Social Media Use and Emotional Experiences During Adolescence: Predictors and Results

Across Cultural Contexts

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Abstract

Social Media Use and Emotional Experiences During Adolescence: Predictors and Results Across Cultural Contexts

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A five-week longitudinal study conducted with a cross-national (Canada/Colombia) community-based sample of 173 adolescents was used for a series of three studies. For **Study 1**, four new measures were developed to create and evaluate measures of anxiety and depressed affect related to social media (SM) use. Specifically, <u>social media anxiety</u>, <u>fear of missing out (FOMO)</u>, <u>social media depressed affect</u> (mood), and <u>social media depressed affect related specifically to concerns about identity</u> (cognition). For **Study 2**, these newly created measures were used to assess intersections between SM use, specifically Facebook, and anxiety and depressed affect. **Study 3** used a process-oriented approach to assess how anxiety directs Facebook use and motives for using Facebook. All of the studies assessed for cross-cultural comparisons. For **Study 1**, confirmatory factor analyses revealed (a) strong support for our a-priori four-factor measurement model, (b) no more than moderate levels of association between the newly developed measures of anxiety and depressed affect, and (c) clear evidence of invariance across the two cultural groups. Gender differences were found for general and social anxiety with scores being more highly elevated for girls. SM-related depressed affect was also higher for girls. For **Study 2**, findings indicated that general anxiety, social anxiety, Facebook-specific anxiety, and FOMO deterred Canadian adolescents from having Facebook but not for Colombians. Anxiety and depressed affect were predictive of each other over time and across contexts, particularly Facebook anxiety, which was a positive predictor of all negative outcomes

related to anxiety and mood. Specifically, Facebook anxiety was a predictor of anxiety (general, social, and FOMO) and depressed affect (general, Facebook-specific, and Facebook self-image problems). Interactions between anxiety and depressed affect lead to increases in anxiety and depressed affect in both places. For **Study 3**, Facebook anxiety and FOMO were strongly associated with motivations for using Facebook (connection, entertainment, shared identity, and lurking) cross-culturally with stronger effects for North American adolescents. Cultural differences in motives for Facebook use were consistent with collectivistic and individualistic values. These findings point to the utility of these measures for promoting research on the intersection between SM use and forms of internalizing problems.

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Contribution of authors

This dissertation consists of three manuscripts and a general introduction adapted from a fourth manuscript.

General Introduction (See Chapter 1)
Wood, M. A., Bukowski, W. M., & Lis, E. (2015). The digital self: How social media serves as a setting that shapes youth's emotional experiences. *Adolescent Research Review. 1*(2). 1-11. doi: 10.1007/s40894-015-0014-8

Study 1 (See Chapter 2)
Wood, M.A., Panarello, B., Saldarriaga, L. M., Castellanos, M. & Bukowski, W. M. (under review). Social Media and Adolescent Mental Health: A Scale for Measuring Social-Media Related Depression and Anxiety.

Study 2 (See Chapter 3)
Wood, M.A., Panarello, B., Saldarriaga, L. M., Castellanos, M. & Bukowski, W. M. (under review). Anxiety Determines Motives for Social Media Use in Early Adolescence: Facebook Motives Among Community Samples of Canadian and Colombian Youth.

Study 3 (See Chapter 4)
Wood, M.A., Panarello, B., Saldarriaga, L. M., Castellanos, M. & Bukowski, W. M. (under review). Social Media as a Developmental Context for Adolescent Well-Being: Effects of Facebook Depressed Affect and Anxiety.

Relative contributions

For the General Introduction: MW conceived of the review, conducted the literature searches and reviews, and wrote the initial manuscript as well as the adapted version of the paper; **WB** participated in the preparation of the manuscript; **EL** participated in the preparation of the manuscript.

For Studies 1, 2, and 3: MW conceived of the study, participated in its design and coordination, was involved in the acquisition of the data, performed the statistical analyses and interpreted the data, and drafted the manuscript; **BP** participated in the design and coordination of the study and was involved in the acquisition of the data as well as the preparation of the manuscript; **LS** participated in the acquisition and organization of the data and acted as a liaison with the schools

in Colombia; **MC** participated in the acquisition and organization of the data and acted as a liaison with the schools in Colombia; **WB** conceived of the study, participated in its design and coordination, performed the statistical analyses and interpreted the data, and drafted the manuscript. All authors approved the final manuscripts.

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Chapter 1

General Introduction

The existing literature on peer relationships indicates that friendships with age mates are crucial for the psychosocial development and general well-being of youth (e.g., Brown & Larson, 2009; La Greca & Harrison, 2005; Rubin, Bukowski, & Bowker, 2015; Wood, Bukowski, & Santo, 2017). Technology and computer-mediated communication (CMC) is ubiquitous, particularly for youth and particularly as a tool for socialization (Eleuteri, Saladino, & Verrastro, 2017; Lenhart, Purcell, Smith, & Zickuhr, 2010; Pew Research Centre, 2018; Twenge, 2017; Reich, Subrahmanyam, & Espinoza, 2012; Steeves, 2014). As observed by Barth (2015), adolescents who have grown up in a world of constant online communication cannot imagine the upbringing of most older persons who grew up without it. This constant communication is primarily maintained via (1) the Internet, whether on social networking sites (SNS), such as Facebook, news update sites such as Twitter, and media sharing sites such as Instagram, and (2) cellular phones, in the form of text messaging and instantaneous picture sharing. The many different forms that this communication can take are often considered under the umbrella term of "social media" (SM) or "new media" (Twenge, 2017; Von Muhlen & Ohno-Machado, 2012) and these have been identified as an important developmental context for youth today (Underwood, Brown, & Ehrenreich, 2018). Higher levels of anxiety and depression are experienced in adolescent and young adult populations of SNS users compared to non-users of SNS (Khodarahimi & Fathi, 2017). Adolescents report that their affective experiences vary depending on the SM platform they are using (Weinstein, 2018). The association between SM use and emotional experiences is critical to understand.

The objective of the current thesis is to illustrate the importance of both friendship and SM in the lives of youth, particularly early to middle adolescents (between ages of 13 and 17), and the impact that these factors have on their emotional well-being at this time of heightened sensitivity towards social influences (Blakemore & Mills, 2014) and rapid development (World Health Organization, 2017). A general decrease in one's life satisfaction occurs between the ages of 11 and 16 years (Goldbeck, Schmitz, Besier, Herschbach, & Heinrich, 2007), indicating the importance of researching emotional well-being in this age group. Adolescence is also a period where physical aggression decreases, and relational victimization becomes more complex (Crick, Nelson, Morales, et al., 2001). SNS arguably provide a domain where youth can experience aggression and bullying in an online context (Dredge, Gleeson, & de la Piedad Garcia, 2014) as well as rejection (Ophir, Asterhan, & Schwarz, 2019). Of course, social media experience can be neither entirely positive or negative (Weinstein, 2018) and can be expected to vary depending upon multiple personal and contextual factors. The general goal of this thesis is to show that SM may serve as a setting which plays a role in shaping emotional development in young individuals with (1) varying predispositions (e.g., for anxiety, depressed mood) and (2) from different cultural backgrounds.

The Importance of Social Relationships for Youth

Social relationships with peers during youth have long been recognized as complex multidimensional constructs with diverse qualities (Bukowski & Hoza, 1989; Wood et al., 2017). Peer relationships take many forms and occur at different levels of social complexity, specifically the group and the dyad. Dyadic peer relationships are reciprocal bonds between youth, which differ from relationships with other peers with whom they may interact on a daily basis but not necessarily form close connections with (e.g., at school). Although the relationships

of younger, preschool aged children tend to be characterized by play, preadolescents spend more time with their friends, increase in the amount of time spent in conversation, and base their interactions on liking and disliking of others (Bukowski, Buhrmester, & Underwood, 2011). During adolescence, friendships with age mates become more salient and increasingly complex and are typically characterized by greater similarity to their friends and the importance of social status (Brown & Larson, 2009) and sensitivity to social influences increases (Blakemore & Mills, 2014). It is well known that friendships are of extraordinary importance to the psychosocial development of youth, especially for the overall well-being of preadolescents (i.e., school-age children) and adolescents. Positive adjustment during adolescence is influenced by the possession of broad social skills and the social acceptance one acquires, such as status and power (Brown & Larson, 2009). These findings highlight the importance of social circles and the opportunities for learning and positive friendship provisions that are experienced at different periods of development.

In recent years, youth have been increasingly connected to others via SM (Twenge, 2017), particularly social networking sites (SNS). Online experiences largely reflect offline experiences for adolescents (Yau & Reich, 2019) but that effects are not identical across individuals, benefitting some and harming others (George & Odgers, 2015). Although SM may provide a means of staying in touch with friends, it is also presumably difficult to control the information provided to one's friends and with their peers in general. On SM, adolescents are exposed to more people and stimuli than they can possibly be in person. As such, adolescents can create a "digital self" in this domain (Wagner, Lipson, Sandy, & Eisenberg, 2014), which often differs from their offline persona. Given the importance of relationships to youth, it is essential to examine the impact that SM has on young people during their development.

Social Media Use by Youth

Usage and statistics. SM is an important tool for the maintenance of social connection. Research with college students indicates that social need is the greatest reason for SM use (Wang, Tchernev, & Solloway, 2012). Adolescents and even preadolescents are known to be frequent users of SM. A Canadian national survey of 5,436 students in grades 4 through 11 charted the use of technology amongst early adolescents (Steeves, 2014). Unsurprisingly, the results of this survey indicated that youth are more attached than ever to their portable electronic devices, with 39% of students sleeping with their cellular phones (Steeves, 2014). Similarly, high school students report spending anywhere from 1-3 hours (44.44%) to 13-23 hours (16.67%) per day on their electronic devices, predominantly on their cell phones (Moulin & Chung, 2017). As such, youth are connected to their social relationships at all times. Adolescents predominantly text message with either their romantic partners or their peers and the content of those messages are generally neutral or positive (Underwood, Ehrenreich, More, Solis, & Brinkley, 2015). Steeves (2014) reported that the primary means of accessing the Internet is with cell phones, with few differences between gender (see also Gross, 2004). The percentage of youth in grade 4 possessing a cell phone is 24% while this number increases to 85% by grade 11. Similarly, Twenge (2017) notes that youth essentially spend the entirety of their leisure time on new media. This data indicates the near universality of SM use among youth and the large proportion of time that is spent engaging with SM and peers.

Facebook remains a highly popular SNS for youth despite the availability and popularity of several forms of SM (Oberst, Wegmann, Stodt, Brand, & Chamarro, 2017). Facebook is used

by 57% of young Canadians, second only to YouTube (75%) (Steeves, 2014). The Pew Research Centre (2018) recently reported similar results in American populations of youth, observing that 51% of adolescents aged 13 to 17 use Facebook and 85% use YouTube. Additionally, 72% of adolescents use Instagram and 69% use Snapchat in the United States (Pew Research Centre, 2018).

Facebook is a primary social networking platform for those over the age of 13 (Aydin, 2012) and hosts billions of accounts worldwide (Facebook, 2019; Kross, Verduyn, Demiralp, et al., 2013). Facebook is both similar and dissimilar to other forms of SM. One important distinction is the provision of access to "synchronous" versus "asynchronous" information. Facebook is an asynchronous SNS where videos and photos remain visible over time. Synchronous platforms, such as Snapchat, provide access to videos and photos that happen in real-time and then disappear. Facebook has recently incorporated features similar to those of "synchronous" platforms (e.g., "stories") and Snapchat has added features of "asynchronous" platforms (e.g., messages with friends remain visible). Despite these additions, significant differences remain. For instance, only personal conversations with others can be accessed on Snapchat, which is not the case with Facebook at this time.

Aside from Facebook and Snapchat, other forms of SM, such as YouTube and Instagram, remain popular amongst youth. Although YouTube is the most widely used, it is arguably the most dissimilar to Facebook in that it is used solely for watching and commenting on videos, which are typically posted by strangers. The SM most similar to Facebook is Instagram, given that it functions to host photos, videos, and comments from "friends". However, Instagram currently offers significantly less personal information than does Facebook as its main function is photo sharing, whereas photo sharing is only one aspect of Facebook. As such, Facebook

provides access to an increasing volume of more highly personalized and diverse stimuli than is available through other SM technology, making it one of the richest sources of social information.

Facebook use increases steadily from childhood to adolescence. The Steeves (2014) national survey demonstrated a substantial increase in SM use (i.e., 54%) from grade 4 to grade 11, suggesting that social connection is of greater importance to adolescents than children. When it comes to Facebook, 67% of those in grade 7 and 95% of those in grade 11 have an account. Additionally, a third of students in grades 4 through 6, who are below Facebook's required age of 13 years, are users of the site. Valkenburg and Peter (2011) reported that online communication is so popular amongst adolescents that this age group far outnumbers adults in terms of instant messaging and SNS use. Facebook also puts adolescents in contact with more people than they would typically see in person (Reich et al., 2012). Similarly, time spent on Facebook is greater for adolescents than for adults (Christofides, Muise, & Desmarais, 2011). Thus, adolescents are the most active users of SNSs like Facebook although their use is less likely to be supervised by adults compared to children's use (Steeves, 2014). Given the ubiquity of SM among adolescents, the effects of engaging with these technologies are imperative to consider.

Positive effects of SM on youth. Although not the focus of this dissertation, it is important to acknowledge the positive consequences of engagement with SM for youth.

Adolescents themselves describe their SM experiences as positive overall (Weinstein, 2018). The enhancement of social contact, independence, communication (Ito, Horst, & Bittani, et al., 2008) and feelings of being emotionally connected with others (Reich, 2010) have all been reported. Preadolescents and adolescents interact online predominantly to remain in contact with

their existing friends (Creasy, 2013; Pempek, Yermolayeva, & Calvert, 2009; Valkenburg & Peter, 2007a) and tend to feel closer to their existing friends when communicating online (Valkenburg and Peter, 2007a). Adolescents are motivated to use online communication for the purposes of companionship (Gross, Juvonen, & Gable, 2002) and relationship maintenance (Jordán-Conde, Mennecke & Townsend, 2014).

In line with adolescent perceptions, online communication has been found to enhance friendship formation and quality (Valkenburg & Peter, 2011). The "Internet enhanced self-disclosure hypothesis" posits that increased self-disclosure on the part of adolescents results in increased social connectedness and well-being (Valkenburg & Peter, 2009b). This claim was supported by research indicating that instant messaging increases friendship quality for adolescents due to intimate online self-disclosure (Valkenburg & Peter, 2009a). One study investigated the association between perceived friendship quality, social anxiety, depression, and Internet usage over a one-year period (Selfhout, Branje, Delsing, ter Bogt, & Meeus, 2009). This study focused on browsing the Internet and instant messaging. The results of this study suggest that the impact of Internet usage on young people is manifested differently for adolescents depending on whether they believe that they possess high or low quality friendships. Specifically, youth who report having high quality friendships are not affected either positively or negatively by their Internet usage, whereas for adolescents with low perceived friendship quality, more time spent browsing the Internet predicts increased depression and anxiety while more instant messaging is associated with lower levels of depression. Although these results were not positive per se, they indicate that negative effects of social media may be limited to at-risk adolescents.

Instant messaging can also contribute to the well-being of distressed adolescents by providing an outlet for their emotions and subsequently contributing to emotional relief (Dolev-Cohen & Barak, 2013). For adolescents, sharing private Facebook interactions predicts feelings of social support over time, which lead to decreases in depressed affect for girls (Frison, Bastin, Bijttebier, & Eggermont, 2018). Self-reported levels of loneliness are lower and social adjustment is higher for late adolescents who use Facebook in order to maintain relationships while transitioning to college (Yang & Brown, 2013) and college students' loneliness decreases with increased Facebook use (Lou, Yan, Nickerson, & McMorris, 2012).

Despite these strong ties to Internet communication, Kearney (2013) reported that adolescents do not perceive their interactions on Facebook as providing the same level of friendship quality as the relations they experience face-to-face, indicating that in-person communication is not threatened by SNS use. Clearly, using the Internet for communication purposes has numerous benefits for the emotional well-being of youth.

Aside from the social and emotional benefits, the potential educational benefits of SM should not be forgotten. Public health organizations have published data on successful use of SM as a way of reaching their target populations (e.g. Kornfield, Smith, Szczypka, Vera, & Emery, 2015). Particularly for younger children, there is evidence that "safe and secure online communication" can teach understanding of and positive attitudes towards other cultures and foster learning about the world and multiculturalism (Hou, Komlodi, Lutters, et al., 2015).

Negative effects of SM on youth. Data regarding the negative effects of SM use are accumulating, especially regarding the effects of negative experiences with others on SM. Researchers have argued that Facebook is a platform where negative interactions between adolescents and their peers are likely to occur (Rice, Petering, Rhodes, et al., 2015), especially

for middle adolescents (Frison, Subrahmanyam, & Eggermont, 2016). The literature on the risks

and consequences of activities such as "sexting" (Ahern & Mechling, 2013) and cyberbullying

(Gini & Espelage, 2014) is unfortunately plentiful. A recent review argues that adolescents are at

higher risk than other populations for a host of negative consequences such as emotional and

health problems due to SM use (Guinta, 2018). Young individuals likely experience problems

such as viewing inappropriate content and bullying while using SM due to susceptibility to

pressure from peers and limited self-regulation abilities (O'Keeffe & Clarke-Pearson, 2011).

Adolescents report negative relational experiences while using SNS, such as online meanness

and bullying ("cyberbullying") (52%), unwanted contact (23%), unintentional disclosure (17%),

and misunderstandings (7%) (Christofides, Muise, & Desmarais, 2012). Scott and Woods (2019)

report that the fear of missing out (FOMO) related to SM amongst adolescents is so strong that it

disrupts their sleep. When engaging with SM, adolescents are more likely to add people to

Facebook who they do not know or like than are adults (Christofides et al., 2011) and are more

likely to post "sexy" photos of themselves on SNS (van Oosten, de Vries, & Peter, 2018). This

suggests that adolescents may put themselves at greater risk when using SM as they are more

willing to engage with others in a careless fashion.

For adolescents, negative emotional states such as depression and anxiety are evoked, and

lower overall life satisfaction reported due to social comparisons with others (e.g., Calancie,

Ewing, Narducci, Horgan, & Khalid-Khan, 2017; Frison & Eggermont, 2016a). This is

particularly true for adolescents who deem their social environments to have in-group

competitiveness (Charoensukmongkol, 2018). Similarly, Calancie and colleagues (2017)

conducted focus groups with eight adolescents with anxiety disorder diagnoses and reported that

these individuals frequently compared themselves to their peers on Facebook, which served to

increase their anxiety. Within clinical populations of adolescents, those with higher anxiety tend to use Facebook more, have more Facebook friends, and engage in more repetitive SM behaviours (Muzaffar, Brito, Fogel, et al., 2018). Thus, the relation between SM use and anxiety may be self-perpetuating. Interestingly, one study found that individuals (adolescents to young adults) who experienced anxiety when not checking Facebook or their text messages has greater symptoms of depression (Rosen, Whaling, Rab, Carrier, & Cheever, 2013). This finding suggests that anxiety and depressed mood are inextricably linked for those using SM.

Research on the negative consequences of SM use has also focused on depressed affect. This is particularly important to investigate during adolescence given that depressive symptoms tend to increase during this period (Angold, Erkanli, Silberg, Eaves, & Costello, 2002). Researchers have described a phenomenon called "Facebook depression". "Facebook depression" describes a situation where individuals become depressed due to Facebook use (Jelenchick, Eickhoff, & Moreno, 2013). Individuals may also be rewarded with attention from close others when they post depressive status updates and, as such, individuals' online personas begin to appear to be depressed even when the individual is not (Moreno, Jelenchick, Egan, et al., 2011). It has been shown that, for college students, approximately one third express mild depressive symptom references on Facebook (Moreno et al., 2011). Therefore, it is important to measure actual depressed affect that an individual is experiencing rather than the depressive content they post. In terms of depressive symptoms as actual subjective states, Facebook use has been shown to have a negative impact on the life satisfaction of college-level students, such that the more they use Facebook, the lonelier they become over time (Kross et al., 2013). For adolescents, older adolescent girls with symptoms of depression have been shown to use SNSs more (Oberst et al., 2017). Jelenchick and colleagues (2013) reported that there is no association

between depression and Facebook use for older adolescents. The conflicting results within the literature is evident.

There may be many routes by which SM contributes to depressed affect. Social comparisons may contribute to the relation between SM and depressed mood. For university-level students, those spending more time on Facebook believe that others are happier than they are (Chou & Edge, 2012). In adolescents, young adults, and adults with clinical disorders, major depression can be predicted by efforts towards impression management (Rosen et al., 2013). Depressed affect may also be impacted by negative interactions with others. Among young adult Facebook users, negative experiences such as misunderstandings or meanness predict depressive symptoms (Rosenthal, Buka, Marshall, Carey, & Clark, 2016). Similarly, adolescents and young adults with problematic Facebook use (PFU) fare worse on measures of positive mental health such as self-worth (Marino, Hirst, Murray, Vieno, & Spada, 2018) and psychological distress (Marino, Gini, Vieno, & Spada, 2018). Another study demonstrated that adolescent high school users of Facebook who use the platform heavily tend to experience greater loneliness whereas those who are low to moderate users have decreased loneliness over time (Wang, Frison, Eggermont, & Vandenbosch, 2018). These results cumulatively suggest an effect of severity on outcomes.

However, Morgan and Cotten (2003) reported that the impact of Internet use on depression differs depending on the activity that one engages in. For example, college students who use the Internet for communication via instant messaging and chat rooms experience a decrease in depressive symptoms, whereas depressive symptoms increase when the Internet is used for other purposes (e.g., shopping, research, and playing games). Indeed, research conducted with adolescents and adults has indicated that using computers for work, playing

video games, using instant messaging and chatting, using e-mail, and watching television do not predict significant clinical symptoms of depression (Rosen et al., 2013). However, one study found that feelings of depression were positively related to instant messaging but not to e-mail or chat use for adolescents aged 12-15 (van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008). The discrepancies in findings may be due to potential mediators, moderators, and differences across the lifespan, obscuring the relation between SM and emotional well-being. Taken together, these findings highlight the importance of accounting for particular age groups and specifying forms of SM of interest.

Some researchers argue that adolescents are cautious when using SNSs and thus their safety is not at high risk (Reich et al., 2012), whereas others report that adolescent caution regarding the disclosure of personal information on Facebook varies depending upon individual and social differences (Liu, Ang, & Lwin, 2013). Late adolescents have reported that their personal information is safe on Facebook and are not concerned that their disclosure on Facebook could threaten them in the future (Jordán-Conde et al., 2014), which may suggest that youth may not pause to consider the long-term implications of using SNSs. One study found that those aged 11-15 years are more likely to request the withdrawal of unfavourable photos of themselves on Facebook while 16-21-year-olds will simply remove their identifying information (Moreau, Roustit, Chauchard, & Chabrol, 2012). The authors interpret this finding to mean that younger preadolescents, who have not yet developed a secure sense of identity, cannot tolerate seeing unflattering pictures of themselves made public, whereas adolescents, who have a more secure sense of identity, can tolerate knowing that such pictures are public as long as they are not explicitly identified in them. Ultimately, the extent to which posting personal information online is detrimental for adolescents remains unclear.

Identity formation and self-presentation. Sullivan (1953), a prominent interpersonal relationships theorist, believed that preadolescence is a crucial time for personality development of the individual and is also a time when youth begin to care for the needs of others as opposed to simply thinking of themselves. Similarly, Erikson (1963; 1959) proposed that adolescence is the developmental period where identity becomes the primary concern. It is also widely understood within the developmental literature that adolescence is a period when youth aim to foster their own autonomy via their identity creation, sexuality, and interpersonal intimacy (e.g., Valkenburg & Peter, 2011).

The digital arena is a sphere in which adolescents can experiment with their self-presentations (Wagner et al., 2014), seek approval from others (Calancie et al., 2017), and manage their interpersonal relationships with peers (Glover & Fritsch, 2018). Adolescents, especially girls, spend time making themselves appear attractive and interesting on Facebook and Instagram to the point where they ask their friends for help in order to maintain these norms (Yau & Reich, 2019). Among college students, the literature demonstrates that self-presentation strategies are associated with emotional well-being such that those with elevated social anxiety and low self-esteem are related to inauthentic presentations of the self on Facebook (see Twomey & O'Reilly, 2017 for a review).

