ADHD can compensate and build better social relationships, because they may not benefit from spending more time online. This would be important to consider in clinical and therapy interventions, specifically, people with higher ADHD symptoms may benefit from

joining support groups or engaging in social activities with multiple different groups of people.

Conclusions

Overall, people with varying levels of ADHD symptoms tend to use Facebook for similar reasons, such as to keep in touch with others, to relax, for entertainment, and because of habit. However, people with higher ADHD symptoms did show some differences in their Facebook patterns. People with higher ADHD symptoms showed a number of Facebook patterns consistent with positive social outcomes. Specifically, they tend to be more active on Facebook and use interactive communication features more frequently than those with lower ADHD symptoms. Higher ADHD symptoms also predicted having more responsive Facebook friends, which can be perceived as receiving support and validation from their peers. This may be due to a higher frequency of posting and posting of material that is conducive to receiving likes and comments by individuals with higher ADHD symptoms. Additionally, those who reported having higher ADHD symptoms also reported being more motivated to use Facebook for companionship and escapism motivations, suggesting they are turning to the Internet to get something different from offline interactions. Finally, despite using Facebook in a social way and having responsive Facebook friends, the present findings suggest there is little social benefit to using Facebook for emerging adults with higher ADHD symptoms. However, it is still unclear if there is any harm to frequently using Facebook. Given that Facebook is an integrated component of the social lives of the majority of emerging adults, it is important for this to be examined in future research.

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APPENDICES

Appendix A

Summary of Measures

Measure	Study Variable	# of items	Analysis
Background Information	Background Information	10	CV
National Institute of Health Toolbox – Adult Social Relationship Scales (NIH-ASRS)	Social well-being	40	DV
Caterino Scale	ADHD symptoms	27	IV, MO
Facebook Activity Measure (FAME)	Facebook activity	30	IV, MO
Facebook Motivation Scale	Facebook motives	30	IV, MO
Facebook Posts	Responsiveness of Facebook friends	5	IV, DV, MO
Facebook – Social Interaction Anxiety Scale (F-SIAS)	Social anxiety on Facebook	7	
Facebook and Extreme Relationships Questionnaire	Dating or bullying on Facebook	2	
Social Interaction Anxiety Scale – 6 (SIAS-6)	Social anxiety	6	CV
Abridged Social Skills Inventory (Abridged SSI)	Social skills	24	CV, DV
Social Desirability Scale – 17 (SDS-17)	Social desirability	16	CV
Substance Use Measure	Substance use	3	CV
Final Questions	Participants impressions of the study		

Note: IV=Independent Variable, DV=Dependent Variable, MO=Moderator, CV=Covariate

Appendix B

Background Information

Please answer the following questions about yourself by selecting the appropriate choice and/or using the space provided.

1. Gender _____

2. Age _____ Years

3. Ethnicity
   - □ Aboriginal (e.g., Inuit, Metis, North American Indian)
   - □ Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)
   - □ Black (e.g., African, Haitian, Jamaican, Somali)
   - □ Asian (e.g., Chinese, Filipino, Korean, Japanese)
   - □ White (Caucasian)
   - □ Latin American
   - □ Other (*please specify)*_____

For participants recruited through method 1

4. Year of studies □ 1 □ 2 □ 3 □ 4 □ 5 or more

   Program of study _____

For participants recruited through method 2

4. Highest level of education completed:
   - □ No certificate, diploma or degree
   - □ High School certificate or equivalent
   - □ Apprenticeship/Trades certificate
   - □ College/CEGEP certificate or diploma
   - □ University certificate or diploma
   - □ University degree
   - □ Post-Bachelor's degree (e.g., Master's, PhD)
   - □ Other (*please specify)*_____

5. Have you ever been diagnosed with a psychological disorder(s)?
   - □ Yes □ No

   If yes, please check all that apply:
   - □ Attention Deficit-Hyperactivity Disorder (ADD/ADHD)

□ Bipolar Disorder
□ Generalized Anxiety Disorder (GAD)
□ Major Depression or Depression
□ Math Disability or Math Disorder
□ Obsessive Compulsive Disorder (OCD)
□ Oppositional Defiant Disorder (ODD)
□ Reading Disability or Reading Disorder (Dyslexia)
□ Separation Anxiety Disorder
□ Social Anxiety
□ Specific Phobia
□ Substance Abuse Disorder
□ Other (*please specify)*_____

Please identify who diagnosed you with this psychological disorder.
□ Psychiatrist
□ Psychologist
□ Physician
□ Teacher
□ Other (*please specify)*_____

Approximately how old were you when this began? _____

If students selected ADHD diagnosis then this question will pop out.
When answering this question think about your ADHD diagnosis.
A. Have you ever taken medication for your ADHD? Please describe.
B. Have you ever participated in therapy for your ADHD? Please describe.
When answering questions 6 and 7 answer about any disorders other than ADHD

6. Have you ever taken medication for a psychological disorder(s)?
□ I do not have a psychological disorder
□ I have a psychological disorder but am not taking medication
□ Yes, I am currently taking medication for a psychological disorder
□ Yes, I took medication for a psychological disorder in the past

