Social Disconnection During COVID-19: The Role of Attachment, Fear of Missing Out, and Smartphone Use

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This mixed-methods study explored adolescents’ \( n = 682 \) feelings of social connection in the time of the COVID-19 pandemic and examined potential risk (fear of missing out, problematic smartphone use) and protective (parent/peer attachment, smartphone use) factors to social disconnection. Data were collected from two schools in Canada using an online survey with questionnaires and open-ended questions. Three themes regarding adolescents’ feelings of social connection during the pandemic were identified through thematic content analysis: (1) feeling socially connected, (2) feeling socially disconnected, and (3) feeling socially indifferent. Moreover, regression analysis identified secure peer attachments as a protective factor against social disconnection in the time of the COVID-19 pandemic, while fear of missing out was identified as an independent risk factor.

Key words: COVID-19 – social connection – fear of missing out – attachment – smartphone use

BACKGROUND

Introduction

The COVID-19 global pandemic has led governments worldwide to implement disease containment measures such as school closures, physical distancing, and home quarantine. These restrictions on physical social interactions have threatened our universal human need for social connection in an unprecedented way. Although this fundamental and intrinsic need for social connection has been studied, labeled, and operationalized in various ways (e.g., Baumeister & Leary, 1995; Bowlby, 1969; Ryan & Deci, 2000), there is consensus among researchers that a perceived sense of social belonging and connection is a basic psychological need, and that satisfaction of this need generates positive outcomes. Indeed, extensive psychological and medical literature have demonstrated that individuals who are better integrated in their social networks and satisfied in their connections with others typically have better physical and mental health, and tend to live longer (see Ryff & Keyes, 1995 for summary). Moreover, humans are innately wired for social connection, and this feeling of connection significantly decreases the toll of stress on physical and emotional health (Nausheen, Gidron, Gregg, Tissarchondou, & Peveler, 2007). Therefore, government efforts to control the spread of COVID-19, such as limiting physical social interactions, have led psychologists to unequivocally voice concerns around the impact of these restrictions on global mental health and well-being (Mehta, 2020). These risks may be particularly heightened for adolescents, for whom the need for social connection is developmentally rooted and exacerbated (Brown & Larson, 2009). As such, it is likely that restrictions on physical social interactions adopted in response to the COVID-19 global pandemic are particularly detrimental for this age group. Thus, with adolescents globally experiencing a prolonged state of physical isolation from their peers, teachers, extended families, and community networks as a result of government-imposed disease containment efforts, it is important that researchers explore the unintended risk and protective factors associated with youths’ feelings of social connection during the time of the COVID-19 pandemic.

The Importance of Social Connection in Adolescence

It is widely accepted that social connection is a fundamental human need across the lifespan (Baumeister & Leary, 1995; Bowlby, 1969; Ryan & Deci, 2000). However, in adolescence, this need is heightened as youth become preoccupied with...
their developmental social goals to belong and feel accepted among their peers (Brown & Larson, 2009). Indeed, adolescents are hardwired to worry about the maintenance of their close connections and they simultaneously fear the consequences of isolation in terms of their social status and peer belonging (Brown & Larson, 2009). In fact, social connection is so critical for healthy adolescent development that difficulties in establishing and maintaining positive peer relationships have been associated with a multitude of negative outcomes, including loneliness, internalizing problems (e.g., depression and anxiety), aggression, criminality, school dropout, and substance use (Asher & Parker, 1989; Coie, Dodge, & Kupersmidt, 1990; Coie, Terry, Lenox, Lochman, & Hyman, 1995; Parker & Asher, 1987; Windle, 1994).