Youth develop both self-presentation and self-disclosure skills in order to cultivate their personal autonomy (Valkenburg & Peter, 2011). Facebook is a place where late adolescents experiment with their identity as they are not yet fixed (Eleuteri et al., 2017; Jordán-Conde et al., 2014). For example, both younger and older adolescents experiment with their identity on the Internet by modifying their self-presentation through instant messaging and chatting (Valkenburg, Schouten, & Peter, 2005) and older adolescents tend to experiment with the

expression of sexual content as well as explicit language within chat rooms with peers (Subrahmanyam, Smahel, & Greenfield, 2006). Modifying self-presentation can also impact mood. College students feel greater subjective well-being when they present themselves positively on Facebook (Kim & Lee, 2011), and present themselves as having better emotional well-being and greater positive affect on Facebook than they do in their actual lives in order to enhance their self-presentation (Qiu, Lin, Leung, & Tov, 2012). As such, youth can receive feedback from others and integrate this feedback into their self-identity (Valkenburg & Peter, 2011). Valkenburg and Peter (2011) argue that online communication allows for the controllability of self-presentation and disclosure that results in a sense of security, which is not necessarily possible with face-to-face interactions. Moreover, they go on to state that the Internet provides: (1) anonymity of one's identity (e.g., in chat rooms) and audiovisual anonymity (i.e., reduced visual or auditory cues that may be overwhelming), (2) asynchronicity (e.g., one can change what they were going to write), and (3) accessibility (e.g., large opportunities to share information). All of these factors are particularly important for preadolescents and adolescents, who may be especially self-conscious at this stage in their lives.

The Emotional Experience of Anxiety by Youth

One aspect of well-being that has been increasingly researched within this literature is anxiety. Few studies have been conducted on the topic of SM usage and anxiety in community samples of adolescents, with existing data largely coming from older populations and individuals with anxiety disorder diagnoses. For instance, adolescents with anxiety disorders tend to feel more anxiety when using Facebook due to comparisons they make with their peers (Calancie et al., 2017). Although this research is closely related to that of the current dissertation, the sample

size was small (8 participants), a clinical population was sampled, and adolescents suffered from varying types of anxiety (e.g., generalized anxiety disorder, specific phobias).

There is mixed evidence as to whether or not anxiety impacts SNS use/engagement. Some evidence exists that adolescents who are socially anxious are as likely as their peers to have a Facebook account and their social anxiety does not appear to impact how much time they spend on SNS or the way in which they use it (Creasy, 2013). Conversely, research has indicated that adolescent boys with elevated anxiety tend to be more involved with SNS (Oberst et al., 2017). These results are supported by research indicating that social anxiety does not impact computer usage and friendship quality for adolescent girls but that socially anxious boys using computers to communicate with peers reported better friendship quality (Desjarlais & Willoughby, 2010). Additionally, as previously mentioned, adolescents with clinical levels of anxiety tend to be more engaged with Facebook and use the platform in a repetitive fashion (Muzaffar et al., 2018). Also, adolescents experiencing emotional loneliness are more likely to engage in Facebook use (Wang et al., 2018). Thus, SNS use and engagement in the context of anxiety may depend on the severity of the anxiety and gender. However, as noted, the data in adolescent populations is limited.

Amongst older populations, researchers have found that socially anxious university students use the Internet in order to manage their social fears (Shepherd & Edelmann, 2005) and that anxious college students use Facebook to connect with other people online (Clayton, Osborne, Miller, & Oberle, 2013). Moreover, socially anxious college-level students with a medium to high need for social assurance (e.g., wanting someone to be with them at all times) engage in more PIU on Facebook (e.g., would interfere with school or social activities) (Lee-Won, Herzog, & Park, 2015). University students report greater concerns about presenting a

negative self-image on Facebook when their social anxiety had elevated the prior day (Burke & Ruppel, 2015), indicating that socially anxious individuals fear negative evaluations online as they do in person. These studies at least identify anxiety as an important facet of well-being to consider when investigating SNS use/engagement but have sampled older populations of youth.

Potential Indirect Effects in the Association between Social Media and Well-Being

        Individual differences. Particular cognitive and/or emotional tendencies are crucial to consider when investigating indirect effects since not every boy and girl will be impacted equally or similarly by SNS use. These individual differences are potentially key underlying factors that explain the association between social networking and well-being. Literature on SM and youth often emphasizes the "poor-get-poorer" and "rich-get-richer" assumptions (e.g., Sheldon, 2008; van den Eijnden et al., 2008). These beliefs hold that adolescents with emotional difficulties will experience greater trouble from Internet use (i.e., "poor-get-poorer") while healthy adolescents will benefit (i.e., "rich-get-richer"). The social compensation hypothesis is also cited frequently (e.g., Valkenburg & Peter, 2007a); it posits that online communication is used predominantly by youth facing difficulties (e.g., are introverted, lonely, or socially anxious). As with "Facebook depression," there is conflicting evidence presented on these assumptions with somewhat greater support for the "rich-get-richer" hypothesis (see Valkenburg & Peter, 2009b). Research with adolescents aged 13 to 17 has indicated that preexisting depression symptoms are at risk for developing problematic Internet use with no differences between sexes (Gámez-Guadix, 2014). Adolescents have also been shown to be at greater risk of victimization by peers when using Facebook in particular when they have depressive symptoms (Frison et al., 2016). Despite differing theoretical orientations, it is well understood that individual differences must be taken

into account as moderators. Surprisingly, analyses addressing indirect effects involving individual differences are uncommon.

Cognitive attributions. One important individual difference is one's cognitive attribution pattern, meaning, the reasons individuals use to explain the events they experience or observe. It is well known that interpretations of and reactions to online information can be affected by one's personal attitudes (Barnett, Nichols, Sonnentag, & Wadian, 2013). Barnett and colleagues (2013) found that adolescents who experience teasing in their offline lives are more likely to anticipate having negative emotional and behavioural reactions to ambiguous teasing on Facebook. Specifically, those who had experienced teasing offline anticipated that they would feel worse and react more negatively towards teasing than individuals who had not dealt with teasing. Aside from teasing, adolescents and adults with more positive attitudes towards technology exhibit fewer signs of mood disorders (major depression, dysthymia, bipolar) (Rosen et al., 2013). These findings provide initial evidence that cognitive expectations are important individual differences to consider when examining the relationship between SM and well-being.

Emotional experiences. The premise of this dissertation is that individual differences in emotional experiences are crucial to consider in research on SM. The intersection between SM use and emotional tendencies of youth is increasingly being considered within the literature (Glover & Fritsch, 2018). However, the results are less than clear and are often contradictory. Some believe that adolescents are at high risk of health and emotional problems when using SM (Guinta, 2018; Muzaffar et al., 2018) whereas others argue that CMC use is largely not harmful for adolescents (Eleuteri et al., 2017).

The frequency and nature of SM use is impacted by emotional characteristics of the individual. Some researchers have found that adolescents who experience a greater degree of

loneliness tend to use instant messaging less often (van den Eijnden et al., 2008). Other

researchers report that socially anxious or lonely adolescents have been found to use instant

messaging with people they do not know well unlike their peers who are more likely to connect

with existing friends online (Gross et al., 2002). Importantly, it is understood that adolescents

who communicate with strangers on the Internet experience more detrimental effects to their

well-being (Valkenburg & Peter, 2007b). Adolescents with lower life satisfaction have also been

shown to engage in more negative comparison to others on Facebook over time (Frison &

Eggermont, 2016a). From the adult literature, it has been shown that individuals with

psychosocial distress tend to prefer online social interactions given the threat reduction that the

Internet provides (Caplan, 2003). Results indicated that levels of depression and loneliness could

predict having a preference for online social interaction.

      Sex differences. Importantly, SNS use appears to impact male and female adolescents

differently (Valkenburg & Peter, 2009b). Blomfield Neira and Barber (2014) discovered that

male users of SNSs might experience positive effects such as the development of social skills

and higher social self-concept than their male peers without SNS profiles. Conversely, female

users may experience lower levels of self-esteem and higher depressed affect than their same sex

peers without SNS profiles. Furthermore, it has been found that adolescent girls, compared with

boys, react more strongly emotionally and behaviourally to ambiguous teasing on Facebook

(Barnett et al., 2013). Tiggemann and Slater (2013) reported that for adolescent girls, Facebook

usage is associated with greater concerns with regards to body image (e.g., belief in the thin

ideal), although these results were correlational in nature and causality could not be determined.

Adolescent males also tend to be more sexually explicit and active online than females

(Subrahmanyam et al., 2006). There is also some initial exploratory research available indicating

that female college students are more likely to become anxious if access to Facebook is unavailable and report that Facebook causes stress (Thompson & Lougheed, 2012). It is therefore critical to take gender differences into consideration when assessing the impact of social networking on well-being.

Culture. Beyond internal affective tendencies, external social demands from peers and other group members are likely to impact an adolescent's engagement with SM. It is probable that the functional significance of anxiety and the pressure to be a participant in the digital "agora" will vary cross-culturally. One common way to help organize cultural differences into overarching patterns is via the constructs of individualism and collectivism (Oyserman, Coon, & Kemmelmeier, 2002). *Individualistic societies* largely place importance upon autonomy, individual rights, privacy, uniqueness, personal pleasure and self-fulfillment, personal control, and personal freedom. *Collectivistic societies* prioritize group membership, in-group harmony is emphasized, the common good is frequently a central goal, mutual expectations and obligations are fundamental and the personal is seen as a part of the social (Oyserman et al., 2002). Individualism and collectivism exist upon a continuum and are not viewed as categorical dimensions. Previous research has successfully demonstrated that contextual factors (based upon the dimensions of collectivism and individualism) in Colombia and Canada affect the psychological well-being (self-worth, perceived competence) of early adolescents (Santo, Bukowski, Lopez, et al., 2013). We therefore expect that, in more collectivist societies, the pressure to engage in SM may override emotion-driven motives for avoidance of SM (i.e., an anxiety response).

Within the technology-mediated communication literature, culture is increasingly being considered as an important factor influencing individuals in their usage of these platforms (e.g.,

Choi, Chu, & Kim, 2012; Wu & Li, 2016). The majority of the literature currently focuses on either one culture at a time or compares Asian to North American, usually the United States (U.S.), cultural groups. Additionally, this research largely samples college and university-level students. For example, South Korean and Chinese undergraduate students are less likely to have remote SNS connections than their U.S. peers whose contacts tend to be larger, more remote, and the nature of the relationships generally weaker (Choi et al., 2012). These results speak to the potential importance of maintaining strong, close relationships within collectivistic cultures whereas individualistic cultures place less of an emphasis on relationship quality. Similarly, American college students are more likely to seek entertainment on SNSs while their Korean peers tend to seek social support (Kim, Sohn, & Choi, 2011) and U.S. undergraduate students are less likely than those in Hong Kong to seek approval from others, attempt to form consensus, and invite responses from others (Seo, Miller, Schmidt, & Sowa, 2008).

Taken together, this cultural research with older youth suggests that individuals from collectivistic and individualistic cultures across America and Asia engage in SM use differentially. Specifically, that young persons who hold collectivist worldviews use SNSs in a way that that reduces threat to group order by promoting cohesion and closeness. These differences have yet to be investigated amongst adolescents across North America and South America, which is one of the aims of the current project.

Limitations

Populations. As mentioned, the vast majority of the research in the aforementioned projects have largely focused on populations that were much older, ranging from late adolescence to young adulthood. Literature on early to middle adolescence is less common. This

is a limitation, as researchers have found that the relation between SM use and depression changes with the developmental period.

Another limitation of the populations studied is that community samples of early to middle adolescents are included in research less than clinical samples of adolescents (e.g., Calancie et al., 2017; Muzaffar et al., 2018; Rosen et al., 2013) or those with PFU or problematic Internet use (PIU) (Gámez-Guadix, 2014; Lee-Won et al., 2015; Marino et al., 2018). Not all of this research was presented in the current document given the limited relevance of the results. The results that were included from these populations within this text therefore do not generalize to the average adolescent.

Lack of specificity of SM platform. Not all of the findings presented in the aforementioned research have been specific to Facebook use, pointing to a lack of depth, breadth, and consensus within the literature. For instance, for adolescents between the ages of 13 and 17 with PIU patterns, symptoms of depression were found to be predictive of negative outcomes one year later, such as using the Internet to regulate mood and a preference for online interactions (Gámez-Guadix, 2014). Additionally, in a group of adolescents aged 10 to 17, it has been reported that troubled youth (i.e., those experiencing victimization and depression) form closer online relationships than other adolescents, which suggests that online relationships may attract more socially and emotionally vulnerable adolescents (Wolak, Mitchell, & Finkelhor, 2003). Cooper (2006) reported that ineffectiveness, a self-reported measure of depressive symptomatology, is related to Internet use in childhood. However, SNS were not specified within these research projects (i.e., Cooper, 2006; Gámez-Guadix, 2014; Wolak et al., 2003) and thus it is difficult to rely on such conclusions regarding mood and Internet use.

In fact, studies which correlated increased Internet use with greater depressive symptomatology among high school students failed to show a similar correlation between SNS use and depression (Banjanin, Banjanin, Dimitrijevic, & Pantic, 2015), which further supports that not all Internet use is equal and that outcomes vary depending on age groups examined. Similarly, van den Eijnden and colleagues (2008) reported that depression and instant messaging are positively related with one another, although this is not the case for loneliness. Moreover, depression and loneliness do not appear to be associated with using chat rooms or e-mail. However, surfing the Internet and instant messaging are not the same as usage of SNSs, and as such these results cannot be extended to Facebook use.

Lack of specificity of measures. It should be noted that some measures that have been used do not necessarily reflect the actual content of the measure. For example, one study attempted to measure the construct of "envy", but the individual items more closely reflected measures of anxiety or depression (e.g., "It is painful to know that your friends are more successful than you") (Charoensukmongkol, 2018). As such, the findings and conclusions drawn from such research are unclear. Overall, mixed findings have been reported on this subject and currently the literature does not suggest that Facebook use per se predisposes individuals to become depressed, but it may be that some individuals are more at risk when faced with this particular stress.

Cross-sectional measurement designs. The majority of the literature presented throughout the current thesis has been cross-sectional. A large proportion have also been survey-based in order to gather statistics on SM use. In other words, longitudinal designs have less often been used to study the effects of SM use over time. In order to comprehend the impact of SM use on emotional well-being, a temporal component is necessary. Otherwise, the findings will simply

apply to how adolescents feel as they use SM (i.e., in the moment, immediately after), and neglect longer-term impacts, even how they feel for a span of weeks while using SM.

Summary

The current literature review has highlighted several important findings within the social media (SM) and peer relations literature, as well as important limitations. Friendships with peers are undeniably of high importance to young persons and are one of the most essential parts of their lives during the transition from childhood to adulthood. The use of SM, particularly social networking platforms such as Facebook, is frequent amongst adolescents and has steadily increased over the years despite the popularity of other SM tools. SM use becomes much more prevalent from preadolescence to adolescence. Indeed, adolescent usage exceeds adult usage of SM. At the same time, adolescents are less likely to be supervised while using online resources, putting them at greater risk for maladjustment than other age groups. Adolescence is also a developmental period of increased sensitivity to social influences, which are now offered in abundance via technological forums. SNSs are primarily used as a means for young people to connect with their friends for social purposes and provide them with a wide range of information that is available to them virtually all of the time. Young people experience both positive (e.g., opportunities for social contact) and negative (e.g., cyberbullying) effects when using SM, which are affected by individual differences such as anxiety and depression as well as cultural worldviews such as individualism and collectivism.

The limitations of the current SM literature described here serve as important points of departure for the research conducted within this dissertation. Notably, one of the major limitations within the literature on youth and SM is that older adolescents and adults are

overwhelmingly sampled, especially college and university-level students, and less information is available on SM use among preadolescents and adolescents despite evidence that they frequently use SNSs such as Facebook. This thesis considers more complex studies and data analyses that include testing for indirect effects within longitudinal data sets. Previous research has been largely cross-sectional, not allowing for analyses on time effects. Another important factor is considered in this research: contextual differences. One of the goals of this dissertation was to determine cultural differences present across two contexts. Namely, Bogotá, Colombia, and Montréal, Canada. The premise of this consideration is the importance of values and social pressure across collectivistic and individualistic groups. Given the centrality of SM in the lives of young persons as well as the risks and benefits associated with SM use, it is crucial to continue to investigate the ways in which SNSs can function as a setting for development in youth and how this differs cross-culturally.

Chapter 2

Social Media and Adolescent Mental Health: A Scale for Measuring Social Media-
Related Depressed Affect and Anxiety

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Social Media and Adolescent Mental Health: A Scale for Measuring Social Media-

Related Depressed Affect and Anxiety

It is a truism that research thrives on the availability of clear, valid, and reliable measures, especially for research on new domains of functioning. We developed a set of flexible measures of internalizing problems associated with youth's experiences with computer-mediated communication (CMC), especially social media (SM). Our goal was to create measures that would have broad applicability across different forms of SM. The point of departure for our study was the observation that research on SM has not yet thoroughly explored the association between CMC experiences and internalizing problems of non-clinical anxiety and depressed affect during the adolescent period of development (Wood, Bukowski, & Lis, 2016). Adolescence is a time of rapid development (World Health Organization, 2017) and heightened sensitivity to social influences (Blakemore & Mills, 2014). Since participation in SM provides opportunities for social comparison and exposure that can be experienced as threatening, disappointing, and exclusionary, it can provoke feelings of anxiety and depression. Research on SM use and symptoms of anxiety and depression has established an important association between these variables within hospital samples of adolescents (Muzaffar, Brito, Fogel, et al., 2018) and in older populations of adolescents and young adults (Moreau, Laconi, Delfour, & Chabrol, 2015). The premise of our study is that in the current cultural climate our understanding of internalizing difficulties needs to recognize the effects of engaging with SM within general community samples of adolescents. Our goal was to create strong measures of forms of internalizing that are tailored to fit SM experiences for the average adolescent.

SM are an important developmental context (Underwood, Brown, & Ehrenreich, 2018). They have a ubiquitous presence in the lives of individuals throughout the world, especially for

adolescents and young adults. Twenge (2017) indicates that adolescents currently spend almost the entirety of their leisure time outside of school-related work and sleep using "new media", which collectively refers to SM use, text messaging, going online, and gaming. The Pew Research Center (2018) indicated that approximately 95% of adolescents have access to smartphones and 45% go online "almost constantly". Similarly, high school students report spending several hours on their electronic devices, ranging from 1-3 hours (44.44%) to 13-23 hours (16.67%) per day (Moulin & Chung, 2017). Time spent using social networking sites (SNS) makes up a substantial proportion of the lives of adolescents, particularly Facebook despite the increasing popularity of other platforms. The Pew Research Center (2018) revealed that approximately 51% of adolescents aged 13-17 report Facebook use and that adolescents are also highly likely to use YouTube (85%), Instagram (72%), and Snapchat (69%). Adolescents' fear of missing out (FOMO) on SM is so strong that it affects their sleep duration by increasing SM usage at night (Scott & Woods, 2019). A large proportion of high school students (72%) even report sleeping with their electronic devices (e.g., tablets, cell phones) and will sometimes wake up during the night to message others (Moulin & Chung, 2017). Facebook shares several features of other SM and yet has specific characteristics that make it distinct. For instance, platforms like Snapchat are considered "synchronous," meaning, photos and videos on Snapchat happen in real-time and do not remain visible like they do on "asynchronous" SNSs such as Facebook. Facebook recently incorporated similar features of "synchronous" platforms (e.g., "stories") while Snapchat added "asynchronous" features (e.g., messages with friends remain visible). Despite these additions, conversations between others cannot be viewed on Snapchat as with Facebook (i.e., only personal conversations can be accessed). In terms of other SM, YouTube is used purely for watching and commenting on videos, which rarely come from one's

friends. Instagram remains most similar to Facebook given its function to host photos, videos, and comments from "friends". Despite these similarities, Instagram offers significantly less personal information (i.e., only photos and videos are visible) than is available on Facebook, making it similar but not identical. It is for these reasons that Facebook remains one of the richest sources of social information amongst SM platforms.

SM intersects with the adolescence-based challenge of emotion regulation, especially for symptoms of anxiety and depressed affect (Underwood et al., 2018). Positive and negative affect are known to be influenced by information available on SM (Kramer, Guillory, & Hancock, 2014). Many Facebook accounts present a highly selective account of a life from which negative experiences have been filtered and positive events have been exaggerated (Twenge, 2017) as adolescents create their tailored, digital self-image (Wagner, Lipson, Sandy, & Eisenberg, 2014). Learning about the fun activities and accomplishments that are selectively presented by one's peers can provoke upward comparisons and "downward" emotions and self-perceptions such as disappointment or lowered self-esteem. These forms of "internalizing" emotions can be conceived of as the predictors, moderators, or consequences of SM use. Poor psychological functioning has been identified as a consequence of frequent use (e.g., daily, multiple times per day) of SNSs including Facebook (Wang, Frison, Eggermont, & Vandenbosch, 2018; Sampasa-Kanyinga & Lewis, 2015). Some argue that adolescent use of CMC is, for the most part, not harmful (Eleuteri, Saladino, & Verrastro, 2017) while others posit that adolescents are at higher risk than other populations for a host of emotional and health problems due to SM use (Guinta, 2018), particularly in clinical samples (Muzaffar et al., 2018). Adolescents who spend more time on screen activities (e.g., texting, SNSs) compared to non-screen activities (e.g., sports, in-person interaction) are unhappier than their peers (Twenge, 2017). Social comparisons may provoke

negative emotions, especially for adolescents who perceive their social environments to be competitive (Charoensukmongkol, 2018). Internalizing problems may also be predictors of SM use. Given that anxiety serves to alert individuals to threat, anxiety has the capacity to direct development during adolescence by restricting the range and nature of environments where a person functions. Anxiety can guide individuals toward or away from forms of experience that can be rewarding or threatening. Within adolescent clinical populations, those with higher anxiety tend to use Facebook more, have more Facebook friends, and engage in more repetitive SM behaviours (Muzaffar et al., 2018). However, conflicting evidence exists for adolescents (Muzaffar et al., 2018) and undergraduate students (Shaw, Timpano, Tran, & Joorman, 2015) with social anxiety in particular. For these reasons, it is likely that anxiety and mood regulate the use of SM and that they alter the association between SM experiences and affective outcomes. It has been shown that individual characteristics and tendencies affect CMC (Papacharissi & Rubin, 2000; Sheldon, 2008) and negative mood outcomes (Rosenthal, Buka, Marshall, Carey, & Clark, 2016) in university students but the same has not been shown in younger populations.

Popular press accounts of the effects of SM experiences have often pointed to the negative effects of SM experience on depressed affect and feelings of inadequacy. Twenge (2017), Turkle (2015), and Pinker (2014) all emphasize that increased use of SM decreases the amount of face-to-face interactions between individuals with damaging consequences for human connections. SM are also perceived by adolescents themselves as a threat to well-being. For instance, adolescents who perceive distorted online material and cyberbullying as present and potentially threatening view SM as a cause for stress, depression, and self-esteem problems (O'Reilly, Dogra, Whiteman, et al., 2018).

SM use is directly relevant to two basic developmental tasks of adolescence: engagement with peers and identity formation. Young people use technology-based communication devices to socialize with their peers (Twenge, 2017; Lenhart, Purcell, Smith, & Zickuhr, 2010) and online friendships are understood to reflect offline relationships for adolescents (Yau & Reich, 2018). However, adolescents using SM are exposed to more stimuli and individuals than they would experience in person, making SM a domain where adolescents can experience their "digital self" (Wagner et al., 2014) which we cannot equate to their offline persona. Additionally, in terms of identity formation, SM function as a performative space where adolescents can experiment with self-presentations and expressions of different identities (Eleuteri et al., 2017; Jordán-Conde, Mennecke, & Townsend, 2014; Valkenburg, Schouten, & Peter, 2005) and serves as a means to identity formation (Wagner et al., 2014)

Little research has investigated the impact of SM on depressed affect in community samples of adolescents and existing studies' conclusions are contradictory. Although the term "Facebook depression" is used colloquially in mass media, not enough scholarly research exists to justify the claim that individuals become depressed due to Facebook use (see Wood et al., 2016). Some authors have reported that no association exists between Facebook usage and depression for older adolescents (Jelenchick, Eickhoff, & Moreno, 2013; Muzaffar et al., 2018). Others have demonstrated a strong association between Facebook use and depressive symptoms among young adults (Rosenthal et al., 2016). Other researchers have studied adolescents but have not specified particular SM tools; some researchers have focused on chat and e-mail usage (van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008), while others have not teased apart the effects of SM tools such as Facebook, Instagram, and cell phone use (Nesi & Prinstein, 2015). Some researchers have used unclear terms to describe online activity, such as

"Internet use," and have used the terms "social media", "social networking", and "Facebook" within the same questionnaire (Kircaburun, 2016), while others have provided unclear definitions of measures, such as items measuring "envy" which may better reflect depression or anxiety (e.g., "It is painful to know that your friends are more successful than you"), rendering results unclear (Charoensukmongkol, 2018). In sum, participant populations and SM platforms vary widely in the literature without much of a coherent picture of the impact of SM on the well-being of the average adolescent. Proper research measurement tools are needed to accurately capture these SM experiences. Although it is admittedly difficult to isolate the effects of separate SM platforms, researchers can attempt to identify how adolescents feel when they are reacting to specific forms of SM by asking pointed questions within their measures.