Approximately how long did you take medication for? _____

7. Have you ever participated in therapy for a psychological disorder(s)?
□ I do not have a psychological disorder
□ I have a psychological disorder but am not participating in therapy
□ I am participating in therapy with a psychologist for a psychological disorder
□ I am participating in therapy with a social worker for a psychological disorder

□ I am participating in therapy with another professional for a psychological disorder
□ I am participating in group therapy for a psychological disorder
□ I am participating in another type of therapy not previously mentioned for a psychological disorder
□ I participated in therapy for a psychological disorder in the past

Approximately how long did you participate in therapy for? _____

8. Have you ever been diagnosed with a physical disability?
□ Yes □ No

If yes, please specify: _____

9. Do you use educational resources (such as adaptive technology, alternative exam accommodations, or other resources through Student Disability Services)?
□ Yes □ No

If yes, please specify: _____

10. How much time do you spend online on average per day?
Hours _____ Minutes _____

11. How much time do you spend on each social networking site on average per day? (Note: If you do not use the site please enter a 0)

Facebook	Hours _____	Minutes _____
Instagram	Hours _____	Minutes _____
Twitter	Hours _____	Minutes _____
Vine	Hours _____	Minutes _____
Pinterest	Hours _____	Minutes _____
Tumblr	Hours _____	Minutes _____
Snapchat	Hours _____	Minutes _____
LinkedIn	Hours _____	Minutes _____
YouTube	Hours _____	Minutes _____
BuzzFeed	Hours _____	Minutes _____
Reddit	Hours _____	Minutes _____
Google+	Hours _____	Minutes _____
Skype	Hours _____	Minutes _____
WhatsApp	Hours _____	Minutes _____

26. How much time do you spend on other social networking sites (i.e., Internet sites where you communicate with other people online) on average per day?

□ I do not use any other social networking sites other than the ones stated above.

Site_____ Hours _____ Minutes _____
Site_____ Hours _____ Minutes _____
Site_____ Hours _____ Minutes _____
Site_____ Hours _____ Minutes _____
Site_____ Hours _____ Minutes _____
Site_____ Hours _____ Minutes _____

Appendix C

Facebook Posts

Instructions: For the next set of questions please log on to your Facebook and go to your profile page. Answer based on the 5 most recent posts you have made that appear on your wall/timeline. This can include status updates, articles, links, photos, or videos.

Post 1
Looking at your most recent post:
What is the date and time of your post: _____

What did you post:

□ Status update
□ Article
□ Photo
□ Video
□ Other (*please specify)*_____

# of likes received: _____
of "loves" received: _____
of "hahas" received: _____
of "wows" received: _____
of "sads" received: _____
of "angrys" received: _____

of comments received: _____

Post 2
Looking at your second most recent post:
What is the date and time of your post: _____

What did you post:

□ Status update
□ Article
□ Photo
□ Video
□ Other (*please specify)*_____

# of likes received: _____
of "loves" received: _____

of “hahas” received: _____
of “wows” received: _____
of “sads” received: _____
of “angrys” received: _____

of comments received: _____

Post 3

Looking at your third most recent post:
What is the date and time of your post: _____

What did you post:

□ Status update
□ Article
□ Photo
□ Video
□ Other (*please specify)*_____

# of likes received: _____
of “loves” received: _____
of “hahas” received: _____
of “wows” received: _____
of “sads” received: _____
of “angrys” received: _____

of comments received: _____

Post 4

Looking at your fourth most recent post:
What is the date and time of your post: _____

What did you post:

□ Status update
□ Article
□ Photo
□ Video
□ Other (*please specify)*_____

# of likes received: _____
of “loves” received: _____

of “hahas” received: _____
of “wows” received: _____
of “sads” received: _____
of “angrys” received: _____

of comments received: _____

Post 5
Looking at your fifth most recent post:
What is the date and time of your post: _____

What did you post:

□ Status update
□ Article
□ Photo
□ Video
□ Other (*please specify)*_____

# of likes received: _____
of “loves” received: _____
of “hahas” received: _____
of “wows” received: _____
of “sads” received: _____
of “angrys” received: _____

of comments received: _____

Appendix D

Facebook and Extreme Relationships Questionnaire

Items to be answered on 5-point Likert scale of 1=Not at all, 2=A little, 3=Somewhat, 4=Often, 5=All the time

Instructions: Please indicate your response to each of the following statements.

1. To what degree do you use Facebook to pursue romantic relationships or communicate with romantic partners?
2. To what degree do you experience negative interactions on Facebook (e.g., bullying)?

VITA AUCTORIS

NAME:	Shanna Deasley
PLACE OF BIRTH:	Markham, ON
YEAR OF BIRTH:	1991
EDUCATION:	Unionville High School, Unionville, ON, 2009
	University of Guelph, B.A., Guelph, ON, 2014
	University of Windsor, M.A., Windsor, ON, 2016