To summarize, the current understanding of the association between internalizing symptoms and SM use can be developed further. Limitations of the current literature are likely due to several factors, including the lack of specific measures. Wood and colleagues (2016) have shown that few studies have focused on the early adolescent period of development as late adolescents and college level students are often sampled. Despite a small amount of conflicting evidence on "Facebook depression," less work has been conducted on "Facebook anxiety" or the tendency for individuals to become anxious due to content viewed on this SM platform.

Our goal was to develop a set of SM-focused measures of anxiety and depressed affect. Four scales were developed. Two scales were measures of anxiety: SM anxiety and FOMO. Two scales were measures of depressed affect. One scale assesses depressed affect specifically related to SM use whereas the other assesses SM-related depressed affect that comes from threats to one's self-image. The content of these scales can be defined as depressed mood that is related to content viewed on SM (e.g., feeling sad because of a post). The second scale was designed to

assess how SM use impacts an adolescent's view of the self as a result of social comparison, and specifically, depressed mood related to upward comparisons with others resulting in self-criticism. One form aims to target the mood component of depressed affect while the other attempts to determine how cognitions about the self are influenced.

Four principles guided our creation of items for each measure. The first principle was clarity. We wanted to create a small set of items for each scale that would reflect as closely as possible the definitions of each construct. Further, we aimed to create measures that would represent distinct factors in a confirmatory factor analysis. A second principle was efficiency. We wanted to create scales that would have a high level of specificity and would minimize participant burden. Many measures of anxiety and depressed affect include multiple items and are characterized by a high level of heterogeneity. A currently available and commonly used measure of FOMO includes 10 items (see Przybylski, Murayama, DeHaan, & Gladwell, 2013). Although this brief, specific measure of FOMO is robust, we aimed to further reduce the number of items to lessen participant burden. Thus, our measure of FOMO was adapted from Przybylski and colleagues' (2013) questionnaire. The third principle was invariance. We wanted to create items whose meanings would be invariant or applicable across cultural contexts. The fourth principle was flexibility. We wanted to create items whose structure provided opportunities for flexibility so that their content could be easily adapted to different SM platforms. In the development of these items we chose to use Facebook as we believe it remains the most complex form of popular SM. Our items were written so that they could be adapted for use with different SM.

A key feature of our study is the use of a cross-cultural format. The participants come from cities in two different countries that are believed to differ on the basic cultural dimensions

of individualism and collectivism. These locations are Montréal, Canada, and Bogotá, Colombia.

To date, most of the literature on SM does not include cross-cultural comparisons, frequently

sampling only one population at a time, with few exceptions (e.g., Xu, Takai, & Liu, 2018).

Here, we aim to make direct comparisons between adolescents from two cultural groups.

Our analysis consisted of four steps. The first step included two confirmatory models, one for

anxiety measures and the other for depressed affect measures. In each model, general measures

of anxiety (general and social anxiety) and depressed affect were included to assess whether the

newly developed scales pertained to SM specifically. Their presence in the model allowed us to

assess the degree to which the newly developed measures diverged from and overlapped with

more general measures. The second step was to assess invariance in the factor loadings across

the two contexts. The third step was to assess the stability of the scales across a five-week

period. Beyond assessing the stability, we wanted to ascertain that each measure from the initial

assessment would be more strongly associated with the corresponding measure at the second

time than with the other measures. Fourth, we wanted to compare the means for each measure for

the participants across cultural contexts.

Method

Participants

Participants were eighth graders (N = 173, Mage = 14 years, range = 14-15) from two

bilingual (English/French) mixed-sex schools in Montréal, Canada, (N = 79, 36 girls) and two

bilingual (Spanish/English) mixed-sex schools in Bogotá, Colombia (N = 94, 47 girls).

Procedure

After obtaining ethical approval from relevant institutions, permission from the school

boards and principals of all participating schools was obtained followed by parental consent using an active consent procedure. Assent was obtained from participants prior to completing questionnaires at Time 1 (T1). Participants were aware that their participation was voluntary and that they were free to discontinue without repercussions. There were no exclusion criteria for participating in the study besides having Facebook. Students were administered the T1 questionnaire in late January or early February and Time 2 (T2) was five weeks later in early-to-mid March. At T1 and T2, the participants completed the questionnaires via tablet computers in their classrooms.

Measures

At each time the participants completed a questionnaire during a classroom-based group administration. The questionnaire was created in English. It was translated into Spanish by translators working in the fields of education and psychology, and then back-translated into English by a separate group of translators to ensure that the meaning of each item was retained. Our measures of anxiety and depressed affect were based upon the Revised Child Anxiety and Depression Scale (RCADS), which is originally a lengthy clinical tool that has been validated in general (non-clinical) adolescent populations (see Mathyssek, Olino, Hartman, et al., 2013). Although an established tool for measuring anxiety and depression in adolescents, the RCADS remains a lengthy questionnaire. In order to create a shorter, more concise measurement tool to administer during classroom data collections, we adapted the RCADS for general usage. Specifically, we have chosen items that reflect overall anxiety and depressed affect rather than particular features of anxiety, which currently appear in the RCADS (e.g., generalized anxiety disorder, obsessive compulsive disorder, panic disorder, social phobia).

Anxiety and depressed affect. Four self-report measures of anxiety were developed.

They are measures of (a) general anxiety, (b) social anxiety, (c) Facebook-related anxiety, and

(d) FOMO. Each were measured with three items. The items used to measure Facebook-related

worry referred to forms of anxiety that either result from viewing Facebook content or worry

regarding what one might see on Facebook (i.e., that they have not seen but expect to see). The

items used to measure FOMO referred to the concern that one is absent from pleasurable or

important experiences and information. All of the scales, with the exception of FOMO, were

rated on a 5-point Likert scale with endpoints *never true* (1) and *always true* (5). A score of "1"

indicated low anxiety, and a maximum score of "5" indicated high anxiety. The FOMO items

were rated on a 5-Point Likert scale with endpoints *not at all true of me* (1) and *extremely true of*

me (5). See Table 1 for the item list.

Three measures of depressed affect were developed. They consisted of (a) general

feelings of depressed affect, (b) depressed affect related to Facebook, and (c) depressed affect as

it relates to self-image. Each were measured with four items. This first factor was created to

assess feelings of depressed affect that the adolescents may feel as a typical state. This second

factor was designed to assess how material presented on Facebook can negatively influence an

adolescent's mood. This third factor was designed to assess how Facebook use impacts an

adolescent's view of the self due to social comparison via SM. These items were rated on a 5-

point scale with endpoints *never true* (1) and *always true* (5). See Table 2 for the item list.

Table 1. Means and Reliability of Time 1 Anxiety Self-Report Measures

Items	Cronbach's α	Item Means
General Anxiety	.87	2.63
• I worry a lot		
• I get stressed a lot		
• I am anxious often		
Social Anxiety	.78	2.41
• I worry that I might do something stupid and other people in class might laugh at me		
• I am afraid that other people will not like me		
• I can feel nervous when I am with other people in my class		
Facebook Anxiety	.78	1.48
• Sometimes I become worried when I read what other people write on Facebook		
• Sometimes I worry about what I will read on other people's Facebook posts		
• Sometimes I worry about seeing something that will upset me on Facebook		
	.81	2.60
FOMO		
• I feel I'm missing something if I go a whole day without checking Facebook		
• I get worried when I find out my friends are having fun without me		
• It is important that I understand my friends "in jokes"		

Table 2. Means and Reliability of Time 1 Depressed Affect Self-Report Measures

| Items	Cronbach's α	Item Means
General Depressed Affect	.89	2.35
• Sometimes I feel lonely		
• Sometimes I feel sad		
• Sometimes I feel unhappy		
• I am often sad		
Facebook Depressed Affect	.87	1.46
• Sometimes I become sad when I see what other people write on Facebook		
• Sometimes when I am feeling sad and I see what other people post on Facebook I become even more sad		
• Sometimes I keep thinking about something somebody posted on Facebook and it makes me feel sad		
• Sometimes when I see what other people post on Facebook I cry		
Facebook Depressed Affect Self-Image	.90	1.82
• Sometimes when I see what other people post on Facebook I think about how disappointed I am with myself		
• Sometimes when I see what other people post on Facebook I become critical of myself		
• Sometimes when I see what other people post on Facebook I feel unattractive		
• Sometimes when I see what other people post on Facebook I think about how others seem better off that I am		

<center>**Results**</center>

Data were analyzed in a four-step process. The first step consisted of confirmatory factor analyses (CFAs) for anxiety and depressed affect items. Analyses in the second step assessed invariance in the factor loadings across the participants from Montréal and Bogotá. The stability of the measures was assessed in the third step. Analyses in the fourth and final step assessed place, time, and gender differences on each of the scale means.

Confirmatory Factor Analyses

Two CFAs were conducted, one for anxiety items and one for depressed affect items. For the anxiety measures, three items each were included for general anxiety, social anxiety, Facebook anxiety, and FOMO at T1 and T2 (see Figure 1). This model had an adequate level of fit (χ^2 (172) = 217.427, $p < 0.05$, CFI = 0.98, TLI = 0.96, RMSEA = 0.04 (0.02-0.06), SRMR = 0.05). Factor loadings for individual items were strong, ranging from 0.56 to 0.85 for individual anxiety items at T1 and T2. Omega values for general anxiety, social anxiety, Facebook anxiety, and FOMO were 0.86, 0.79, 0.78, and 0.79 respectively. The strongest correlations (0.84) were between the general anxiety and social anxiety variables at T1 and T2. These high correlations suggest that adolescents who have a tendency to be anxious are also typically socially anxious. The lowest correlations were between social anxiety and FOMO, implying that socially anxious adolescents are less likely to feel that they are missing out from activities with peers.

For the depressed affect measures, four items each were included for general depressed affect, Facebook depressed affect, and depressed affect related to self-image at T1 and T2 (see Figure 2). This model had a good level of fit (χ^2 (202) = 299.374, $p < 0.05$, CFI = 0.96, TLI = 0.95, RMSEA = 0.06 (0.04-0.07), SRMR = 0.05). Factor loadings for individual items were observed to be adequate, ranging from 0.44 to 0.91 at T1 and T2. Omega values for depressed

Figure 1
Self-report Measures for Anxiety
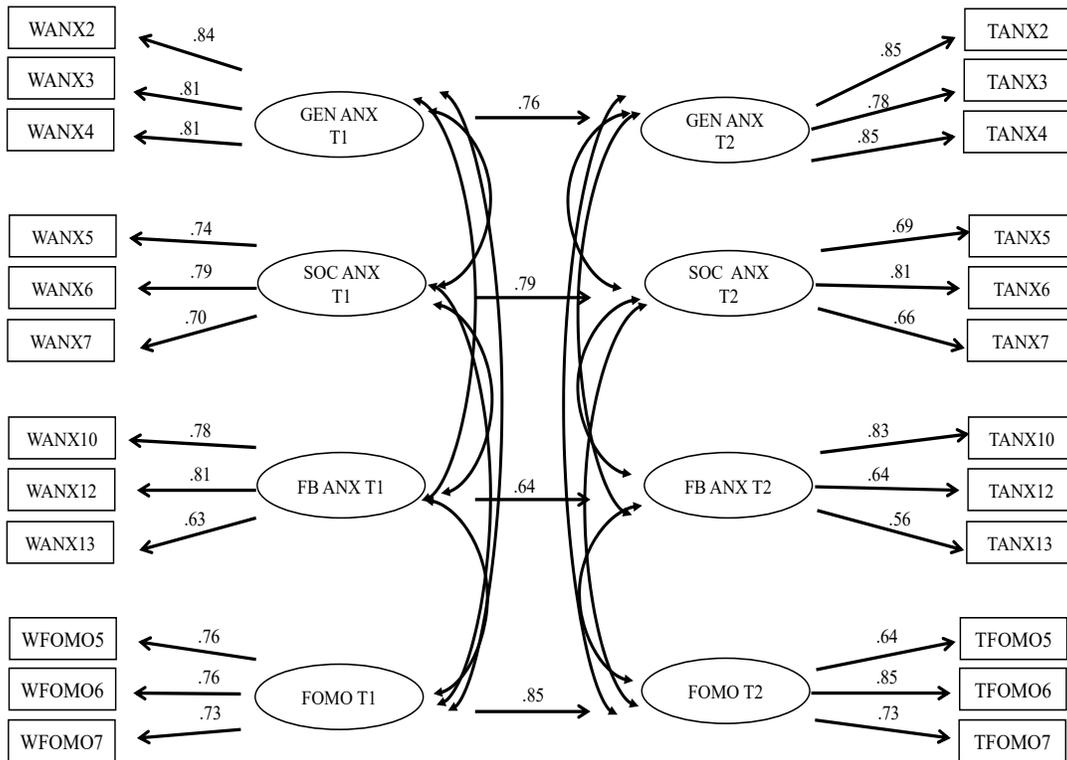
Statistically significant values below *p* of 0.01 are presented.

Figure 2
Self-report Measures for Depressed Affect
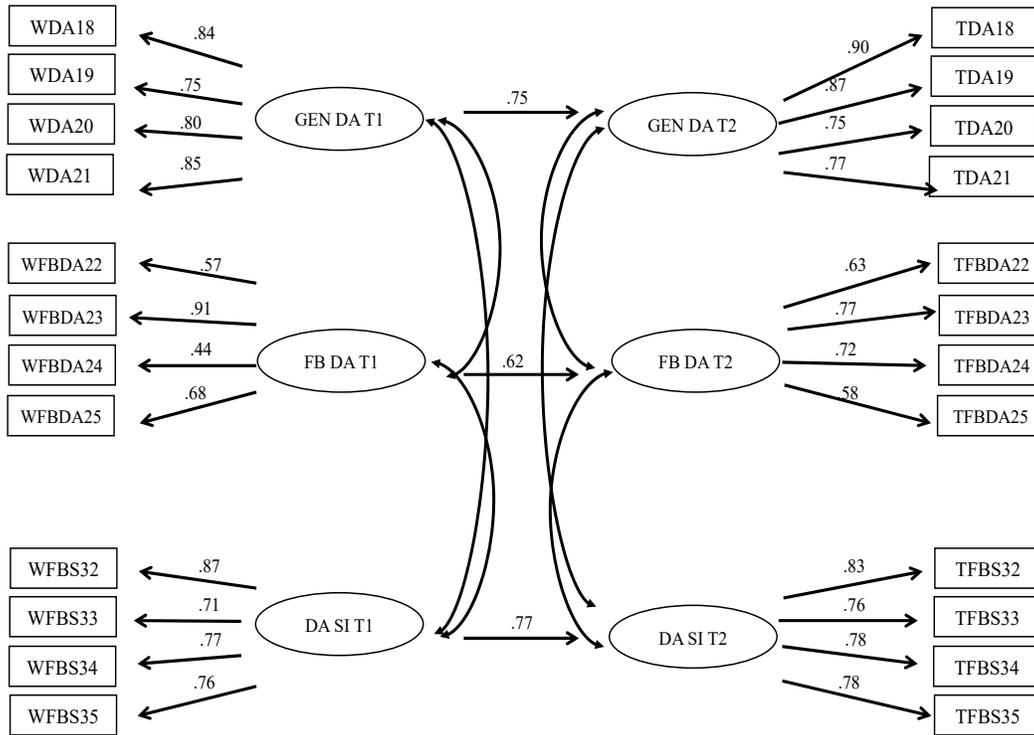
Statistically significant values below *p* of 0.01 are presented.

affect, Facebook depressed affect, and Facebook depressed affect related to self-image were

0.89, 0.76, and 0.86 respectively. The highest correlations were between Facebook depressed

affect and Facebook depressed affect related to self-image (0.91).

Invariance Analyses

In the second step scalar and metric invariance was assessed for each of the seven latent

measures (i.e., depressed affect, SM depressed affect, SM depressed affect/self-image, general

anxiety, social anxiety, SM anxiety, and FOMO) across the two countries. The "Model = scalar"

option in Mplus (Muthén & Muthén, 1998-2012) was used to assess invariance in the intercepts

for the item factor loadings within each latent measure. Comparison of the models in which the

intercepts were allowed to differ between the two set of participants were compared with models

in which they were set to be equal failed to reveal statistically significant differences in model fit

for any of the seven scales.

Metric invariance analyses consisted of multi-group comparisons conducted with the

factor loadings for the items within each scale. The factor loadings observed with the Montréal

participants were compared with those observed with the participants from Bogotá. With each

pair, equality constraints were used to force the two loadings to be equal. A significant decrease

in the model fit, as indexed by a statistically significant increase in the Chi-square value, was

used as the indicator of difference. Seven sets of analyses were conducted, one for each factor.

Each analysis started with a baseline model in which the factor loadings were allowed to vary

freely for each group. The Chi-square index from this model was used as the comparison point

for the subsequent models in which equality constraints were imposed on the loadings observed

with a particular item with the two groups. Using T1 data, a total of 24 comparisons were made.

Two significant differences were observed. The loading for the item "Sometimes when I see

what other people post on Facebook I cry" on the SM depressed affect scale was significantly ($\Delta X^2(1) = 4.99$, $p < 0.05$) larger for the Montréal participants (standardized coefficient = 0.79) than the Bogotá participants (standardized coefficient = 0.63). The loading for the item "I can feel nervous when I am with other people in my class" on the FOMO scale was significantly ($\Delta X^2(1) = 5.21$, $p < 0.05$) larger for the Montréal participants (standardized coefficient = 0.88) than the Bogotá participants (standardized coefficient = 0.64). The observation of only two differences in 24 comparisons is not compelling evidence of between group variance (see Van de Schoot, Lugtig, & Hox, (2012).

Stability

Each of the seven latent factors showed an adequate level of stability between T1 and T2 (see Figures 1 and 2). The T1 to T2 correlation for the depressed affect, SM depressed affect, SM depressed affect/self-image, general anxiety, social anxiety, SM anxiety, and FOMO factors were 0.75, 0.62, 0.77, 0.76, 0.79, 0.64, and 0.85 respectively.

Mean Differences

For the final analyses, effects of place, time, and gender on each of the latent means were computed with the analysis of variance (ANOVA). For <u>anxiety</u>, there was a significant effect of gender for general anxiety at T1 ($F(1,149) = 11.443$, $p = 0.001$) and at T2 ($F(1,149) = 10.915$, $p = 0.001$) and social anxiety at T1 ($F(1,149) = 8.028$, $p = 0.005$) and T2 ($F(1,149) = 11.892$, $p = 0.001$). Scores for general and social anxiety were significantly higher for girls at both times. The means for social anxiety were higher for the girls than for the boys at T1 (Ms (sds) = 2.59 (1.06) and 2.12 (0.93)) and T2 (Ms (sds) = 2.61 (1.14) and 2.00 (0.99)). The same pattern was observed with the means for general anxiety. The means (and standard deviations) for the girls and boys were 3.04 (1.22) and 2.39 (1.09) at T1 and 3.06 (1.20) and 2.42 (1.26) at T2. Additionally, a

significant effect of place was present for Facebook anxiety at T1 ($F(1,149) = 11.070$, $p = 0.001$). The mean for the Montréal participants (M (sd) = 1.67 (0.79)) was higher than that of participants from Bogotá (M (sd)= 1.41 (0.68)).

For <u>depressed affect</u>, there was a significant effect of gender for general depressed affect at T1 ($F(1,149) = 24.268$, $p = 0.000$) and at T2 ($F(1,149) = 12.976$, $p = 0.000$). At both times the mean for girls was higher than the mean for boys (at T1 Ms (sds) = 2.74 (1.05) and 1.92 (0.86); at T2 Ms (sds) = 2.74 (1.05) and 2.11(1.03)). A significant effect of place was also observed for Facebook depressed affect at T1 ($F(1,149) = 6.184$, $p = 0.014$). The mean for the Montréal participants (M (sd) = 1.56 (0.74)) was higher than that of the participants from Bogotá (M (sd)= 1.25 (0.54)). There was a significant effect of gender for Facebook depressed affect related to self-image at T2 ($F(1,149) = 4.207$, $p = 0.042$) with stronger effects for girls in both contexts. The mean for girls was higher (M (sd)= 1.90 (0.91)) than the mean for boys (M (sd) = 1.56 (0.79)).

Discussion

Social media (SM) are a daily experience for adolescents around the world (Twenge, 2017). The purpose of this paper was to develop a measure that can assess how experiences with a ubiquitous form of SM intersect with emotional experiences and psychological functioning amongst adolescents cross-culturally. Experiences of anxiety and depressed affect were chosen as the focus of this paper given the prevalence of such symptoms in community samples and the negative effects of these symptoms (e.g., Nesi & Prinstein, 2015; Wood, Bukowski, & Santo, 2017). New measures with high specificity and efficiency that add to the conceptual and methodological toolbox available for research on experiences with SM across cultures were developed and assessed. The conceptual and empirical points of departure for this study was the

recognition of our current limited understanding of the intersection between SM experience and internalizing constructs amongst community samples of adolescents. The new measures, specifically SM anxiety, FOMO, SM depressed affect, and SM depressed affect/self-image show limited degrees of intercorrelation and very strong levels of reliability in spite of including a reasonably small number of items. For example, our FOMO measure includes just three items, whereas a prior measure included 10 items (Przybylski, et al., 2013). CFAs revealed a clear factor structure for the scales we developed.

It is crucial to specify particular forms of SM when conducting research. Adolescents report that their affective experiences vary depending on the SM platform they are using (Weinstein, 2018). Our measures specifically targeted Facebook use, which we believe offers unique experiences for adolescents, whereas previous research has largely conflated SM that serve different purposes (e.g., Instagram for sharing lasting photos and videos, Snapchat for photos and videos with filter options that remain briefly). More general measures of SM experiences will not capture these important differences. Our newly created measures can be used flexibly in that that investigators can insert the SM of interest into the questionnaire, allowing for further comparison studies. Arguably, over time, different SM platforms tend to become more similar as they adopt features which others have shown to be marketable. As such, differences between SM tools are likely to become fewer and the emotional consequences of using them more similar.

Several interesting and important findings were observed. Primarily, our results provide evidence that Facebook anxiety and Facebook depressed affect are distinct constructs. This indicates that adolescents may experience anxiety or depressed mood following content that they are exposed to on Facebook. This finding supports the need to create distinct measures for

particular emotional experiences related to SM and evidence that more general measures lack specificity. Secondly, our results demonstrate that girls tend to experience greater general anxiety, social anxiety, and depressed mood cross-culturally, potentially putting them at greater risk for negative emotional consequences when viewing content deemed threatening. Third, the high correlation between the measures of Facebook depressed affect and Facebook depressed affect/self-image implies that the negative effect of SM experience come from threats to one's self-image. A negative consequence of SM use may be an assault on views of the self that result from comparisons with others, which would invariably have a strong impact on one's mood. Additionally, contextual differences were found for Facebook depressed affect with higher levels in Montréal samples of adolescents. This finding indicates that (1) cultural factors are important to consider when conducting research on SM and emotional well-being and (2) adolescents from individualistic cultural contexts have a tendency to experience more negative affect due to engagement with SM content. Lastly, the CFAs indicated that FOMO is distinct from the other forms of anxiety. Its difference from social anxiety contradicts a claim that FOMO is a form of social anxiety (see Wang, Xie, Wang, et al., 2018). Our interpretation of this result is such that one form of anxiety is likely to motivate approach behaviours (FOMO) rather than avoidance behaviours (social anxiety). For instance, adolescents with FOMO may be motivated to engage in greater SM use so as not to miss out on content posted by others. Conversely, adolescents with social anxiety might be more likely to withdraw from SM use for fear of social comparisons that may further increase their anxiety.

There are strengths and limitations in the current project. The major strength of this paper comes from the use of community-based populations of early adolescents rather than clinical samples, which is often a focus of research on SM (e.g., Wood et al., 2016), making the results

more applicable on a societal level. The majority of studies on SM tend to focus on older populations of adolescents and young adults (see Wood et al., 2016). We added to the conceptual and methodological toolbox by compiling our own items with high specificity to create reliable scales that researchers can use to study SM experience. Another main strength is the inclusion of cross-cultural samples and the demonstration that our items generalize across contexts. Although a strength of the study is the use of a longitudinal design, the time between T1 and T2 was only five weeks. We recognize that limitations of the current paper include collecting data over a short interval and that specific features of usage were not assessed (e.g., active versus passive use of SM, actively tracking SM behaviour).

For future research, we intend to extend this project by using the sample of participants and measures of anxiety and depressed affect used here to determine the interaction between SM and adolescent well-being. More specifically, we aim to further investigate individual differences in SM experiences and determine how adolescents with particular tendencies (e.g., proclivity for anxiety) may experience different outcomes than peers with other predispositions (e.g., tendencies to experience depressed mood). The goal is to demonstrate how SM impacts adolescents differentially and cross-culturally.

Chapter 3

Anxiety Determines Motives for Social Media Use in Early Adolescence: Facebook Motives Among Community Samples of Canadian and Colombian Youth

Wood, M.A., Panarello, B., Saldarriaga, L. M., Castellanos, M. & Bukowski, W. M. (in preparation for publication). Anxiety Determines Motives for Facebook Use in Early Adolescence: Facebook Motives Among Community Samples of Canadian and Colombian Youth.

Anxiety Determines Motives for Facebook Use in Early Adolescence: Facebook Motives Among

Community Samples of Canadian and Colombian Youth

Social media (SM) are a worldwide phenomenon, affecting persons of all ages,

particularly adolescents (George, Russell, Piontak, & Odgers, 2017; Underwood, Brown, &

Ehrenreich, 2018). Adolescence is a critical developmental period in which rapid development

takes place (World Health Organization, 2017) and individuals are increasingly sensitive to

social influences (Blakemore & Mills, 2014). Given the importance of SM in the lives of

adolescents (Twenge, 2017), it is a particularly significant developmental context for studying

adolescent experiences. Our goal was to contribute to the literature on what motivates adolescent

engagement with one particular platform: Facebook. We aimed to determine whether particular

emotional experiences (e.g., anxiety) could motivate different forms of engagement with SM in

early adolescents from two cultures.

The current popularity of Facebook is undeniable. It is the largest social network online,

with Facebook's news page reporting more than a billion accounts worldwide. Facebook remains

popular among adolescents (used by 51% of adolescents in the United States (U.S.) despite

growing use of SM such as Snapchat and Instagram (Pew Research Centre, 2018). Adolescents

frequently use their technological communication devices to socialize with their peers (Brown &

Larson, 2009; Lenhart, Purcell, Smith, & Zickuhr, 2010; Twenge, 2017) and online and offline

friendship networks overlap greatly (George & Odgers, 2015). Although Facebook has wide

international participation, with over 85% of daily users outside of North America, the literature

on SM are largely conducted within North American contexts (Wood, Bukowski, & Lis, 2016).

Typically research on SM use is concerned with variations in usage and with the effects

of using SM (George et al., 2017). The effects of Facebook have captured the attention of

empirically-driven social scientists and science journalists in the popular press (Pinker, 2014; Twenge, 2017). Currently, there is a need to situate Facebook use within affective processes that are critical components of adolescent development. There is a particular need to understand how Facebook participation intersects with different forms of anxiety during adolescence (Wood et al., 2016). Facebook experiences likely intersect with forms of affect and aspects of social and emotional regulation, and anxiety may guide adolescents' motives for using Facebook. This premise serves as the conceptual point of departure for the present study. Instead of focusing on individual differences in Facebook use or on outcome measures, we chose to take a process-oriented approach to assess how anxiety directs Facebook use.

Existing research on motives for Facebook use point to the importance of relationship maintenance, entertainment, and passing time (Moreau, Laconi, Delfour, & Chabrol, 2015; Sheldon, 2008). Although some work has been conducted on particular characteristics of individuals using SM, especially Facebook, this has focused on college/university students (Papacharissi & Rubin, 2000; Sheldon, 2008). One cross-cultural study of Chinese and Japanese university students identified three factors for social networking site (SNS) engagement: information sharing and exchange, deepening existing relationships, and expanding current interpersonal networks (Xu, Takai, & Liu, 2018). Among adolescent populations, studies on problematic Facebook use (PFU) have indicated that internal motives, such as coping, were more strongly related to PFU than external motives, such as social motives (Bischof-Kastner, Wolstein, & Kuntsche, 2014; Marino, Mazzieri, Caselli, Vieno, & Spada, 2018).

Facebook is likely to affect the adolescence-based challenge of navigating emotional experiences and regulating emotions by directing adolescents either toward or away from SM. Whereas some anxious youth may fear missing out on important communication or activities

with friends to the point of disrupting their sleep (Scott & Woods, 2019), others may be motivated to avoid contexts or SNS behaviours that pose a threat to their emotional well-being (Calancie, Ewing, Narducci, Horgan, & Khalid-Khan, 2017). One study outlined that adolescents who experience the fear of missing out (FOMO) have greater Facebook-related stress due to feelings of not belonging in regard to their peers (Beyens, Frison, & Eggermont, 2016). Specifically, anxious youth may fear triggering anxiety by viewing information posted and therefore avoid engagement in SM. Facebook can be threatening to adolescents given that they have access to a vast amount of decontextualized and selective information that can lead to a host of negative emotional outcomes (e.g., uncertainty, misinterpretation). Being exposed to such ambiguous information is likely to affect certain individuals more than others, especially adolescents with high anxiety (Calancie et al., 2017; Muzaffar, Brito, Fogel, et al., 2018). Although there is some evidence that social anxiety does not affect how social networking sites are used or how much time is spent using them (Creasy, 2013), other studies have demonstrated that socially anxious adolescents disclose less personal information about themselves on Facebook due to privacy concerns (Liu, Ang, & Lwin, 2013) and that clinical levels of anxiety is related to more repetitive SNS behaviours (Calancie et al., 2017; Muzaffar et al., 2018). Adolescent and young adult users of social networking have been shown to experience higher levels of anxiety and depression than non-users (Khodarahimi & Fathi, 2017). Shy college-level individuals are more likely to use SNS for the purpose of keeping in touch with friends (Jackson & Wang, 2013) and feel increased social support from and satisfaction with friends (Baker & Oswald, 2010). However, shyness is related to, but not equated with, anxiety. This information provides evidence that Facebook may affect anxious and non-anxious individuals differently,

although data about affective differences that motivate approach or avoidance behaviours around SM during adolescence remains limited.

Beyond internal affective tendencies, external social demands are likely to impact engagement with SM and the functional significance of anxiety and the pressure to be a participant in the digital "agora" will vary cross-culturally. The constructs of individualism and collectivism help organize cultural differences into overarching patterns (Oyserman, Coon, & Kemmelmeier, 2002). *Individualism* is a worldview that largely places importance upon privacy, autonomy, uniqueness, personal control, individual rights, personal pleasure and self-fulfillment. Conversely, *collectivism* refers to a worldview where group membership is central. Mutual expectations and obligations are fundamental, the common good is often a major goal, in-group harmony is emphasized, and the personal is seen as a part of the social (Oyserman et al, 2002). Previous research has successfully demonstrated that contextual factors (collectivism and individualism) in Colombia and Canada influence the well-being (self-worth and perceived competence) of early adolescents (Santo, Bukowski, Lopez, et al., 2013). Culture is increasingly being understood to influence how individuals interact with technologically-mediated communication (Choi, Chu, & Kim, 2012; Wu & Li, 2016). We propose that, in more collectivist societies, the pressure to engage in SM may override anxiety-driven motives for avoidance of SM. Research conducted with East-Asian university students indicated that these populations of individuals are more concerned with maintaining social norms, for instance, by acting to prevent the loss of relationships (Xu et al., 2018). Similarly, in a cross-cultural comparison, Korean college students were found to be more likely to use SNSs for social support while Americans tended to seek entertainment on SNSs (Kim, Sohn, & Choi, 2011). When compared to U.S. undergraduate students, students in Hong Kong have been found to be more likely to seek

approval, show response inviting, and aim to form consensus (Seo, Miller, Schmidt, & Sowa, 2008). Additionally, U.S. undergraduates are more likely to have more remote SNS connections and weaker ties with a larger amount of people than their South Korean or Chinese peers (Choi et al., 2012). This research lends evidence to our expectation that individuals from collectivistic backgrounds, arguably those who are more likely concerned with avoiding negative outcomes on SNS and maintaining group cohesion, will potentially partake in what would be expected at the group level so as to uphold collectivist values. To our knowledge, this has not been investigated in adolescent populations cross-culturally between North American and South America.

The overall goal of our study was to 1) determine what accounts for the use of SM platforms like Facebook and 2) to examine individual as well as cultural differences that may affect adolescents' engagement with Facebook. We designed a questionnaire to assess the motives for using SM. Four motives were measured: connection (maintaining relationships); shared identities (engaging with others with similar interests); entertainment (using when feeling bored); and lurking (looking at profiles of others to whom one has no direct contact). These objectives were pursued in a short-term (five-week) longitudinal study conducted with a cross-national sample from Canada and Colombia.

Four predictions were addressed in this study: (a) the likelihood of having a Facebook account was expected to be the same in Montréal and Bogotá; (b) anxiety was expected to be associated with having a Facebook account and this association was anticipated to vary by country; (c) anxiety was expected to predict motives for using Facebook and would vary by country; and (d) an indirect association was anticipated to exist between place, anxiety, and motivations for using Facebook.

Method

Participants

Participants were eighth grade adolescents (N = 173, *M*age = 14 years, range = 14-15) from two bilingual (English/French) mixed-sex schools in Montréal, Canada, (*N* = 79, 36 girls) and two bilingual (Spanish/English) mixed-sex schools in Bogotá, Colombia (*N* = 94, 47 girls).

Procedure

Ethical approval was obtained from all relevant institutions. Parental consent was obtained using an active consent procedure. Assent was obtained from participants before completing the questionnaire at Time 1 (T1). Students were aware that participation was voluntary and that they could discontinue without negative repercussions. Participants were administered the T1 questionnaire in late January or early February and Time 2 (T2) was five weeks later in early-to-mid March. Questionnaires were completed using tablet computers.

Measures

At each of the two waves, participants completed a questionnaire in a group administration within their classrooms. The questionnaire was created in English then translated into Spanish by translators working in psychology and education, and then back-translated into English by a separate group of translators to ensure meaning retention.

SM Use. Participants were asked if they had their own Facebook account. They were asked to report Yes (coded as "1") or No (coded as "0"). If participants did not have a Facebook account then they were excluded from the study.

Anxiety. Four self-report measures of anxiety were developed and used in this study. They are measures of (a) general anxiety, (b) social anxiety, (c) Facebook-related anxiety, and (d) fear of missing out (FOMO). Each measure had three indicators (see Table 1). The items used

Table 1. Self-Report Measures of Anxiety and Omega values at T1

Items	Omega
General Anxiety • I worry a lot • I get stressed a lot • I am anxious often	0.90
Social Anxiety • I worry that I might do something stupid and other people in class might laugh at me • I am afraid that other people will not like me • I can feel nervous when I am with other people in my class	0.88
Facebook Anxiety • Sometimes I become worried when I read what other people write on Facebook • Sometimes I worry about what I will read on other people's Facebook posts • Sometimes I worry about seeing something that will upset me on Facebook	0.93
FOMO • I feel I'm missing something if I go a whole day without checking Facebook • I get worried when I find out my friends are having fun without me • It is important that I understand my friends "in jokes"	0.85

to measure Facebook worry referred to forms of anxiety that either result from viewing Facebook content or worry regarding what one might see on Facebook (i.e., that they expect to see but have not viewed). Our anxiety measures were based upon the Revised Child Anxiety and Depression Scale (RCADS), a lengthy clinical tool used with in general (non-clinical) adolescent populations (see Mathyssek, Olino, Hartman, et al., 2013). The RCADS remains a lengthy questionnaire despite being an established tool for measuring anxiety amongst adolescents. We adapted the RCADS by making it shorter and more concise for more general usage during classroom data collections. Items were chosen and modified to reflect general and social anxiety and depressed affect while items specific to particular anxiety disorders were eliminated (e.g., obsessive compulsive disorder, panic disorder). The FOMO items referred to the concern that one is absent from pleasurable and/or important experiences and information. All of the scales, with the exception of FOMO, were rated on a five-point Likert scale with endpoints *never true* (1) and *always true* (5). A score of "1" indicated low anxiety, and a score of "5" indicated high anxiety. The FOMO items were rated on a five-point Likert scale with endpoints *not at all true of me* (1) and *extremely true of me* (5). Although the brief, specific measure of FOMO that we based our measure upon is robust (Przybylski, Murayama, DeHaan, & Gladwell, 2013), we aimed to further reduce the number of items to lessen participant burden. Thus, our measure of FOMO was adapted from Przybylski and colleagues' (2013) questionnaire to reduce the items from 10 to three. Each of these four scales were observed to be reliable at T1 and T2 and were stable over time (see Figure 1). The assessment of a confirmatory factor analysis (CFA) of this set of measures in Mplus (Muthén & Muthén, 1998-2012), showed an adequate level of fit ($\chi^2(172) = 217.427$, $p < .05$, CFI = 0.98, TLI = 0.96, RMSEA = 0.04 (0.02-0.06). Specifically, the four types of anxiety were found to be sufficiently different. See Study 1 for a detailed account.
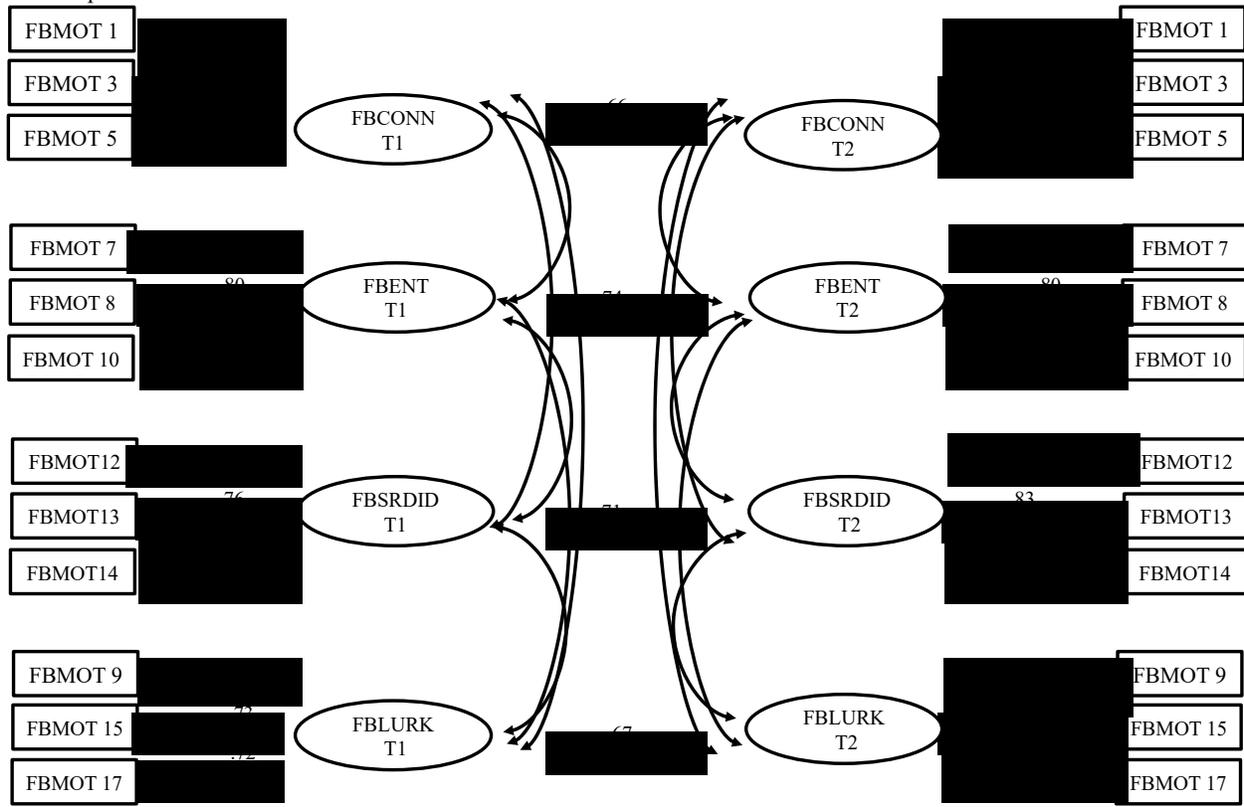
Figure 1
Self-report Measures for Anxiety
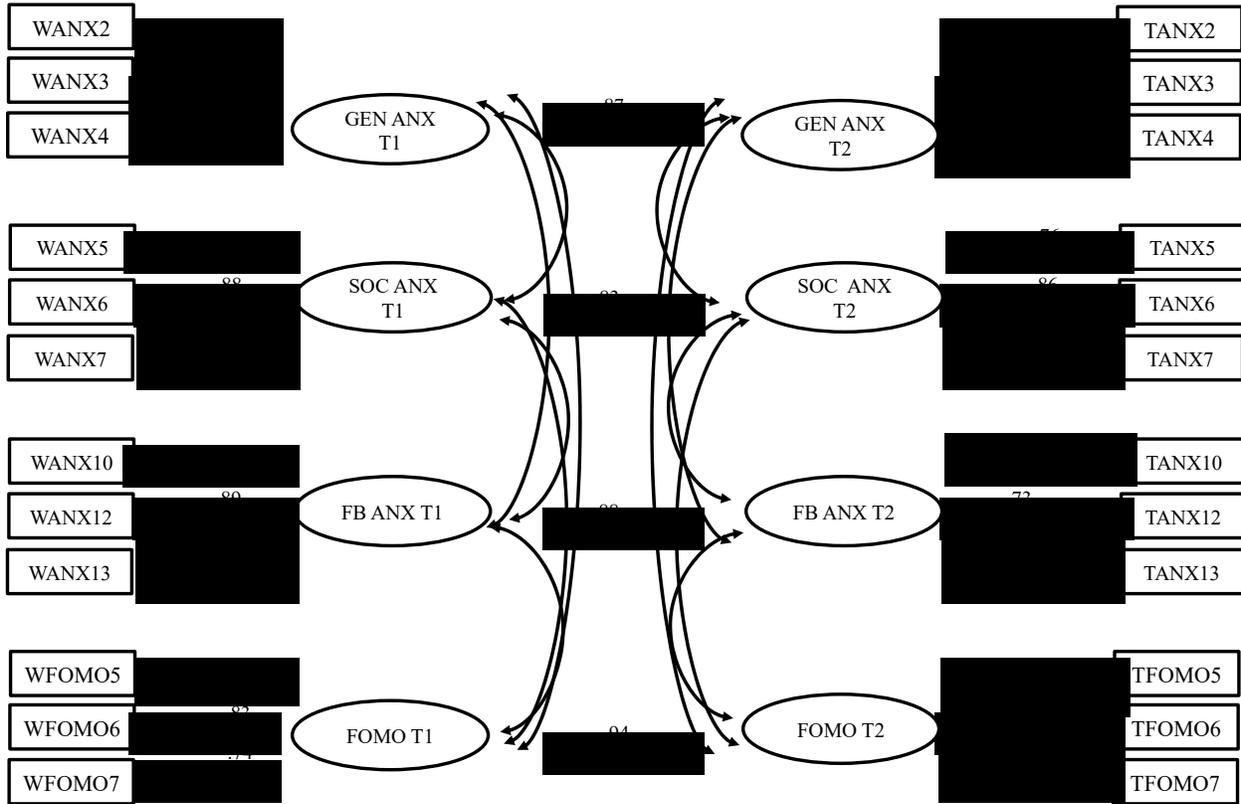
Statistically significant values below *p* of 0.01 are presented.

Facebook Motivation. Motives for using Facebook were assessed with a set of self-report items that were designed for this study but based on previous research on motives for using Facebook that employed a larger number of items per factor (see Sheldon, 2008). Four latent factors were created with three items per factor to measure connection, entertainment, shared identities, and lurking (See Table 2). Connection referred to maintaining engagement with others, entertainment referred to looking for stimulation or fun, shared identities referred to engaging with similar others, and lurking referred to viewing the profiles of others that they do not know directly. Participants rated the items on these scales using a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). Each of these four scales were observed to be reliable at T1 and T2 and measures were stable over time (see Figure 2). The assessment of CFA of this set of measures showed an excellent level of fit ($\chi^2(41) = 55.642$, $p > .05$, CFI = 0.99, TLI = 0.98, RMSEA = 0.05 (0.00-0.07). Sheldon (2008) formulated similar motives for Facebook use (e.g., "relationship maintenance", "entertainment", "passing time"), which has since been validated in more recent research amongst adolescents and young adults with problematic Facebook use (Moreau, Laconi, Delfour, & Chabrol, 2015). Similarly, another motives questionnaire originally created in German that was adapted for adolescent use employed 20 questions across the four dimensions of "social", "coping", "conformity", and "enhancement" motives (Bischof-Kastner et al., 2014). However, we perceived certain items to overlap across factors on both these scales as well as other motive scales available with similar dimensions provided (e.g., Wijesundara, 2014) and we noted some problems with meaning retention when translated into English (e.g., Bischof-Kastner et al., 2014). As such, we aimed to further improve upon these scales by (a) reducing redundancy in the items and (b) focusing on wording by employing translators in the field.

Table 2. Self-Report Measures of Motives for using Facebook and Omega Values at T1

Items	Omega
Connection	0.77
• To stay in touch with people I rarely see in person	
• To meet new people/make new friends	
• To make plans with my friends	
Entertainment	0.81
• To flirt with someone for fun	
• To post pictures	
• To pass the time when I'm feeling bored	
Shared Identities	0.83
• To join groups	
• To communicate with likeminded people	
• To express the same attitudes as others to feel accepted	
	0.80
Lurking	
• To view pictures others have posted	
• To look at the profiles of people I don't know	
• I use Facebook more to check the profiles of others I don't know or don't know well	

Figure 2
Self-report Measures for *Facebook* Motivation

FBMOT 1		FBCONN T1		FBCONN T2		FBMOT 1
FBMOT 3						FBMOT 3
FBMOT 5						FBMOT 5

FBMOT 7		FBENT T1		FBENT T2		FBMOT 7
FBMOT 8						FBMOT 8
FBMOT 10						FBMOT 10

FBMOT12		FBSRDID T1		FBSRDID T2		FBMOT12
FBMOT13						FBMOT13
FBMOT14						FBMOT14

FBMOT 9		FBLURK T1		FBLURK T2		FBMOT 9
FBMOT 15						FBMOT 15
FBMOT 17						FBMOT 17

Statistically significant values below *p* of 0.01 are presented.

<center>**Results**</center>

Place Differences in Having Facebook

The first question concerned whether the frequency of having a Facebook account was the same for the participants from Montréal and Bogotá. A Chi-square analysis was conducted to assess whether the dichotomous variable "place" (i.e., Montréal or Bogotá) was related to the answer to the question "Do you have a Facebook account?". For Montréal participants, 70 individuals (89%) answered "yes" and 9 (11%) answered "no"; for Bogotá participants, the corresponding values were 83 (88%) and 11 (12%). The Chi-square analysis used to assess contextual differences revealed a statistically nonsignificant value ($\chi^2(1) = .004$, $p > .90$), indicating no variations in Facebook frequency.

Place Differences, Anxiety, and Having a Facebook Account

The second question addressed whether anxiety was associated with having Facebook and whether this association varied cross-culturally. The analyses consisted of series of hierarchically organized models. The analyses started with an initial model followed by a set of multigroup analyses where we compared the coefficients observed with the participants from Montréal and Bogotá. The initial model included direct paths from the Facebook use measure to all measures of anxiety. This model was observed to have an adequate level of fit ($\chi^2(55) = 110.57$, $p > .05$, CFI = 0.97, TLI = 0.96, RMSEA = 0.08 (0.06-0.09). The Facebook use measure was observed to be associated with the measure of social anxiety (standardized coefficient = -0.21, $t = -2.76$, $p = .01$) and the measure of Facebook anxiety (standardized coefficient = -0.16, $t = -2.02$, $p = .04$). The associations between the Facebook use measure and the measures of general anxiety and FOMO were statistically nonsignificant.

Subsequently, equality constraints were used in four sets of multigroup analyses to determine whether there were contextual differences in these associations. A baseline model was

<div align="right">60</div>

assessed in which the observed coefficients were allowed to vary freely across groups. The fit of this model was observed to be excellent (χ^2(122) = 134.43, p > .2, CFI = 0.99, TLI = 0.99, RMSEA = 0.04 (0.00-0.07). Next, equality constraints were added to each of the anxiety measures to force the coefficients to be equal across the two groups. With each anxiety measure, the fit of the "fixed" model was significantly worse than the fit of the baseline model indicating a difference between the two places ($\Delta \chi^2$(1) = 4.71, p < .05 for general anxiety; ($\Delta \chi^2$(1) = 6.55, p < .01 for social anxiety; $\Delta \chi^2$(1) = 14.87, p < .01 for Facebook anxiety; and $\Delta \chi^2$(1) = 4.96, p < .05 for FOMO). With each measure, the values for the Montréal participants were statistically significant whereas the values were statistically nonsignificant for those in Bogotá (standardized coefficients = -0.25 and 0.12; -0.39 and -0.01; -0.41 and 0.22; and -0.33, and 0.05 for the Montréal and Bogotá participants respectively with the measures of general anxiety, social anxiety, Facebook anxiety, and FOMO). These analyses are represented in Figure 3.

Motivations for Using Facebook

The third question concerned whether anxiety predicted the participants' motives for using Facebook and whether these associations varied cross-culturally. This question was addressed by examining the effect of the four T1 anxiety measures on the four measures of motives. Two sets of analyses were conducted: (1) concurrent associations between the T1 anxiety measures and the T1 motive measures, and (2) prospective associations between the T1 anxiety measures and the T2 measures of motives while controlling for the effects of the T1 measures of motives. For the first set of analyses, the T1 anxiety measures were used to predict the T2 motive measures after the effects of place had been accounted for. This initial model showed a good level of fit (χ^2(228) = 387.056, p > .01, CFI = 0.96, TLI = 0.94, RMSEA = 0.06

Figure 3

Facebook Use and Anxiety Cross-culturally
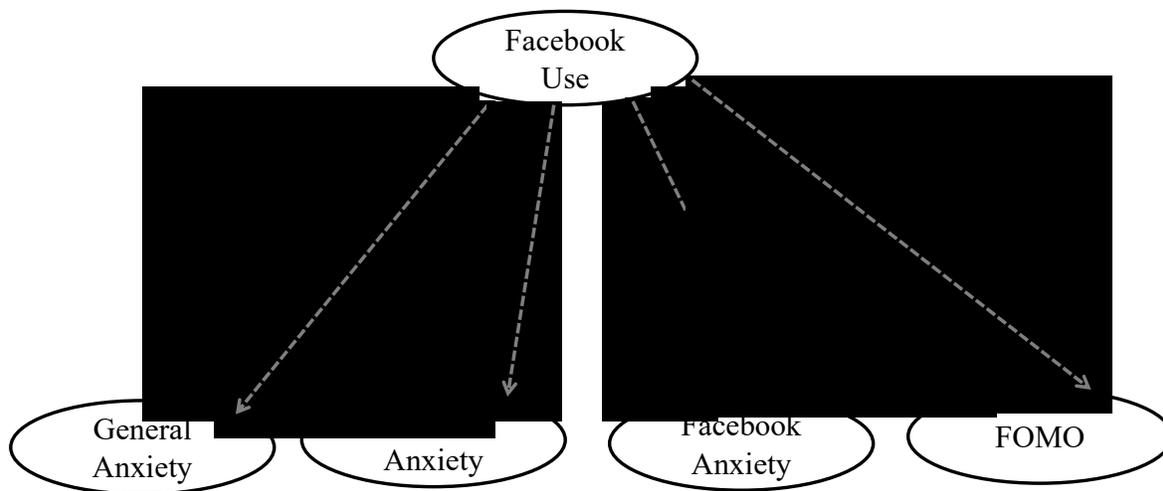
Dashed lines are statistically non-significant.

Statistically significant values below *p* of 0.05 are presented.

Values for Montréal are presented in black and Bogotá in grey.

(0.05-0.08). The results demonstrated that direct effects of general anxiety on all Facebook

motives were nonsignificant ($p > .14$ for each).

Next, results indicated that direct effects of social anxiety on shared identity were

statistically significant ($p < .05$) but that the effects on the other motives were nonsignificant

($p > .43$). The direct effects of Facebook anxiety on all of the Facebook motives were significant

($p < .01$) as were the direct effects of FOMO on all of the Facebook motives ($p < .01$). See

Figure 4 for a representation of these results.

For the second set of analyses, the T1 anxiety measures were used to predict the T2

motive measures after the effects of the T1 motive scores had been accounted for. The model

showed a good level of fit ($\chi^2(553) = 1070.053$, $p > .01$, CFI = 0.89, TLI = 0.87, RMSEA = 0.07

(0.07-0.08). The results demonstrated that direct effects of general anxiety on all Facebook

motives were nonsignificant ($p > 0.08$ each). Next, results indicated that direct effects of social

anxiety on shared identity were significant (standardized coefficient = 0.44, $p = .02$) but that the

effects on the other motives were nonsignificant ($p > .55$). The direct effects of Facebook anxiety

on all of the Facebook motives were significant (0.72, 0.67, 0.46, and 0.49, respectively, $p < .01$

for all) as were the direct effects of FOMO on all of the Facebook motives (0.25, 0.30, 0.29, and

0.44, respectively, $p < .01$ for all). See Figure 5 for a representation of these results.

Next, equality constraints were used to force the variables to be equal to determine which

of the aforementioned effects were strongest. First, a free model was conducted followed by six

separate models equating the strongest effects for Facebook anxiety (i.e., connection motives)

and FOMO (i.e., lurking motives). The free model showed a good level of fit ($\chi^2(561) =$

1091.955, $p > .01$, CFI = 0.88, TLI = 0.87, RMSEA = 0.08 (0.07-0.08). The fit of the model in

Figure 4

The Effects of Anxiety on Motivations for Using Facebook While Controlling for Place Effects
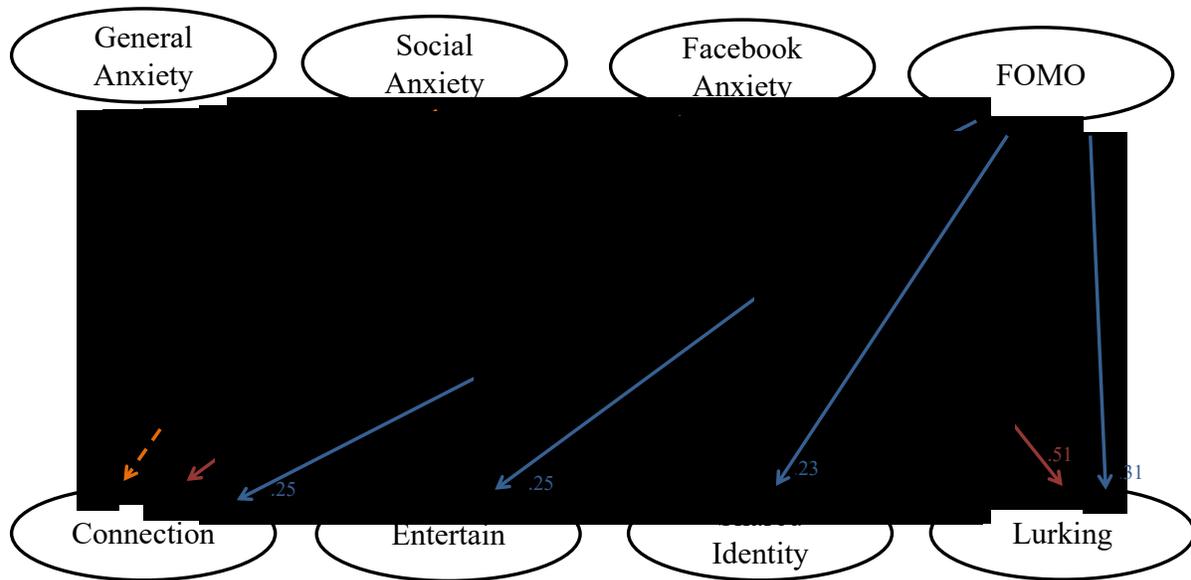
Dashed lines are statistically non-significant.
Statistically significant values below *p* of 0.05 are presented.
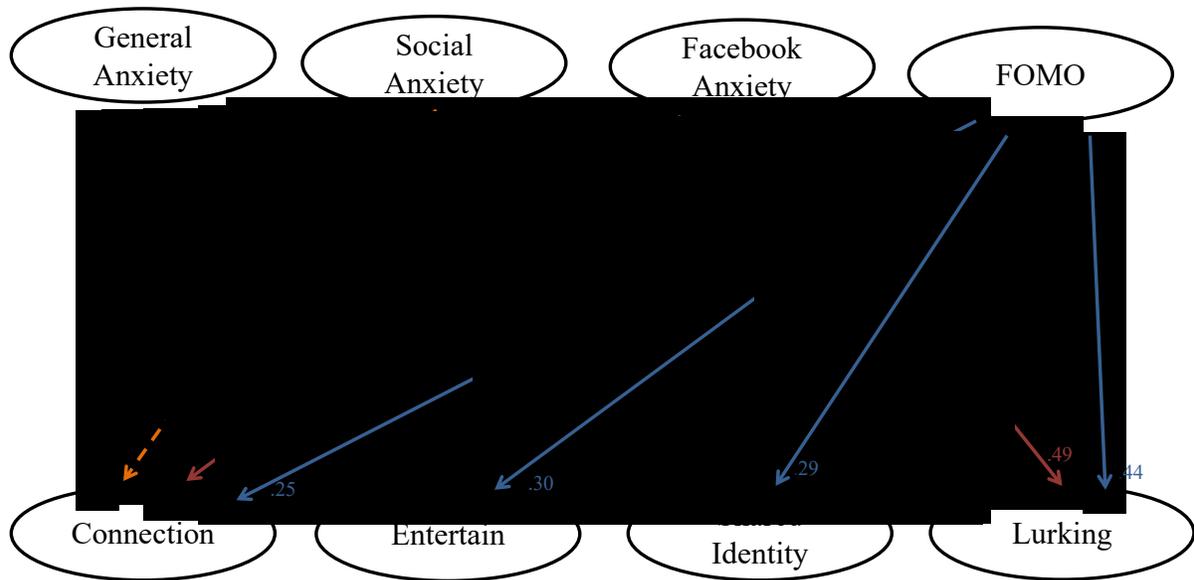
Figure 5

The Effects of Anxiety on Motivations for Using Facebook While Controlling for Motives at T1


Dashed lines are statistically non-significant.
Statistically significant values below *p* of 0.05 are presented.

which the coefficients were set to be equal was compared to the fit of the free model to determine if the equality constraints made the model worse. In the first set of analyses the coefficients from the Facebook anxiety measure to the motive measures (i.e., connection, entertainment, shared identity, and lurking) were set to be equal to each other. Facebook anxiety was observed to be a significantly stronger predictor of connection than any other motive ($\Delta \chi^2(1) = 3.852$, $p = .05$ for entertainment; ($\Delta \chi^2(1) = 3.882$, $p < 0.05$ for shared identity; and $\Delta \chi^2(1) = 0.391$, $p = .05$ for lurking). The second set of analyses followed the same format as the first set except that FOMO was used as a predictor of all motives. Again, the paths from FOMO to the motive measures were set to be equal. In each analysis, FOMO was a nonsignificantly stronger predictor of lurking than any other motive ($\Delta \chi^2(1) = 2.645$, $p = .10$ for connection; ($\Delta \chi^2(1) = 0.486$, $p = .49$ for entertainment; and $\Delta \chi^2(1) = 0.712$, $p = .40$ for shared identity).

The final analyses assessed whether motives varied by place. This model showed a good level of fit ($\chi^2(47) = 79.378$, $p < .01$, CFI = 0.98, TLI = 0.96, RMSEA = 0.06 (0.04-0.09) (see Figure 6). The effects of place on connection, entertainment, shared identity, and lurking were statistically significant (i.e., $p = 0.00$ for each motive). A set of models were assessed to examine differences in the measures of motivation for using Facebook. An index of place (Bogotá = 1, Montréal = 2) was used as the primary predictor and measures of anxiety were used as covariates to control for differences between participant groups. When the measures of general anxiety and social anxiety were used as covariates, the measure of place was observed to be associated with the motives of connection, entertainment, and shared identity ($p < .04$) but not lurking ($p = .24$) (see Figure 7). In contrast, when Facebook anxiety was used as the covariate, place was observed to be associated with only one motive, specifically connection ($p < .02$) (see Figure 8). Lastly, when the measure of FOMO was used as the covariate, the measure of place was observed to be

Figure 6

The Effects of Place on Motivations for Using Facebook (Baseline Model)
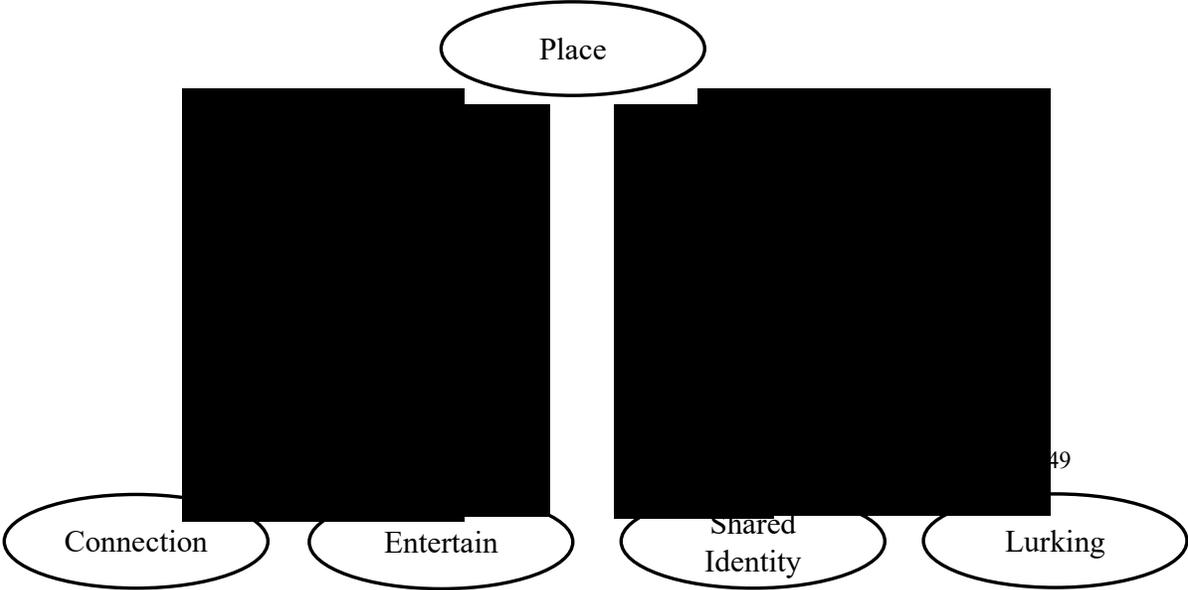
Statistically significant values below *p* of 0.01 are presented.

associated with all motives ($p < .02$) (see Figure 9). In all cases, adolescents in Montréal cited those motives for using Facebook more frequently than adolescents in Bogotá. Thus, the association between different types of anxiety and reasons to use Facebook appear to be stronger for participants from individualistic cultures.

Indirect effects. We assessed whether place had an effect on motivation for using SM when anxiety was present. All forms of anxiety were included in four separate analyses. Only one model showed a statistically significant indirect effect, which was the model using Facebook-specific anxiety as the variable situated between place and motive. This model showed a good level of fit (χ^2(193) = 262.478, $p < .01$, CFI = 0.98, TLI = 0.97, RMSEA = 0.05 (0.03-0.06). The results demonstrated an indirect effect from place to using Facebook for connection purposes via Facebook anxiety ($B = 0.124$, $p = .04$), from place to using Facebook for entertainment purposes via Facebook anxiety ($B = 0.023$, $p = .00$), from place to using Facebook for shared identity purposes via Facebook anxiety ($B = 0.173$, $p = .01$), and from place to using Facebook for lurking purposes via Facebook anxiety ($B = 0.155$, $p = .01$) (see Figure 10).

Discussion

The overriding goal of this study was to change the direction of research on adolescents' experiences with social media (SM). Two key features distinguish this study from prior projects. First, we wanted to go beyond the study of mere usage of SM. Our goal was to recognize that adolescents use SM for different reasons. We wanted to assess how motives for using SM were related to individuals' characteristics and how they differed across cultural contexts. The second distinguishing feature of this study was our use of measures of anxiety as antecedents of differences in SM use. Typically, anxiety has been conceived of and studied as an outcome. In

Figure 7

The Effects of Place on Motivations for Using Facebook While Controlling for General and Social Anxiety Effects
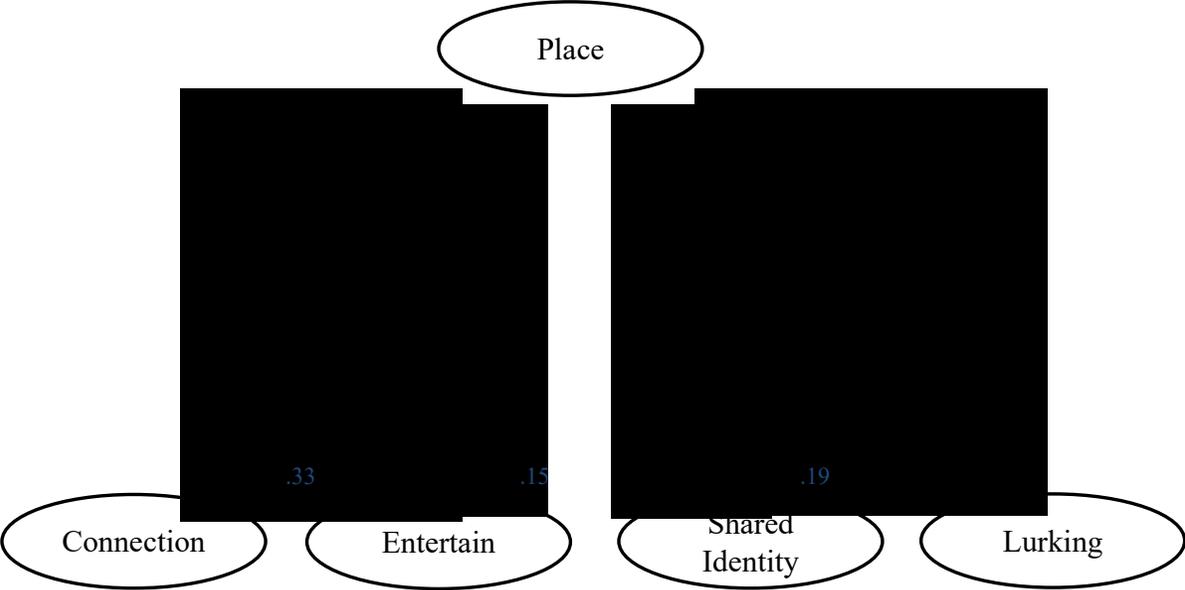
Dashed lines are statistically non-significant.

Statistically significant values below *p* of 0.05 are presented.

Values for General Anxiety in black.

Figure 8

The Effects of Place on Motivations for Using Facebook While Controlling for *Facebook* Anxiety Effects

Dashed lines are statistically non-significant.
Statistically significant values below *p* of 0.05 are presented.

Figure 9
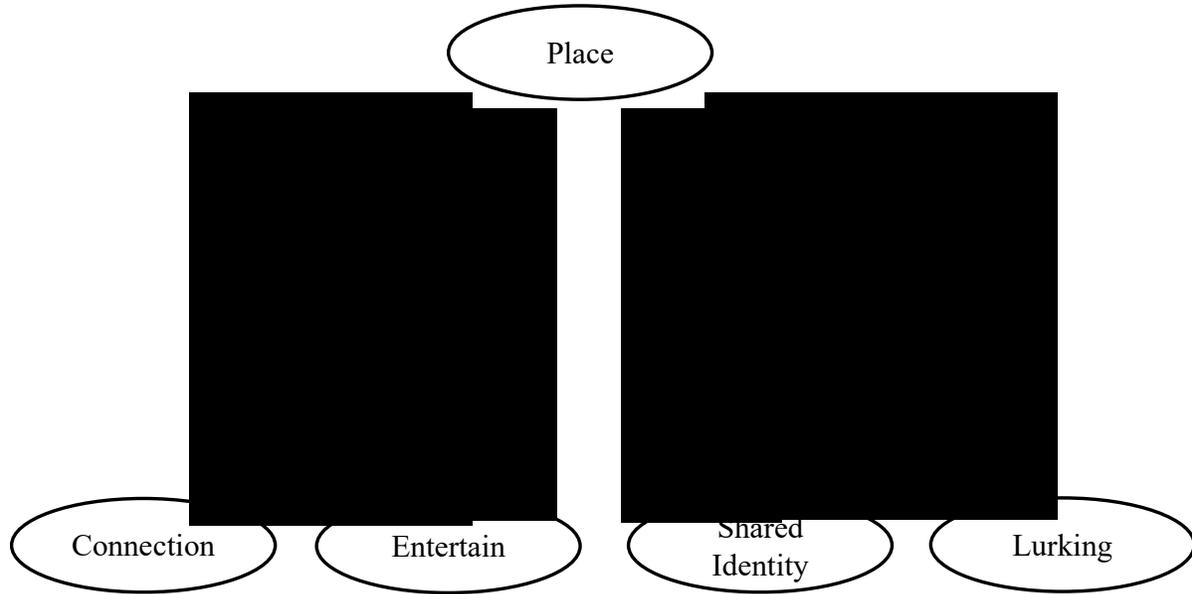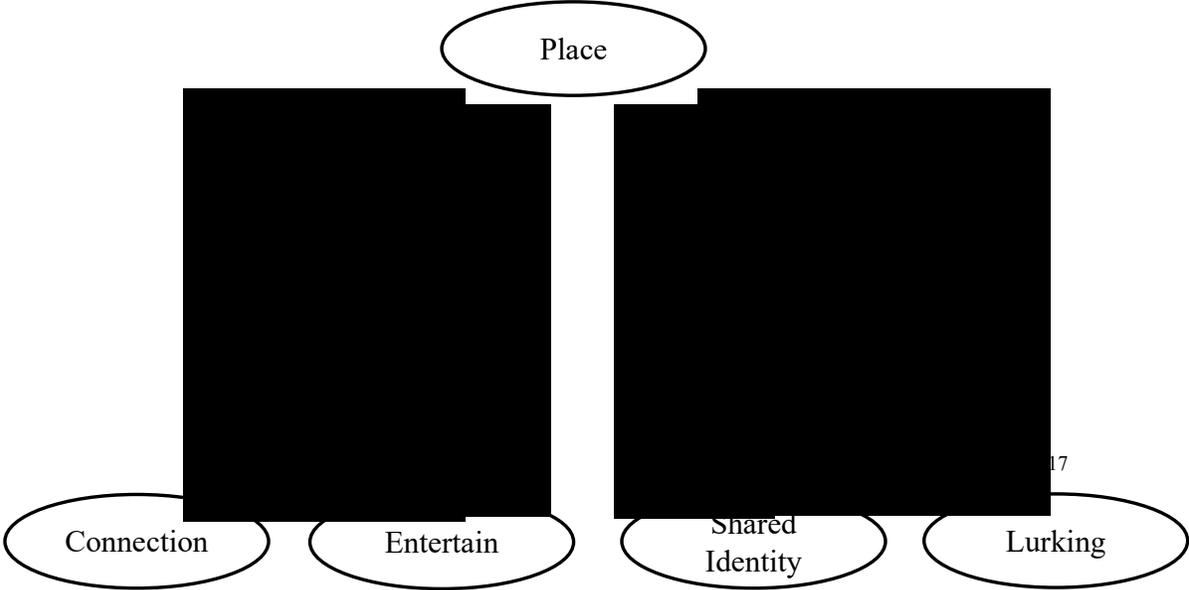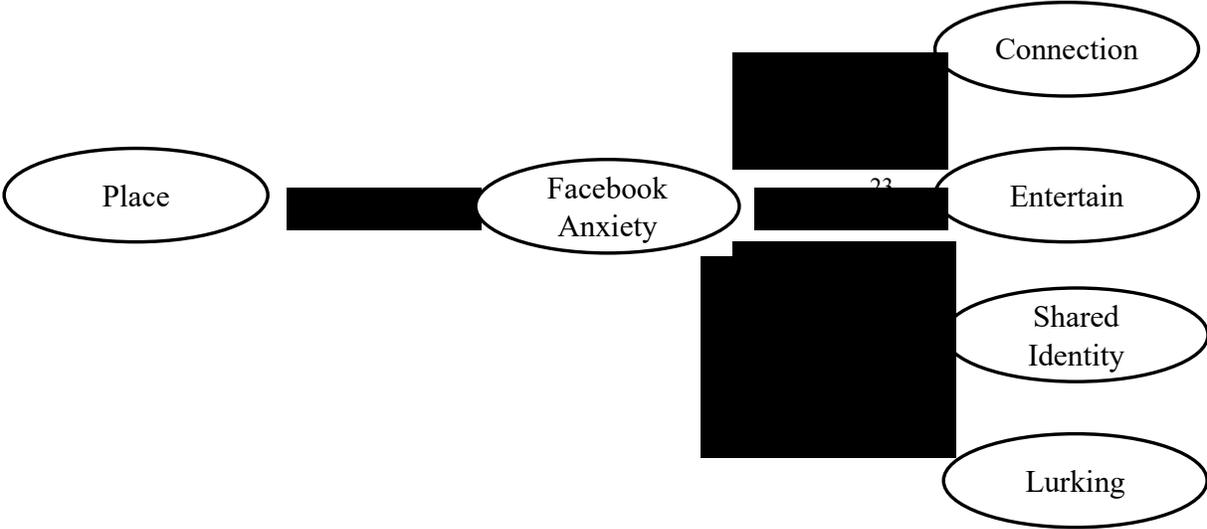The Effects of Place on Motivations for Using Facebook While Controlling for FOMO Effects

Dashed lines are statistically non-significant.
Statistically significant values below *p* of 0.05 are presented.

Figure 10

The Indirect Effects of Place on Motivations for Using Facebook

Statistically significant values below *p* of 0.05 are presented.

this study we wanted to assess anxiety as a component of SM use and how it may influence SM use. A further critical feature of this study is its use of participants from two cultural contexts.

The specific goals of the study were to determine whether individual as well as cultural differences that may affect adolescents' engagement with Facebook (Canada and Colombia). New, more precise measures concerning adolescent motives for using SM were created that add to the conceptual and methodological toolbox available for research on basic aspects of SM experiences. Our measures show acceptable or even strong levels of reliability despite including a reasonably small number of items. For example, a previous measure of FOMO upon which we based our work included 10 items (Przybylski et al., 2013). We adapted this measure so that only three items were included. These measures were created in a way that they can be modified by researchers investigating various forms of SM, such that the name of the SM platform of interest may be inserted into the questionnaires. As such, our new measures aimed to be more concise, specific, and flexible.

In line with our expectations, the first set of findings validated our emphasis on anxiety in a cross-national sample. We found that no differences existed in terms of the frequency of having a Facebook account cross-culturally. We specifically demonstrated that adolescents in the Canadian culture who experience various forms of anxiety (general, social, Facebook-specific, and FOMO) are less likely to have a Facebook account. A critical finding is that anxiety appears to discourage Canadian adolescents from a common social domain. Conversely, SM engagement does not appear to be influenced by anxiety for Colombian adolescents. This result may be explained by perceived social pressure on the part of Colombian adolescents, which is potentially greater than their anxiety related to SM engagement. We interpret these findings to mean that adolescents in collectivistic contexts such as Colombia may engage in SM activity regardless of

their feelings towards using SM because of peer influence. In contrast, adolescents in more individualistic settings such as Canada may feel less social pressure than Colombian adolescents and therefore decide whether to engage in SM like Facebook based upon their individual preferences and needs.

With regards to motives for engaging in SM, when controlling for place effects, social anxiety was found to be a significant predictor of using Facebook for the purpose of connecting with others sharing similar interests. Additionally, both Facebook-specific anxiety and FOMO were predictors of all motives for using Facebook (connection, entertainment, shared identity, and lurking). It is conceivable that adolescents with more specific worries are better able to identify reasons as to why they engage in Facebook use. Similarly, socially anxious adolescents might more readily acknowledge that they are seeking shared, socially and interpersonally connecting experiences with others on SM, which they may be reluctant to do in person.

Analyses of indirect effects between place (country) and motives for using SM demonstrated that only Facebook anxiety affects the relation between place and all Facebook motives. These results are in line with our primary finding that Facebook anxiety is a significant predictor of all forms of Facebook motivation. They reveal that place is a predictor of Facebook motives when Facebook anxiety is high and that this is especially strong for adolescents in Canada. It may be that due to the individualistic values, Canadian adolescents who are anxious about what they might see on Facebook may be more aware of the reasons why they are using Facebook. In contrast, adolescents in Colombia experiencing Facebook anxiety may be less aware of the reasons why they are using Facebook given group pressure to engage. These findings are in line with previous research that demonstrated that motives for SNS use (e.g., connecting with people they know but rarely see, to keep in touch with friends) were higher for

participants in an individualistic setting (U.S.) than those in a collectivistic setting (China) (Jackson & Wang, 2013). These authors posit that individuals in collectivist cultures may have their social/interpersonal needs met in person and as such use SNS less for these purposes, which may also provide an explanation for our current findings.

The current study has several key strengths. First, we studied community-based populations of early adolescents rather than clinical samples which are often the focus of research on SM (see Wood et al., 2016 for a review), making the results more generalizable to the average adolescent. Second, this study focuses on a younger population than most studies, which typically focus on older adolescents and young adults in college and university (see Wood et al., 2016 for a review). Third, we had the opportunity to collect data in two cultural contexts (North and South America) with individualistic and collectivistic values. Little research has thus far been conducted with cross-cultural comparisons amongst adolescents, and none to our knowledge have compared Canadian to Colombian populations, and these cross-cultural projects, like most research, have focused on undergraduate and college-level students (Choi et al., 2012; Jackson & Wang, 2013; Kim, Sohn, & Choi, 2011; Seo et al., 2008; Wijesundara, 2014; Xu et al., 2018) or have compared the U.S. to Asian countries (Choi et al., 2012; Jackson & Wang, 2013; Kim et al., 2011; Seo, Miller, Schmidt, & Sowa, 2008; Wijesundara, 2014). A fourth strength is the use of specific, concise, reliable, and flexible scales specific to anxiety and SM for the use of other researchers in the field. Despite these strengths, we recognize that collecting data at additional time points and on specific features of usage (e.g., active versus passive use of SM, time spent on SM) would be beneficial for future research. However, our "lurking" dimension is arguably what is considered to be "passive Facebook use" in existing literature (e.g., Frison & Eggermont, 2016b). Additionally, another limitation is that our "connection" motive consisted of

items pertaining to both the maintenance and the seeking of relationships with others, which could arguably be teased apart as separate motives.

Our results indicate that adolescents use SM, Facebook in particular, differentially and that individual predispositions, specifically in regard to anxiety and potential avoidance tendencies, are important determinants of (a) whether adolescents use SM like Facebook, and (b) the motives underlying adolescent use of SM. These tendencies appear to vary by context, signaling cultural influences. Given the ubiquitous and continually increasing nature of SM in the lives of adolescents (Twenge, 2017; Wood et al., 2016), there is a need to identify what entices or repels them from engaging in this global phenomenon. In addition to the traditional challenges of adolescence, such as identity formation and daily responses to social situations, they now have an additional digital developmental context in which to maneuver as well. We view this area of research as a domain ripe with information pertaining to the emotional lives of adolescents and the developmental challenges they face at an emotionally sensitive time (Blakemore & Mills, 2014).

The current project contributes to the literature on SM and early adolescent emotional experiences of anxiety. We see that individual differences in anxiety influence how SM are engaged with, establishing that adolescents' emotional experiences are intertwined with their SM experiences. Not only do individual differences exist in motives for using SM, but cross-cultural factors were demonstrated to be of import as well. Specifically, anxious adolescents in individualistic and collectivistic contexts differentially engage with SM. These findings indicate the necessity of considering how individual, emotional, and cultural differences impact use of SM. The results of the current paper indicate a need for future research on emotional outcomes of SM use for different individuals across cultural contexts.

Chapter 4

Social Media as a Developmental Context for Adolescent Well-Being:

Effects of Facebook Depressed Affect and Anxiety

Wood, M.A., Panarello, B., Saldarriaga, L. M., Castellanos, M. & Bukowski, W. M. (in

preparation for publication). Anxiety Determines Motives for Facebook Use in Early

Adolescence: Facebook Motives Among Community Samples of Canadian and

Colombian Youth.

Social Media as a Developmental Context for Adolescent Well-Being:

Effects of Facebook Depressed Affect and Anxiety

Social media (SM) have a ubiquitous presence in the lives of individuals throughout the world. People young and old can be seen nearly everywhere using phones and other technological devices to text message, use the Internet, and interact on SM. This extensive use is especially relevant to adolescents who, more so than adults, frequently use SM in the form of social networking sites (SNS) and instant messaging (Christofides, Muise, & Desmarais, 2011; George, Russell, Piontak, & Odgers, 2017; Twenge, 2017; Underwood, Brown, & Ehrenreich, 2018; Valkenburg & Peter, 2011). Adolescence is a developmental period in which individuals experience rapid growth (World Health Organization, 2017) and are more sensitive to social influences from others (Blakemore & Mills, 2014). The primary reason adolescents use SM is to engage with their peers (Twenge, 2017; Lenhart, Purcell, Smith, & Zickuhr, 2010) and to maintain their relationships (Moreau, Laconi, Delfour, & Chabrol, 2015; Sheldon, 2008). It is well understood within the developmental literature that friendships with peers are central in the psychosocial development of adolescents and have an impact on their well-being (e.g., Rubin, Bukowski, & Bowker, 2015; Wood, Bukowski, & Santo, 2017). In this way, adolescent friendships, emotional well-being, and SM are crucially linked.

SM is a performative arena where adolescents experiment with self-presentations and self-identities (Eleuteri, Saladino, & Verrastro, 2017; Jordán-Conde, Mennecke, & Townsend, 2014; Valkenburg, Schouten, & Peter, 2005), often visible to a large audience. Adolescence is also a period where youth attribute importance to similarity between themselves and their peers and view social status as critical (Brown & Larson, 2009), making SM a domain where adolescents can make social comparisons with others even when outside of the school context.

As such, the impact of SM usage on the well-being of adolescent youth is an essential domain of study and can arguably be considered a "digital" developmental context (Underwood et al., 2018) where individuals form their "digital self" (Wagner, Lipson, Sandy, & Eisenberg, 2014; Wood, Bukowski, & Lis, 2016) that they then present to others in their networks. Facebook is the largest available SNS, hosting over a billion accounts as stated on their website, and remains highly popular amongst adolescents aged 13 to 17 despite the popularity of other platforms such as Instagram and Snapchat (Pew Research Center, 2018). The amount of time spent using SNS makes up a substantial proportion of the lives of today's adolescents. Adolescents spend hours per day on their communication devices (Jelenchick, Eickhoff, & Moreno, 2013; Moulin & Chung, 2017; Sampasa-Kanyinga & Lewis, 2015; Tiggemann & Slater, 2013), with almost the entirety of their leisure time outside of school and sports spent on SM (Twenge, 2017). Their engagement with SNS often interferes with their sleep due to increased SM usage in the evening (Scott & Woods, 2019) and sleep is disrupted in order to message with friends during the night (Moulin & Chung, 2017). Although friendships on SM are understood to reflect in-person relationships (George & Odgers, 2015; Yau & Reich, 2018), a greater amount of information is available online than can be experienced "offline." Facebook is the form of SM focused on within this study because of the unique qualities it possesses, despite similarities to other platforms. For instance, Facebook offers a "synchronous" platform where videos, photos, and messages can remain visible over time. This allows for the continual availability of a large quantity of information that comes predominantly from one's friends. It is for these reasons that Facebook is considered one of the richest sources of information, particularly social information, available on SM.

SM is understood to intersect with emotional experiences, especially anxiety and depressed affect. This is a particularly important task for adolescents, who are known to experience more difficulty with emotion regulation, when faced with the challenge of being exposed to a large amount of exaggerated, filtered, and manicured posts from others (Twenge, 2017), which leads to comparisons to one's peers and, in turn, negative emotional outcomes (Charoensukmongkol, 2018; Rosenthal, Buka, Marshall, Carey, & Clark, 2016). Adolescents who spend more time on SM compared to "offline," in-person activities tend to be unhappier than their peers (Twenge, 2017). This point has certainly been argued in the popular press by Turkle (2015) and Pinker (2014), who emphasize that SM use decreases face-to-face interactions, which they argue has damaging consequences for human connections. In other words, not only can we identify reasons why adolescents engage in SM use (Moreau et al., 2015; Muzaffar, Brito, Fogel, Fagan, et al., 2018; Sheldon, 2008), we are also able to target outcomes of SM engagement for adolescents and specify differences between individuals with varying emotional tendencies and predispositions. Some researchers argue that SM use by adolescents is largely not harmful (Eleuteri, Saladino, & Verrastro, 2017) while others report that adolescents are a high-risk group for several emotional and health problems while using these technologies (Guinta, 2018). The latter has been shown to be especially true for clinical samples of adolescents (Muzaffar et al., 2018). Interestingly, adolescents themselves report greater symptoms of depression, stress, and self-esteem problems when they perceive cyberbullying or distorted material to be present on SM (O'Reilly, Dogra, Whiteman, et al., 2018). In terms of engagement with SNS, adolescent girls experiencing depressed affect tend to use SNSs more than their peers (Oberst, Wegmann, Stodt, Brand, & Chamarro, 2017). For adolescents with clinical levels of anxiety, ambiguous information presented on Facebook is experienced as more

threatening (Calancie, Ewing, Narducci, Horgan, & Khalid-Khan, 2017) and more repetitious behaviours are often engaged in (Calancie et al., 2017; Muzaffar et al., 2018). Taken together, it appears that emotions are affected by SM engagement and emotional dispositions of adolescents affect the degree of impact SM has on their lives and well-being and the ways in which they engage in its usage.

Although the aforementioned research indicates that SM use and emotional experiences are related, there are limitations within the available literature. Primarily, most work has focused on older adolescents and young adults, particularly college and university-level students, rather than young to middle adolescents (e.g., Chou & Edge, 2012; Clayton, Osborne, Miller, & Oberle, 2013; Oberst et al., 2017; Moreno, Jelenchick, Egan, et al., 2011; Muzaffar et al., 2018; Shepherd & Edelmann, 2005). Secondly, results are often contradictory. For instance, some report that Facebook usage is not related to depression for older adolescents (Jelenchick et al., 2013; Muzaffar et al., 2018), while others have demonstrated that a strong association exists between Facebook use and depressive symptoms for young adults (Rosenthal et al., 2016). A larger proportion of evidence exists demonstrating that adolescent and young adult users of SNS experience higher anxiety and depression than non-users (Khodarahimi & Fathi, 2017). In terms of research that has been conducted with adolescents, SM tools have not always been specified (Nesi & Prinstein, 2015) and questionnaires have used varying terms to gather information on SM use (Kircaburun, 2016). However, evidence suggests that adolescents with the fear of missing out (FOMO) experience greater Facebook-related stress (Beyens, Frison, & Eggermont, 2016). Thirdly, clinical populations are often sampled rather than conducting community-based research (e.g., Calancie et al., 2017; Muzaffar et al., 2018). Further research is warranted to

clarify the effects of SNSs in community-based samples of early adolescents, particularly in regard to Facebook.

The overall goal of this study was to situate SM use, specifically Facebook use, in an emotional framework. Specifically, to determine how SM impacts the emotional well-being of adolescents with particular tendencies, such as for anxiety or depressed mood. The <u>first question</u> concerned the association between anxiety and Facebook use. First, it was expected that anxious adolescents would be less likely to have a Facebook account given exposure to potentially threatening material and, as such, avoid this platform. Second, it was expected that the importance placed upon the individual versus the group would affect engagement with Facebook, such that anxious adolescents from collectivistic cultures, which emphasize in-group harmony (Oyserman, Coon, & Kemmelmeier, 2002) (in this case, Bogotá, Colombia) may be more likely than anxious adolescents from individualistic cultures, emphasizing autonomy (Montréal, Canada) to use Facebook despite their anxiety in order to maintain group norms. The <u>second question</u> concerned changes in anxiety and depressed affect over time for Facebook users. First, we assessed whether the measures we used for anxiety and depressed affect were stable from T1 to T2. Second, we addressed whether elevated anxiety could predict depressed affect over time and vice versa. This question was based upon literature with children demonstrating a bidirectional relationship between anxiety and depression (Lavigne, Hopkins, Gouze, & Bryant, 2015). Third, and most important to the hypotheses, we assessed whether anxiety impacted depressed affect over time and vice versa. Fourth, we examined whether these effects would be seen to the same degree for the participants from Montréal and Bogotá. Essentially, the main concern regarded how adolescents who have problems with anxiety and depressed mood would behave and react differently than their peers when engaging with

Facebook. One important issue that is addressed in this study concerns the stability of anxiety and depression related to Facebook. Although it is reasonable to assume that each of these constructs will be stable across a short time interval, one can expect that the stability of anxiety and depressed affect will vary as a function of one another. Specifically, anxiety will depend on the effect of one's experiences with SM as manifested in measures of depressed affect and that anxiety is likely to support the continuity of experiences of Facebook-related depressed affect.

Questions pertaining to anxiety and Facebook focused largely on engagement with this SM platform, whereas items pertaining to depressed affect concerned whether Facebook use affects mood. Specifically, whether some adolescents with depressive predispositions are more likely to experience elevations in depressed mood following the use of Facebook. We were particularly interested in the impact of Facebook use on self-image, especially the potential effects on self-criticism and self-esteem. We expected that adolescents with elevated depressed affect who have Facebook in both Bogotá and Montréal would experience worsened mood over time. This assessment of the intersection between depressed affect and Facebook use fills a basic gap in our understanding of how SM use affects a common emotional experience linked to well-being. A critical aspect of our current analysis is the use of a longitudinal data set that will allow us to address issues related to antecedents and consequences.

Method

Participants

Adolescent boys and girls (N = 173) in 8th grade in mixed-sex schools in North America (*M*age = 14 years, range = 14-15), from two bilingual (English/French) schools in Montréal, Canada, (*N* = 79, 36 girls) and two bilingual (Spanish/English) schools in Bogotá, Colombia (*N* = 94, 47 girls) participated.

Procedure

First, ethical approval was obtained from the relevant institutions. Next, permission from the school boards and principals of the schools in Canada and Colombia was obtained. Subsequently, an active consent procedure was used to attain parental consent. Lastly, adolescent assent was obtained from participants. Participants were made aware that their participation was voluntary and that they could discontinue without repercussions at any point during the study. There were no exclusion criteria for participation aside from having a Facebook account. The Time 1 (T1) questionnaire was administered in late January or early February and Time 2 (T2) was five weeks later in early-to-mid March. Adolescents completed questionnaires at T1 and T2 on tablet computers in their classrooms.

Measures

At each time the participants completed a questionnaire during a classroom-based group administration. The questionnaire was created in English and then translated into Spanish by translators working in the fields of education and psychology. The questionnaires were then back-translated into English by a separate group of translators to ensure meaning retention of items.

Social media use. Participating adolescents were asked if they had their own Facebook account. They reported either Yes (coded as "1") or No (coded as "0").

Anxiety and depressed affect. Four self-report measures of anxiety were developed with three items each: (a) general anxiety, (b) social anxiety, (c) Facebook-related anxiety, and (d) FOMO (See Figure 1). Facebook-related worry referred to anxiety resulting from viewing Facebook content or worry regarding what might be seen on Facebook. FOMO referred to the concern that one is absent from pleasurable or important experiences and information. All of the

Figure 1
Self-report Measures for Anxiety
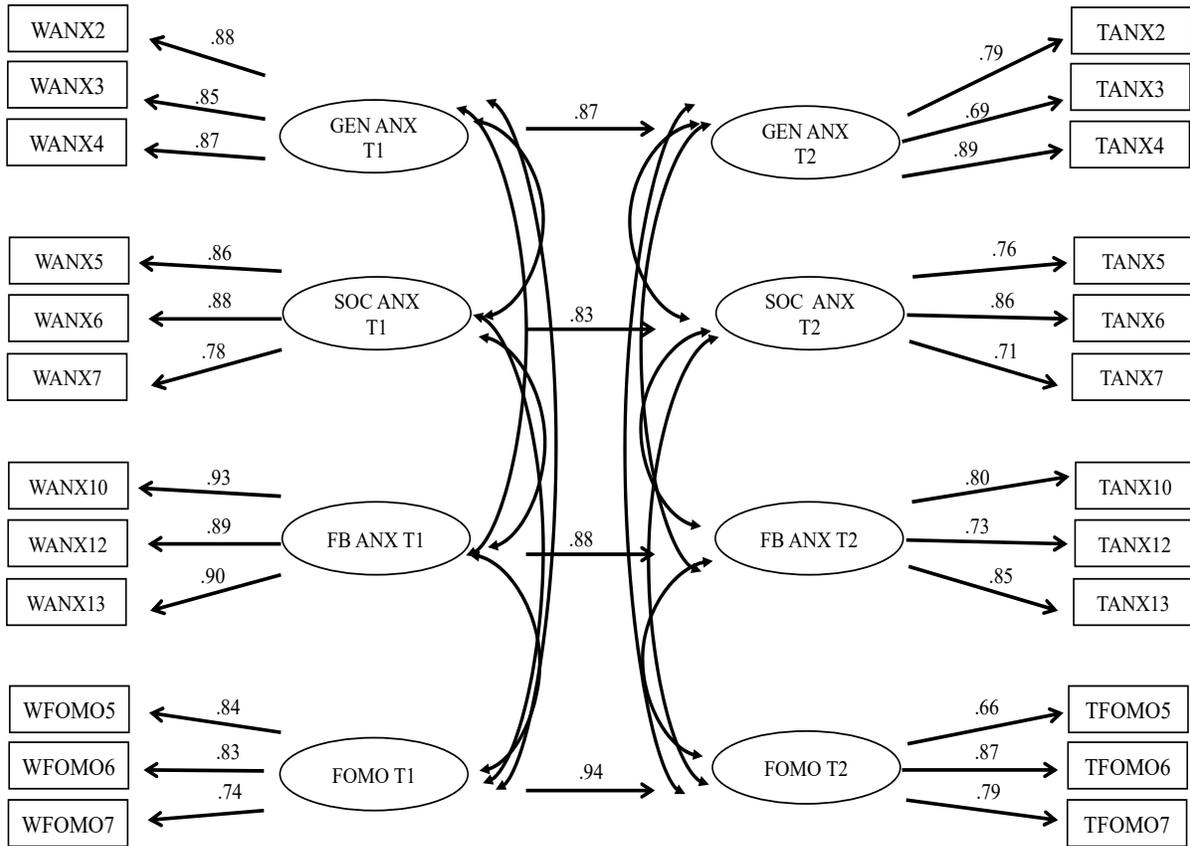
Statistically significant values below *p* of 0.01 are presented.

scales, with the exception of FOMO, were rated on a 5-point Likert scale with endpoints *never true* (1) and *always true* (5). A score of "1" indicated low levels of anxiety, and a maximum score of "5" indicated high anxiety. FOMO items were rated on a 5-Point Likert scale with endpoints *not at all true of me* (1) and *extremely true of me* (5).

Three measures of depressed affect were developed, with four items each: (a) general feelings of depressed affect, (b) depressed affect related to Facebook, and (c) depressed affect as it relates to self-image (See Figure 2). The first factor assessed feelings of depressed affect that adolescents may feel as a typical state. The second factor assessed how Facebook posts can negatively influence mood. The third factor assessed how Facebook use impacts an adolescent's self-image due to social comparison on SM. Participants rated the items on these scales using a 5-point scale ranging from *never true* (1) and *always true* (5). See Study 1 for a more detailed explanation of these measures.

Results

Place Differences in Having a Facebook Account

A Chi-square analysis was conducted to determine whether adolescents in Montréal and Bogotá participated in Facebook use at the same rate. For adolescents in Montréal, 89% reported having Facebook ($N = 79$, 70 = yes, 9 = no). For adolescents in Bogotá, 88% reported having Facebook ($N = 79$, 83 = yes, 11 = no). The Chi-square analysis revealed no significant variations in Facebook frequency ($\chi^2(1) = .004$, $p > .90$).

Place Differences, Anxiety, and Having a Facebook Account

The next analyses consisted of series of hierarchically organized models to assess whether anxiety was associated with having Facebook and whether this association varied cross-

Figure 2
Self-report Measures for Depressed Affect
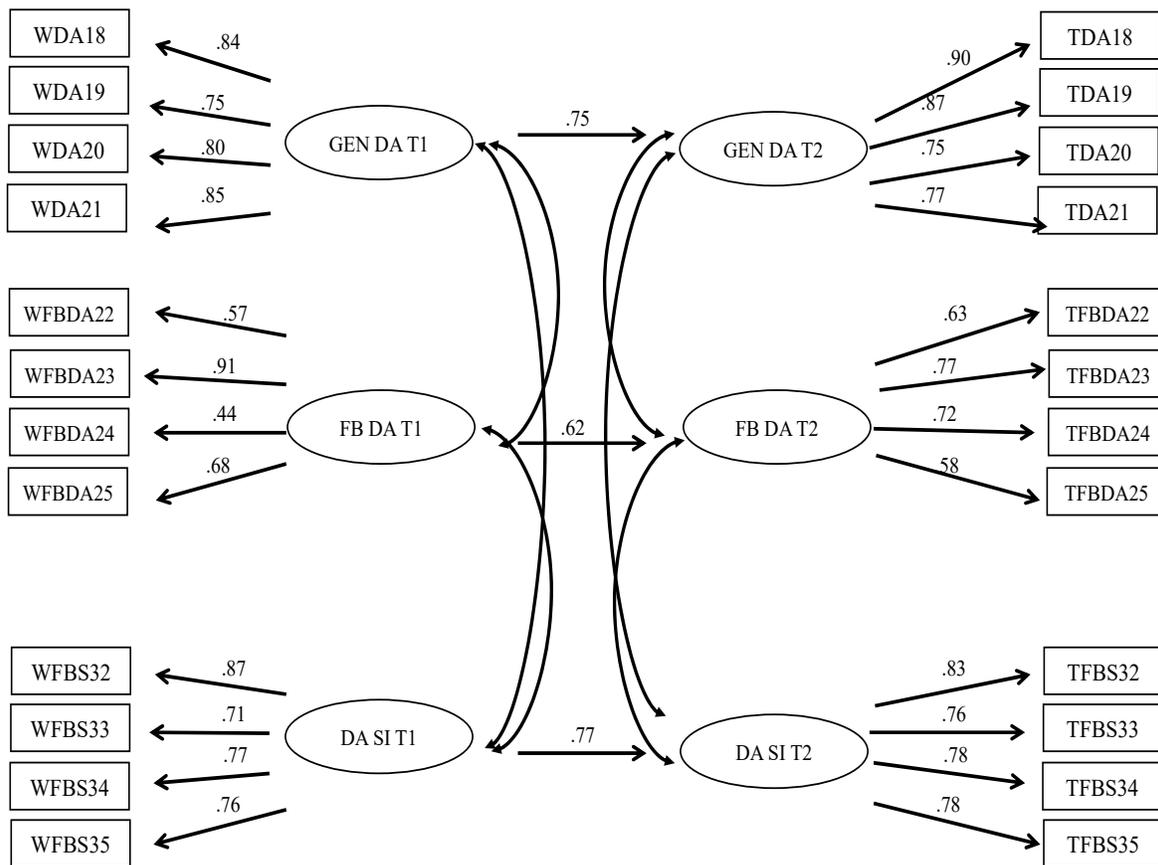
Statistically significant values below *p* of 0.01 are presented.

culturally. The analyses started with an initial model followed by a set of multigroup analyses where we compared the coefficients observed with the participants from Montréal and Bogotá. The initial model included direct paths from the Facebook use measure to all measures of anxiety. This model was observed to have an adequate level of fit ($\chi^2(55) = 110.57$, $p > .05$, CFI = 0.97, TLI = 0.96, RMSEA = 0.08 (0.06-0.09). The Facebook use measure was associated with the measures of social anxiety (standardized coefficient = -0.21, $t = -2.76$, $p = .01$) and Facebook anxiety (standardized coefficient = -0.16, $t = -2.02$, $p = .04$). The associations between the Facebook use measure and the measures of general anxiety and FOMO were nonsignificant.

Subsequently, equality constraints were used in four sets of multigroup analyses to determine whether there were contextual differences in these associations. A baseline model was assessed in which the observed coefficients were allowed to vary freely across groups. The fit of this model was observed to be excellent ($\chi^2(122) = 134.43$, $p > .2$, CFI = 0.99, TLI = 0.99, RMSEA = 0.04 (0.00-0.07). Next, equality constraints were added to each of the anxiety measures to force the coefficients to be equal across the two groups. With each anxiety measure, the fit of the "fixed" model was significantly worse than the fit of the baseline model indicating a difference between the two places ($\Delta \chi^2(1) = 4.71$, $p < .05$ for general anxiety; ($\Delta \chi^2(1) = 6.55$, $p < .01$ for social anxiety; $\Delta \chi^2(1) = 14.87$, $p < .01$ for Facebook anxiety; and $\Delta \chi^2(1) = 4.96$, $p < .05$ for FOMO). With each measure, the values for the Montréal participants were significant whereas the values were nonsignificant for those in Bogotá (standardized coefficients = -0.25 and 0.12; -0.39 and -0.01; -0.41 and 0.22; and -0.33, and 0.05 for the Montréal and Bogotá participants respectively with the measures of general anxiety, social anxiety, Facebook anxiety, and FOMO). See Figure 3.

Figure 3
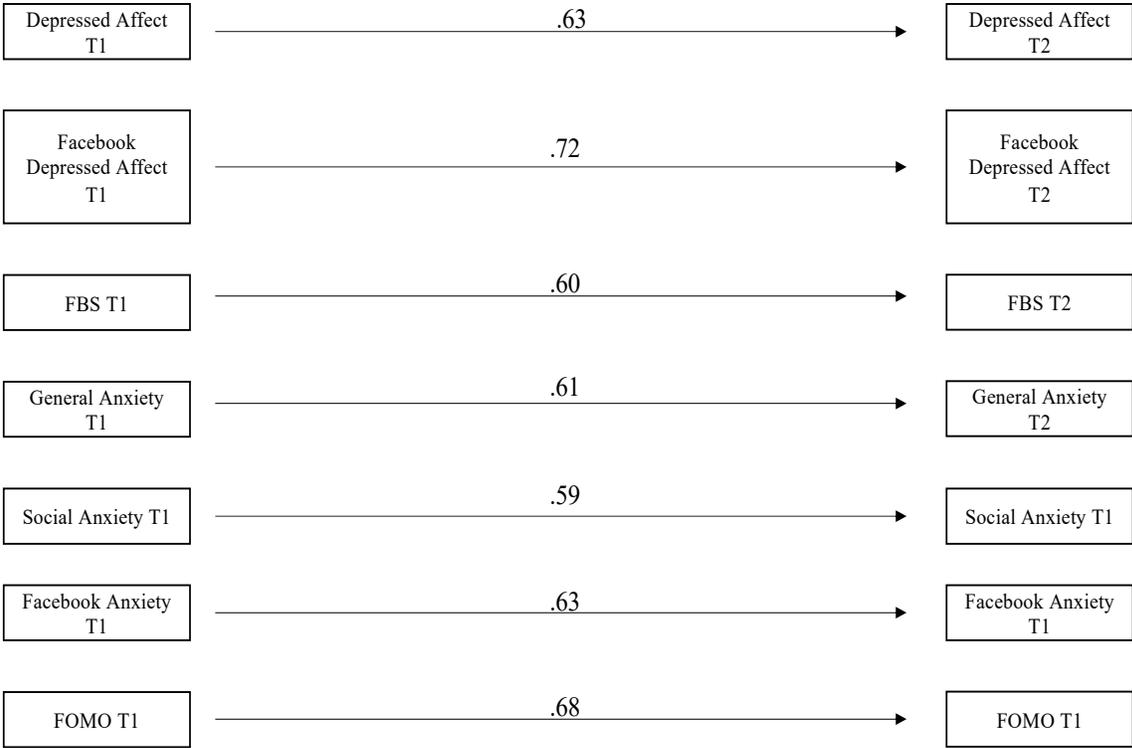Facebook Use and Anxiety Cross-culturally
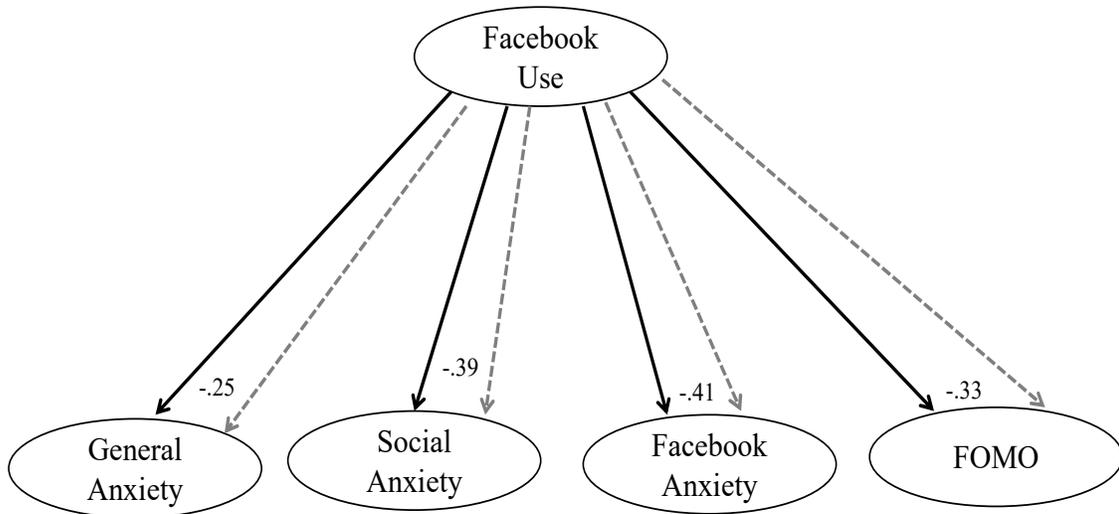
Dashed lines are statistically non-significant.
Statistically significant values below *p* of 0.05 are presented.
Values for Montréal are presented in black and Bogotá in grey.

Effects of Anxiety and Depressed Affect Across Time

The next set of analyses had three broad purposes. They were to (a) assess the relative degree of stability from T1 to T2 in the measures of depressed affect and anxiety; (b) to assess the concurrent and cross-lagged paths between the measures of anxiety and depressed affect; and (c) to examine whether the measures of anxiety moderated the stability of the measures of depressed affect and whether the measures of depressed affect moderated the stability of the measures of anxiety. Using structural equation modeling (SEM) conducted with Mplus (Muthén & Muthén, 1998-2012), a hierarchically organized set of three analyses was performed.

The first model included the autoregressive paths from the T1 measures of depressed affect and anxiety to the corresponding measures at T2 (See Figure 4). The model assessed the stability of the measures and it served as a baseline model to which the subsequent models could be compared. The second model included cross-lagged paths in which each of the anxiety measures were used as predictor variables of depressed affect measures over time and depressed affect was used as a predictor of anxiety over time. This model assessed the direct associations between the multiple measures at T1 and at T2. The third model included moderation analyses assessing whether anxiety functions as a moderator of depressed affect and anxiety over time. Interaction scores were created by computing the multiplicative products of each combination of one of the anxiety measures with one of the depressed affect measures. A regression-based residualization procedure was used to extract from each of the multiplicative products any variance that was due to the additive effects of the two measures used to create it. This process minimized the association between the interaction scores and the individual measures of anxiety and depressed affect.

Figure 4
Anxiety and Depressed Affect Stability

Depressed Affect T1	.63 →	Depressed Affect T2
Facebook Depressed Affect T1	.72 →	Facebook Depressed Affect T2
FBS T1	.60 →	FBS T2
General Anxiety T1	.61 →	General Anxiety T2
Social Anxiety T1	.59 →	Social Anxiety T1
Facebook Anxiety T1	.63 →	Facebook Anxiety T1
FOMO T1	.68 →	FOMO T1

The first model included seven direct autoregressive paths, one from each of the T1 measures of anxiety and depressed affect to the corresponding measure at T2 (see Figure 5). This model also included covariances among the seven T1 measures and among the T2 measures. We observed seven significant effects. Each of the directional paths was observed to be significant ($p = 0.00$ for all) and all standardized coefficients were greater than 0.58. The observed standardized coefficients were 0.63, 0.72, 0.60, 0.61, 0.59, 0.63, and 0.68 for the measure of general depressed affect, Facebook depressed affect, depressed affect related to Facebook self-image problems, general anxiety, social anxiety, Facebook anxiety, and FOMO respectively. The fit of the model was weak (χ^2 (104) = 988.927, $p < 0.01$, CFI = 0.65, TLI = 0.56, RMSEA = 0.24 (0.23-0.25), SRMR = 0.20).

The second model included the direct autoregressive paths as well as the additional cross-lagged paths, one from each T1 measure of anxiety and depressed affect to each T2 measure of anxiety and depressed affect (see Figure 5). We observed 15 significant effects. A significant predictor of T2 general depressed affect was T1 Facebook anxiety (standardized coefficient = 0.167, $p = 0.01$). Significant predictors of T2 Facebook depressed affect included T1 social anxiety (standardized coefficient = 0.161, $p = 0.00$), and T1 Facebook anxiety (standardized coefficient = 0.236, $p = 0.00$). Significant predictors of T2 depressed affect related to Facebook self-image problems included T1 general depressed affect (standardized coefficient = 0.157, $p = 0.00$), and T1 Facebook anxiety (standardized coefficient = 0.357, $p = 0.00$). Significant predictors of T2 general anxiety included T1 Facebook anxiety (standardized coefficient = 0.163, $p = 0.02$) and T1 general depressed affect (standardized coefficient = 0.253, $p = 0.00$). Significant predictors of T2 social anxiety included T1 Facebook anxiety (standardized coefficient = 0.309, $p = 0.00$), T1 FOMO (standardized coefficient = -0.098, $p = 0.02$), and T1

Figure 5
Anxiety and Depressed Affect Statistically Significant Cross-lagged Paths
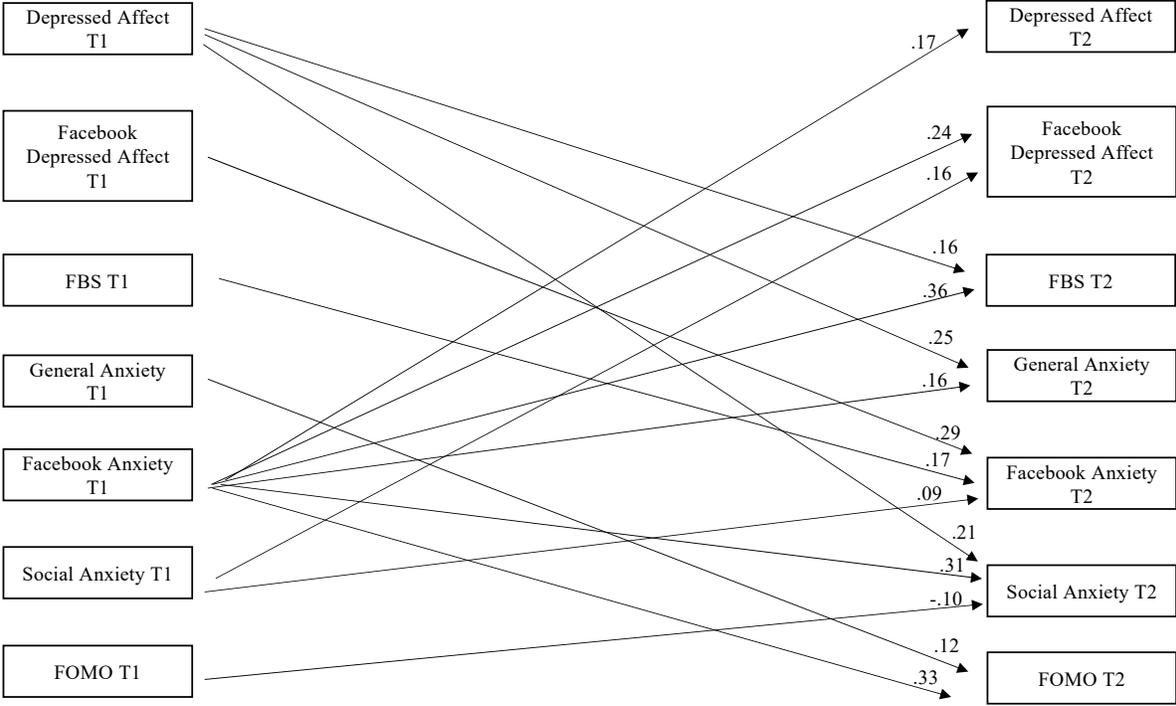
general depressed affect (standardized coefficient = 0.214, p = 0.00). Significant predictors of T2 Facebook anxiety included T1 social anxiety (standardized coefficient = 0.087, p = 0.05), T1 Facebook depressed affect (standardized coefficient = 0.287, p = 0.00), and T1 depressed affect related to Facebook self-image problems (standardized coefficient = 0.166, p = 0.01). Lastly, significant predictors of T2 FOMO included T1 general anxiety (standardized coefficient = 0.121, p = 0.00), and T1 Facebook anxiety (standardized coefficient = 0.330, p = 0.00). The fit of the model (χ^2 (89) = 822.935, p < 0.01, CFI = 0.71, TLI = 0.57, RMSEA = 0.23 (0.22-0.25), SRMR = 0.14) was better than that of the first model ($\Delta \chi^2$ (15) = 165.992, p = 0.00).

The third model included the direct autoregressive paths, the cross-lagged paths, as well as the newly added terms that represented the interactions between the measures of depressed affect and anxiety. These new items were used to assess indirect effects (see Figure 6). Five significant effects were observed: (a) the interaction between T1 social anxiety and Facebook depressed affect predicted the T2 measure of Facebook depressed affect (standardized coefficient = 0.129, p = 0.00); (b) the interaction between T1 FOMO and T1 Facebook depressed affect predicted FOMO at T2 (standardized coefficient = -0.201, p = 0.00); (c) the interaction between T1 general anxiety and T1 Facebook depressed affect predicted T2 depressed affect related to Facebook self-image problems (standardized coefficient = 0.096, p = 0.00); (d) the interaction between T1 general anxiety and T1 Facebook depressed affect predicted Facebook anxiety at T2 (standardized coefficient = 0.112, p = 0.00); and (e) the interaction between T1 general anxiety and depressed affect related to Facebook self-image problems at T1 predicted FOMO at T2 (standardized coefficient = 0.096, p = 0.00). The fit of the model (χ^2 (78) = 264.916, p < 0.01, CFI = 0.90, TLI = 0.87, RMSEA = 0.13 (0.11-0.14), SRMR = 0.04) was better than the second model ($\Delta \chi^2$ (11) = 558.019, p = 0.00). Finally, multi-group analyses were conducted to assess

Figure 6

Anxiety and Depressed Affect Interaction Effects
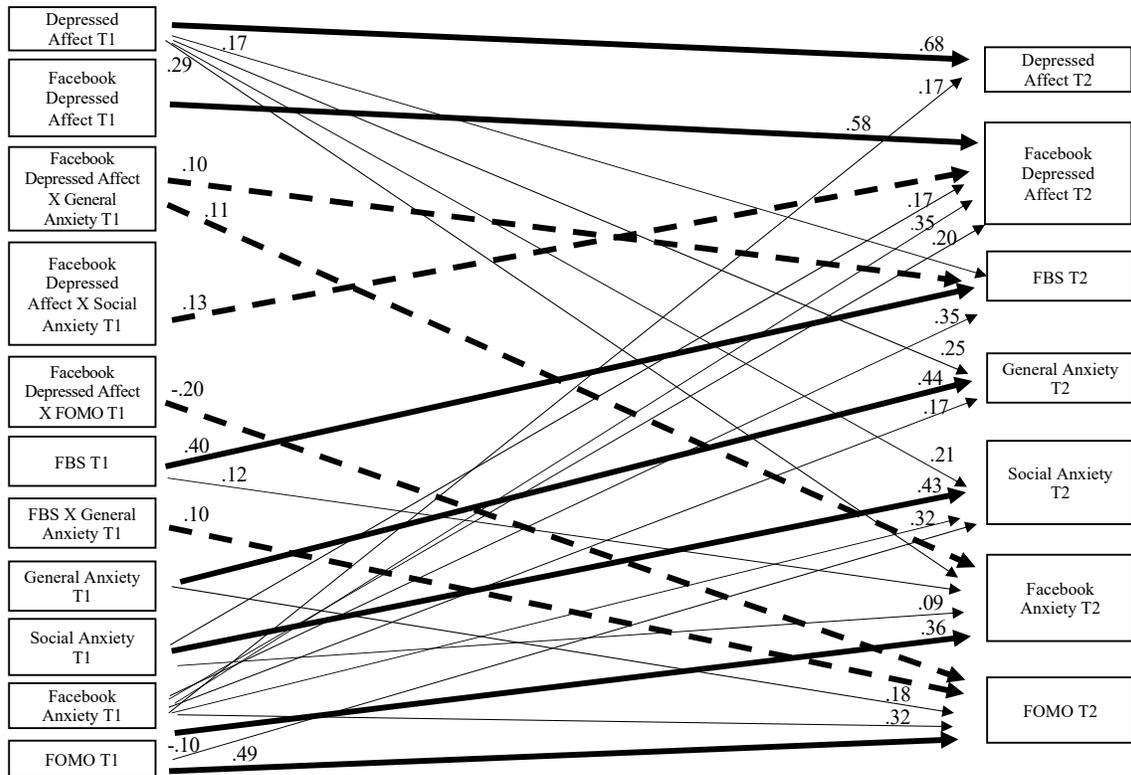
Dashed lines are statistically significant interaction effects.
Statistically significant values below *p* of 0.05 are presented.

whether the effects observed in these models differed for the participants in Bogotá and Montréal. This comparison was conducted by assessing a model where all variables were included and set to be free and comparing these results to a restricted model where each path was constrained sequentially. If there was no significant difference between the models, contextual effects were determined not to be present. Following all comparisons, it was revealed that none of the moderation effects differed by context.

Discussion

The purpose of this paper was to assess how experiences with a primary form of social media (SM), specifically Facebook, intersect with emotional regulation and psychological functioning of adolescents. This work was based upon the understanding that SM, especially SNSs like Facebook, occupy a significant amount of time in the lives of today's adolescents (Twenge, 2017). SM has arguably become a developmental context in which adolescents can form their "digital self" (Wagner et al., 2014) at a period of rapid growth (WHO, 2017) and sensitivity to social influences (Blakemore & Mills, 2014). The goals of this study were to assess how different forms of anxiety and depressed mood are implicated in adolescents' experiences with Facebook and to assess the differential Facebook-related dynamics in two cultural contexts. More specifically, the goals of the study were to (a) investigate the association between Facebook use and anxiety and depressed affect longitudinally, and (b) assess how Facebook-related depressed affect may result from the perception of Facebook as a threat.

In our analyses, we examined the effects of anxiety and depressed affect over time for adolescents who use Facebook. We found that (a) various forms of anxiety predicted anxiety and depressed affect over time, (b) various forms of depressed affect predicted anxiety and depressed affect over time, and (c) various forms of anxiety and depressed affect moderated the relation

between anxiety and depressed affect over time. It is important to note that no place differences were found in these analyses and as such the effects were relevant cross-culturally. In terms of anxiety as a predictor of outcomes, Facebook anxiety at T1 was shown to be the greatest predictor of the most numerous negative outcomes at T2. These outcomes were: general anxiety, social anxiety, FOMO, general depressed affect, Facebook depressed affect, and Facebook depressed affect related to self-image problems. Essentially, Facebook anxiety was a predictor of all forms of anxiety and depressed affect over time. Our results demonstrate that adolescent users of Facebook who are anxious about the content they might view on Facebook are those who are most at risk for experiencing anxiety and depressed affect over time. This result is unsurprising given that these are young persons who are exposing themselves to their fears regularly, most likely on a daily basis. As opposed to exposure settings, in which stimuli are controlled (e.g., in cognitive-behavioural therapy) and where anxiety is expected to decrease over time, Facebook is a context that is ever-evolving, with innumerable posts and messages being added constantly, which remain online indefinitely. This may serve as a setting where it is difficult to habituate to one's environment, and as such negative experiences accrue over time.

Next, general anxiety at T1 was a predictor of FOMO at T2. It appears that being anxious in general leads to increases in worry related to missing out on experiences with friends. Given the importance of friendships during this developmental period, one might expect that youth with anxious tendencies will be concerned about their social interactions but not necessarily fear them (i.e., as would be the case with social anxiety).

We also found that social anxiety at T1 predicted both Facebook anxiety and Facebook depressed affect at T2. Thus, adolescents who are worried about their social interactions are prone to experiencing greater concerns related to Facebook over time. We take this as evidence

that adolescents who are concerned with their personal relationships and use Facebook are those who feel greater anxiety and depressed affect over time regarding what they see on Facebook. In other words, their social anxiety makes them prone to anxiety and low mood due to worries about what they might view in the digital social sphere.

When assessing the different forms of anxiety over time, one negative association was observed: FOMO at T1 was a negative predictor of social anxiety at T2. We interpret this result to mean that adolescents who are more socially anxious are less likely to worry about missing out on interactions with peers and may even be grateful for the excuse to avoid interactions, given that they experience increased levels of anxiety in these encounters. This result parallels a finding from the literature on video game use showing that avoidant young adults were less likely to use media for connective purposes (e.g., social networking) and more likely to use interactive, single-user media (e.g., violent video games) than shy, unsociable, or non-shy individuals (Nelson, Coyne, Howard, & Clifford, 2016). Youth who experience elevated levels of social anxiety may be less concerned with connecting to their peers (i.e., using Facebook) and as such demonstrate lower levels of FOMO.

In regard to depressed affect as a predictor of outcomes, Facebook depressed affect and Facebook depressed affect related to self-image problems were both predictors of Facebook anxiety at T2. Thus, adolescents experiencing low mood due to social comparisons or content viewed on Facebook are more likely to feel anxious over time about what they might see online. Lastly, general depressed affect at T1 was a predictor of general anxiety, social anxiety, and Facebook depressed affect at T2. Therefore, it appears that adolescents who experience low mood in general are more likely to feel anxious over time both in general and during social encounters. Adolescents with general depressed affect tend to experience decreased mood

specifically related to Facebook longitudinally, indicating that low mood can exacerbate in this particular domain.

It is interesting that more general forms of anxiety (general and social) predicted specific forms of depressed affect (e.g., Facebook depressed affect) and specific forms of anxiety (e.g., Facebook anxiety, FOMO), whereas general depressed affect predicted general forms of anxiety. Regarding the general anxiety predicting specific depressed affect finding, it is possible that those who are more generally anxious may not necessarily experience depressed affect overall but that their chances of experiencing low mood increase when interacting on Facebook. Moreover, it is not surprising that youth who are generally anxious are more likely to experience Facebook-specific anxiety over time. However, the result indicating that general depressed affect predicted general forms of anxiety was unexpected. It is possible that adolescents with low mood, and therefore emotional vulnerability, tend to experience more anxiety across time as well. This finding may speak to the abundant literature that anxiety and depressed affect commonly co-occur.

In the analyses assessing for interaction effects, several interactions between anxiety and depressed affect emerged as predictors of negative outcomes. Primarily, the interaction between T1 general anxiety and T1 Facebook depressed affect predicted two outcomes at T2: Facebook anxiety and Facebook depressed affect related to self-image problems. Regarding the first outcome, we speculate that adolescents who are generally anxious and who feel increased sadness after they view information posted on Facebook are at risk for experiencing greater anxiety about what they might view on Facebook in the future. Similarly, these adolescents might also experience worsening self-image over time as a result of their existing tendency to worry about the Facebook content of others and their proclivity for feeling low mood while

comparing themselves unfavourably to what they read. Subsequently, we found that the interaction between T1 general anxiety and T1Facebook depressed affect related to self-image problems predicted FOMO at T2. It is possible that adolescents who are generally anxious and who have a tendency to experience low mood due to comparing themselves to others on Facebook may become concerned that they are not having as much fun as their peers and consequently experience heightened FOMO over time. We also discovered that the interaction between T1 social anxiety and T1 Facebook depressed affect predicted Facebook depressed affect at T2. We interpret this finding to mean that adolescents who feel increased sadness after they view information posted on Facebook tend to fare poorer over time if they are also socially anxious, possibly due to their fears regarding the opinions of other people. Lastly, the interaction between T1 FOMO and T1 Facebook depressed affect negatively predicted FOMO at T2. Although this finding was unexpected, we speculate that adolescents who worry about missing out on experiences with their peers and who simultaneously have decreases in mood following Facebook use potentially become less concerned about being absent from fun interactions over time due to worsened mood (e.g., elevated apathy). Since this was not investigated in the current study, further research on the interactions between FOMO and depressed affect are warranted.

It is interesting to note that general anxiety and Facebook depressed affect rarely had direct effects on the outcome variables but were often significant predictors in the moderation analyses. For instance, although general anxiety was found to have a direct impact on later levels of FOMO for Facebook users, the interaction between elevated general anxiety and Facebook depressed affect resulted in increased Facebook anxiety and Facebook self-image problems across time. Thus, the interplay between feeling generally anxious and experiencing depressed affect as a result of Facebook use appears to have important consequences on both anxiety and

mood. Similarly, the interaction between general anxiety and Facebook self-image problems (once again, general anxiety and mood) was a predictor of FOMO over time. Additionally, the interaction between Facebook depressed affect and social anxiety resulted in increased Facebook depressed affect longitudinally. Lastly, the interaction between FOMO and Facebook depressed affect negatively predicted FOMO over time. These results highlight the difficulties that adolescents may experience if they are high on general anxiety or Facebook depressed affect and simultaneously have other anxiety and mood concerns.

These results confirm the qualitative findings and speculations seen in popular books about the downsides to SM experience (Pinker 2014; Turkle, 2015). They also indicate that not all individuals will be affected by Facebook in a similar fashion and that individual predispositions are pertinent to consider in this research domain. The implications of our findings with regards to interventions are worth noting. Early adolescents need to be made aware that particular sensitivities may put them at risk for subsequent emotional problems. Like rejection sensitivity, it is the concern itself that appears to matter, as opposed to the actual experience. For instance, it is how adolescents perceive threats that affect their emotional well-being more than actual negative interactions on Facebook. This finding also supports our basic claim that the effects of SM experience need to be understood via the lens of anxiety and depressed affect-related constructs and that this is relevant cross-culturally.

This paper presents several strengths and limitations. One strength is our sample of participants. Community-based populations of early adolescents were sampled, whereas the majority of studies on SM focus on older populations of adolescents and young adults with clinical psychological disorders. While the sample of the current paper is a strength, sample size is a limitation, especially given the complexity of the analyses performed. Although the amount

of time that elapsed between T1 and T2 was only five weeks, the application of a longitudinal design with multiple time points was another strength of our study. Most importantly, this study is the first to our knowledge to examine how Facebook use affects emotional well-being across Canadian and Colombian adolescents. However, future studies should consider the inclusion of greater cultural diversity along with further exploration of the interactions between FOMO and depressed affect, as stated previously. Importantly, future research should also investigate gender differences in the Facebook experience and emotional well-being.

Overall this research provides concrete evidence that adolescent emotional experiences and Facebook use are intertwined. Fundamentally, a bidirectional association exists between Facebook use and emotions, such that the way that early adolescents feel determines the manner in which they interact with SNS, and this interaction with SNS has a direct impact on their emotional well-being.

Chapter 5

General Discussion

The purpose of the three papers in this dissertation was to examine the interaction between social media (SM) and adolescent emotional experiences. The <u>first paper</u> aimed to create a new measure to assess adolescent experiences on SM, particular anxiety and depressed affect. The <u>second paper</u> investigated particular motives for which adolescents use SM and another new measure was created. Lastly, the <u>third paper</u> was a results paper that sought to better understand how individual differences in anxiety and depressed affect impact SM users over time. All three of the papers examined cross-cultural differences, specifically, between countries that are predominantly individualistic and collectivistic. The importance of this work lies in the centrality of SM in the lives of the average adolescent (Eleuteri, Saladino, & Verrastro, 2017; Twenge, 2017) and how SM are in effect a developmental context for youth during a time of growth (World Health Organization, 2017), identity development (Valkenburg & Peter, 2011; Wagner, Lipson, Sandy, & Eisenberg, 2014), and heightened peer influence (Blakemore & Mills, 2014; La Greca & Harrison, 2005; Rubin, Bukowski, & Bowker, 2015). The results from the current research support a need to account for individual differences in adolescent emotional experiences related to SM.

The measures used in the current dissertation specified one major SM platform, namely Facebook, which remains popular among adolescents at this time (Oberst, Wegmann, Stodt, Brand, & Chamarro, 2017; Pew Research Centre, 2018). The premise for doing so was that research has demonstrated differing emotional outcomes for adolescents depending on the SM platforms they engage with (Weinstein, 2018). Indeed, a large proportion of the research available on SM has used more general measures of SM experience such that different platforms

have been conflated. This is problematic because different SM provide vastly diverse experiences. For instance, Snapchat is a platform for sharing videos and photos with filter options that remain for a short period of time, whereas Instagram is a platform for lasting videos and photos where "friends" can "like" posts that others create. Although Facebook was specified within the questionnaires in the current research, the goal was to create measures that could be used flexibly by researchers such that the term "Facebook" could easily be replaced with the name of another platform. In this way, the aim was to add specificity to the current project while not limiting future projects.

Paper 1

In regard to the first paper, the aim was to (1) create an improved measure of SM-related experiences and emotional well-being among community (i.e., non-clinical) samples of early and middle adolescents and (2) assess the factor structures and reliability of the scales. The goal was to create a measure of SM-related anxiety and depressed affect that could be used across cultural contexts. Questionnaires were built for both English and Spanish populations. Symptoms of anxiety and depression are prevalent within community samples of adolescents (e.g., Nesi & Prinstein, 2015; Wood, Bukowski, & Santo, 2017) and, as such, are important to study so as to better comprehend the emotional experience of the average adolescent. The newly created measures of anxiety included SM anxiety and FOMO while the measures created for depressed affect assessed SM depressed affect and SM depressed affect related to self-image. These new measures revealed clear factor structures through confirmatory factor analyses (CFAs), strong levels of reliability, and limited intercorrelation between items. Although scales exist to measure the interaction between anxiety and depressed affect and SM use among adolescents, the aim

here was to reduce the number of items present, augment specificity and, in turn, increase efficiency during data collections by minimizing participant burden.

Results. The results of the first paper indicated that Facebook anxiety and Facebook depressed affect are distinct from one another. These results support the need for specific measures of emotional experiences related to SM use among adolescent populations. The results also demonstrated a gender effect, where girls in both Colombia and Canada experienced higher levels of general and social anxiety as well as depressed mood. A place effect was observed where adolescents from Canada experienced higher levels of Facebook depressed affect than their peers in Colombia. Not only does this finding suggest that cultural factors impact the association between SM and emotional well-being, it also indicates that adolescents in individual settings are at greater risk for negative affect when engaging with SM. A high correlation between measures of Facebook depressed affect and Facebook depressed affect particular to self-image problems was revealed. This finding suggests that threats to an adolescent's self-image are highly related to depressed mood, likely due to comparisons made with others. In terms of anxiety, as per the CFA analyses, it was found that FOMO was distinct from other forms of anxiety. This result was unsurprising given that FOMO is most likely motivated by approach behaviours (i.e., so as not to miss out on important activities or information), whereas other forms of anxiety (e.g., social anxiety) may trigger avoidance behaviours. This particular result contradicts past research suggesting that FOMO is a form of social anxiety (e.g., Wang, Xie, Wang et al., 2018).

Paper 2

In regard to the second paper, the focus was the assessment of adolescents' motives for using SM. Antecedents of Facebook use were examined rather than outcomes in this paper.

Particularly of interest was how the experience of anxiety may influence whether individuals

engage with SM cross-culturally. The aim was to determine whether having a Facebook account

was less common among anxious adolescents (who may be avoiding the site) and if motives for

engaging in SM were different for anxious adolescents. Another goal was to create a

questionnaire to measure SM motives for adolescents. The motives measures were based upon

previous scales (e.g., Przybylski, Murayama, DeHaan, & Gladwell, 2013) but adapted so as to

reduce the number of items for greater specificity and reduction of participant burden. The

motives measure revealed strong reliability.

Results. The results of the second paper indicated that there were no differences in the

frequency of having a Facebook account across the two cultures. However, Canadian adolescents

with anxiety were found to be less likely to have Facebook than their anxious counterparts in

Colombia. In other words, anxiety did not deter Colombian adolescents from using SM but may

have inhibited Canadian adolescents from engagement with SM. Here, cultural differences

become apparent for youth in collectivistic and individualistic settings. It is possible that

Colombian adolescents may perceive greater social pressure to engage in Facebook use from

peers. Given the importance of group membership and harmony within collectivistic settings,

anxiety related to SM use may be a less unpleasant option than going against group norms.

Conversely, adolescents from Canada, who are more likely to prioritize individual preferences

over group norms, may remove themselves from this digital context if they are experiencing

anxiety related to SM.

Motives. Several results were revealed when conducting analyses pertaining to SM

motives. The first set of analyses controlled for place (Colombia/Canada), and thus these

findings reflect both cultural groups. It was demonstrated that social anxiety predicted Facebook

use for the purpose of connecting with similar others. This finding provides support for previous research indicating that socially anxious college-level students seek to maintain their relationships on SM (Baker & Oswald, 2010; Jackson & Wang, 2013), which may be difficult for them to do in person. Moreover, all of the motives created in the new measure (for entertainment, connection, lurking, and shared identity) were positively predicted by Facebook anxiety and FOMO. These findings were surprising given that, as stated above, one form of anxiety was viewed as a motivator of approach behaviours (FOMO) while the other of avoidance behaviours (Facebook anxiety). It appears that, for anxious adolescents who do use SM (i.e., those who do not avoid Facebook altogether), this platform is used in active (connection, shared identity) in addition to passive (entertainment, lurking) ways. One explanation may be that these adolescents, having made a choice to be on Facebook despite their anxiety, are more aware of the specific reasons for which they are using this site.

  Indirect effects. The results of the analyses pertaining to indirect effects demonstrated one significant finding: Facebook anxiety was the only measure that affected the relation between place and Facebook motives. Similar to the previously reported findings indicating that Facebook anxiety was a predictor of all Facebook motives, here it was demonstrated that place (Colombia/Canada) was a significant positive predictor of all motives for using Facebook when Facebook anxiety is elevated. This effect was found to be stronger for Canadian adolescents. Worldviews present in individualistic and collectivistic cultures may explain the strength of these findings. Specifically, Colombian adolescents who are anxious about Facebook engagement may be less cognizant of reasons for which they are using SM than youth in Canada given social pressures present with Latin American contexts. These results reflect what has been demonstrated in other cross-cultural comparisons across collectivistic and individualistic

settings, such as China and the United States (U.S.), where connection motives are stronger for those who may not have their social needs met in person (Jackson & Wang, 2013).

Paper 3

In regard to the third paper, the aim was to employ the measures created in the first paper in order to determine whether anxiety and depressed affect among adolescents who use SM impact their experiences with Facebook. Again, cross-cultural effects were assessed. In particular, the association between SM use, anxiety, and depressed mood were examined over time. In addition, we investigated whether anxiety was a predictor of depressed affect longitudinally for adolescents using SM. It was anticipated that adolescents with elevated levels of anxiety who perceive threats to be present on Facebook would experience worsened mood over time. Overall, the third paper was focused largely on outcomes of SM use for adolescents with anxiety and depressed affect whereas the first two papers were concerned with the development of measures to assess anxiety, depressed affect, and motives related to SM use.

Results. Primarily, results of this paper demonstrated three general findings: (1) anxiety was a positive predictor of anxiety and depressed affect longitudinally, (2) depressed affect was a positive predictor of anxiety and depressed affect longitudinally, and (3) interaction effects exist between anxiety and depressed affect longitudinally. No significant cross-cultural differences were revealed for these analyses.

Anxiety as a predictor. The first set of results focused on anxiety as a predictor. Primarily, results showed that Facebook anxiety at Time 1 (T1) positively predicted all negative psychological outcomes at Time 2 (T2): general anxiety, social anxiety, FOMO, general depressed affect, Facebook depressed affect, and Facebook depressed affect related to self-image problems. As anticipated, adolescents who experience elevated anxiety in relation to Facebook

are likely to experience several forms of anxiety and depressed affect over time. In essence, adolescents who experience anxiety related to Facebook are exposed to a myriad of stimuli each day, meaning almost constantly facing what they deem as threatening, with new posts constantly being added, potentially available indefinitely depending on the SM platform in question. As opposed to typical exposure to feared stimuli, which can decrease anxiety over time, exposure to an uncontrolled context such as Facebook may not provide an opportunity for habituation and anxiety reduction. Indeed, it may serve to increase anxiety and depressed mood over time.

Two more results were observed: (1) general anxiety at T1 positively predicted FOMO at T2 and (2) social anxiety at T1 positively predicted Facebook anxiety and Facebook depressed affect at T2. Concerning the first result, being generally anxious appears to lead to fears of missing out of experiences and information over time. Therefore, adolescents with anxious tendencies seem to become concerned about inclusion in social activities online, which is not surprising given the importance of peer relationships and social interactions during this period. Concerning the second result, socially anxious adolescents are likely to experience more Facebook-specific anxiety and depressed mood across time. Again, this result is unsurprising and was anticipated. It suggests that adolescents who are anxious about social relationships and interactions in general are those who feel greater anxiety and depressed affect pertaining to what they see on Facebook, a digital social domain.

Lastly, one negative association was found when using anxiety as a predictor. Specifically, FOMO at T1 negatively predicted social anxiety at T2. These findings support the previous result that FOMO and social anxiety are distinct from one another. One explanation may be that socially anxious adolescents are less likely to experience FOMO, as they experience social interactions as anxiety provoking. As previously mentioned, one form of anxiety is seen as

motivating approach behaviour (FOMO) while the other motivates avoidance behaviour (social anxiety). As such, and inverted relation may exist where socially anxious individuals are less likely to worry about missing out on information and activities with peers since they experience anxiety interpersonally. In other words, adolescents with social anxiety are not necessarily less concerned with being involved with peers or friendships in general. Rather, socially anxious youth may experience a conflict (i.e., would like to have friends but are anxious about socializing) and, as such, do not experience strong levels of FOMO.

     Depressed affect as a predictor. The second set of results focused on depressed affect as a predictor. Both types of depressed affect related to Facebook at T1 (i.e., Facebook depressed affect and Facebook depressed affect self-image) positively predicted Facebook anxiety at T2. This finding suggests that adolescents experience increased anxiety related to what they may see on Facebook when they experience depressed mood because of what they view on Facebook and due to social comparisons with others. Therefore, not only is anxiety a positive predictor of depressed affect, but depressed affect is also a predictor of anxiety longitudinally. Facebook depressed affect at T2 was also positively predicted by general feelings of depressed mood at T1. This result indicates that adolescents who generally experience low mood are more likely to experience worsened mood due to content they view on Facebook over time. Similarly, aside from emotional experiences triggered by Facebook, general feelings of depressed affect at T1 positively predicted general anxiety and social anxiety. It thus appears that, for adolescents with a tendency to experience low mood, their overall levels of anxiety and anxiety related to social interactions worsen over time regardless of SM content they have viewed.

     Overall, these analyses revealed interesting outcomes. Primarily, general forms of anxiety (i.e., general anxiety and social anxiety) were predictors of Facebook depressed affect, Facebook

anxiety, and FOMO, which are related to specific triggers. One explanation is that adolescents who are generally anxious do not necessarily experience depressed mood over time typically but do when using SM. Additionally, adolescents who are generally and socially anxious appear to experience anxiety specific to Facebook over time, which is unsurprising given their initial tendencies. Conversely, general depressed affect was a positive predictor of general forms of anxiety, which was an unexpected result. Therefore, these results suggest not only that symptoms of anxiety and depressed affect co-occur but also that depressed mood may precede anxiety during adolescence, possibly orienting youth to threats in their environment. These findings support previous research in younger populations of children indicating a bidirectional relationship between symptoms of depression and anxiety (Lavigne, Hopkins, Gouze, & Bryant, 2015).

Interaction effects. The third set of results focused on interaction effects across time, with different forms of anxiety and depressed affect interacting to produce negative outcomes. *Interaction effect 1.* The first interaction effect demonstrated that the interaction between general anxiety at T1 and Facebook depressed affect at T1 positively predicted (1) Facebook anxiety at T2 and (2) Facebook depressed affect self-image problems at T2. The first finding suggests that adolescents with the tendency to feel anxious and experience sadness after viewing Facebook content are more likely to become anxious over time regarding what they may see on Facebook. The threat perceived here would be viewing content on SM that could further impact their mood. The second finding suggests that adolescents with the aforementioned tendencies are also more likely to have self-image problems over time. It is possible that their general tendency to worry and experience of low mood resulting from Facebook exposure results in further comparisons with others over time and subsequent depressed mood.

Interaction effect 2. The second interaction effect demonstrated that the interaction between general anxiety at T1 and Facebook depressed affect related to self-image problems at T1 positively predicted FOMO at T2. It appears that adolescents with a predisposition for anxiety and depressed mood resulting from comparing themselves to others on Facebook experience more FOMO over time. It may be that youth who make upward comparisons to peers online and experience worry begin to fear they are being left out across time.

Interaction effect 3. The third interaction effect demonstrated that the interaction between social anxiety at T1 and Facebook depressed affect at T1 positively predicted Facebook depressed affect at T2. Therefore, adolescents who suffer from depressed mood from viewing content on Facebook experience a worsening of these symptoms over time if they are typically socially anxious. One possible explanation for this result is that socially anxious adolescents fear the opinions of others and, as such, their mood is negatively affected over time by seeing what others are writing on SM.

Interaction effect 4. The fourth interaction effect demonstrated that the interaction between FOMO at T1 and Facebook depressed affect at T1 negatively predicted FOMO at T2. This result was unanticipated given the negative relation between FOMO at T1 and T2. It is a possibility that adolescents who experience FOMO and depressed mood related to Facebook may become less concerned about missing out on activities or information presented by their peers because of their depressive symptoms (e.g., apathy).

Strengths and Limitations

Strengths. There are several strengths and some limitations present across the three projects. The primary strength of this research comes from the sampling of community-based adolescents when the majority of research on SM and emotional well-being comes from clinical

samples (see Wood, Bukowski, & Lis, 2016 for a review). Therefore, the results across the three papers are applicable on a more general, societal level and are not limited to select groups of adolescents with serious psychological problems. A second strength is that early to middle adolescence was the focus of this project whereas the bulk of work in this field has been conducted with older adolescents and young adults between the ages of 18 and 25. Although studies sampling these populations informed the current research, the goal here was to better comprehend how younger individuals are impacted by SM engagement, given the critical developmental tasks present during this time. In other words, younger adolescents and older adolescents, or even young adults, cannot be expected to face the same challenges within the digital context. This research adds to the literature available on the impact of SM on developing adolescents as well as an understanding of their motives for using social networking sites (SNS). The current studies also focused on both a process-focused approach (used in the second paper) in order to identify specific predictors of SM use by adolescents as well as an outcome-related approach to determine emotional consequences of SM use (used in the third paper). These analyses specifying predictors and outcomes of SM use were made possible by the longitudinal format of this study, another strength of the current project.

A central strength of these papers was the inclusion of cross-cultural samples from Bogotá, Colombia, a South American country, and Montréal, Canada, a North American Country. Colombia is a relatively collectivistic country whereas Canada is a relatively individualistic country. Data from Colombia was gathered in Spanish whereas data in Canada was collected in English. The results from the current dissertation indicate that (1) the items used in the measures generalized across contexts and (2) results differed depending upon culture. Previous cross-cultural research has largely focused on undergraduate and college-level students

(e.g., Choi, Chu, & Kim, 2012; Jackson & Wang, 2013; Kim, Sohn, & Choi, 2011; Seo, Miller, Schmidt, & Sowa, 2008; Wijesundara, 2014; Xu, Takai, & Liu, 2018). Several cross-cultural studies have also compared Asian countries with the U.S. (e.g., Choi et al., 2012; Jackson & Wang, 2013; Kim, Sohn, & Choi, 2011; Seo et al., 2008; Wijesundara, 2014). This study appears to be the first to examine how SM use affects emotional well-being across Latin American and Canadian early to middle adolescents.

Limitations. One potential limitation of the current project is the amount of time that elapsed between T1 and T2, which was only five weeks. A longitudinal study conducted across a greater period and with additional time points would be more informative. Additionally, sample size was a limitation of this project, especially given the complexity of the analyses performed. Several potentially important analyses were not conducted, such as gender effects in the third paper, given the number of variables included in these models. More time points and a larger sample size would allow for more sophisticated statistical analyses. Another limitation is that specific features of SM usage were not assessed. For instance, whether adolescents used SM actively (i.e., posting frequently, commenting on the posts of others) or passively (predominantly viewing posts of others, infrequent use of SM). This information would add nuance to the current findings, especially regarding individual differences in the SM experience. Arguably, the "lurking" variable used in paper two could be considered "passive Facebook use" (e.g., Frison & Eggermont, 2016b), although it was not considered as a predictor of emotional outcomes in the current project. Lastly, in the second study, the "connection" motive had items related to seeking out and maintaining relationships. These motives could arguably be separated to reflect two different motivators for using SM.

In terms of future research, as highlighted in the results of the third paper, exploration of the interactions between FOMO and depressed affect is warranted. Also, as indicated, gender differences were not explored within the third paper given the complexity of the analyses. As such, gender differences in the interaction between SM experience and emotional well-being is needed to understand whether girls and boys are differentially affected and in what particular ways. Additionally, in the third paper, one indirect effect suggested that adolescents with FOMO and Facebook depressed affect at T1 experience decreased FOMO at T2. Here, it is speculated that this may be due to depressive symptoms such as apathy. More research is needed to explore the association between FOMO and depressed mood due content viewed on Facebook.

Summary

Taken together, the importance of this research lies in supporting the evidence that SM experiences and adolescent emotional well-being are fundamentally intertwined. Here, the focus was on anxiety and depressed affect that early to middle adolescents in non-clinical populations commonly face day to day. Emotional experiences and SM engagement were demonstrated to have a bidirectional association, such that not every adolescent will experience similar effects when using SM. Individual differences among early to middle adolescents influence how information on SNS is perceived and impacts their psychological well-being. What is more, cultural worldviews (collectivism and individualism) impact how adolescents use and experience SM. Early adolescent participation in popular SM was demonstrated to vary depending upon emotional tendencies cross-culturally. The results from the current dissertation support ideas proposed about the risks inherent in SM experience (Pinker 2014; Turkle, 2015). As emphasized throughout this project, early to middle adolescence is a critical developmental period where

youth now must navigate a digital, "online" developmental context as well as the ones they have traditionally experienced "offline".

There are several implications of the current project. Primarily, two concise, reliable, and efficient questionnaires were developed to be employed in future research. These measures target the interaction between adolescent emotional experiences and SM use as well as motivators of using SM altogether. These scales were created and validated with cross-cultural samples across North America and South America to account for worldviews that can influence SM engagement and experiences. These scales were then employed in a longitudinal data collection in order to further research on the emotional experiences of adolescents who use SM across cultures. These results have implications for early adolescents who are facing typical developmental challenges along with new, potentially harmful experiences on SM. Through psychoeducation, it is important for adolescents to be made aware of their own emotional experiences, the risks present on SM platforms such as Facebook, and how these variables interact. Although adolescents may experience actual threats on SM, here it is proposed that it is the anticipation of threats is what affects anxiety and depressed mood. Rejection sensitivity or anticipatory anxiety are distressing experiences in and of themselves, regardless of actual rejection or fears manifesting. Adolescents, particularly those who are early to middle adolescents, could benefit from a better understanding of the relationship between their emotions and SM use.

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