Not only does social connection in adolescence serve as a protective factor against an array of risk behaviors, but it also contributes to more positive mental health outcomes by decreasing feelings of anxiety, depression, and loneliness (Beam & Kim, 2020; DuBois & Silverthorn, 2005; Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999). Feelings of social connection appear to be essential to adolescents’ personal development, lifestyle, and overall health (Barber & Schluterman, 2008; Stoddard, Henly, Sieving, & Bolland, 2011; Uchino, Uno, & Holt-Lunstad, 1999). For example, a longitudinal study conducted by Olsson, McGee, Nada-Raja, and Williams (2013) found that a sense of social connection in adolescence is a strong predictor of well-being in adulthood. Moreover, in the current context of the COVID-19 pandemic, a longitudinal study conducted by Magson et al., (2021) found that feeling socially connected served as a protective factor to the emotional health of adolescents, suggesting that adolescents’ feelings of social connection may be central to their well-being in the time of the pandemic.

**Adolescent Parent & Peer Attachment**

During adolescence, developmental social goals coincide with the fundamental human need for social connection, which means that adolescents strive to establish supportive peer bonds and begin to rely more on their peers and less on their parents (Lerner & Steinberg, 2009; Weeks & Asher, 2012). In the midst of these changing parental relationships, peers become important sources for intimacy, feedback about social behavior, social influence, and social and emotional support (Bokhorst, Sumter, & Westenberg, 2010; Collins & Laursen, 2004; Collins, Welsh, & Furman, 2009). In this way, while parents continue to be an important source of support and protection in adolescence (Moretti & Peled, 2004; Yang, Fu, Liao, & Li, 2020), they begin to share this significance with peers. Researchers often explain such findings by referencing Attachment Theory (Bowlby, 1969); a well-established relationship model focusing on the bonding quality between individuals, and a useful framework in which to conceptualize the characteristics and relative importance of these social relationships (i.e., with parents and peers) in adolescence.

According to Attachment Theory (Bowlby, 1969), the fundamental and intrinsic human need for social connection drives individuals to form attachment bonds with close others as a means of protecting them from danger by ensuring that they maintain proximity to caring and supportive others. In this way, attachment bonds are said to result from an enduring motivational system designed by natural selection to serve human survival needs through protecting the attached individual from physical and psychological harm. While primary attachment bonds develop in infancy (i.e., with primary caregivers/parents), these relationships are theorized to provide internal representations of the functioning and significance of close relationships throughout the lifespan (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969). Specifically, interactions with available and responsive attachment figures (e.g., primary caregivers/parents) facilitate the optimal functioning of the attachment system and promote a sense of attachment security. However, when attachment figures are not reliably available and supportive, defensive secondary attachment strategies develop, resulting in a sense of attachment insecurity. These attachment predispositions (i.e., attachment security vs. insecurity) guide future expectations about the availability and accessibility of support from close others (Bowlby, 1969), and thus likely play a key role in predicting feelings of social connection throughout development. Indeed, attachment security in adolescence is associated with popularity, social acceptance, prosocial behavior, higher quality friendships, and lower stress in peer relationships (Allen, Porter, McFarland, McElhaney, & Marsh, 2007; Dykas, Ziv, & Cassidy, 2008; Seiffge-Krenke, 2006; Shomaker & Furman, 2009).

While relationships with caregivers/parents usually consist of the primary attachment bond, in adolescence, peer relationships begin to increasingly take on critical attachment functions (Allen &
specifically, peer relationships in adolescence provide increasing levels of intimacy, companionship, and instrumental support (furman & buhrmester, 1992). as adolescents develop close relationships with their equals, they begin seeking out these peers for support and reassurance (frawley & davis, 1997; hazan & zeifman, 1994). thus, while the stress of severe illness would likely still cause an adolescent to turn to parents as their primary attachment figure, peer-related stressors, which can also be severe and distressing, might result in a close peer temporarily moving into the position of the primary attachment figure (markiewicz, lawford, doyle, & haggart, 2006). indeed, the pioneering work of zeifman and hazan (2008) found that the relative positioning of peers and caregivers in the attachment hierarchy depends not only on the developmental stage of the adolescent (i.e., whereby peers increasingly occupy the role of the primary attachment target in older adolescence), but also on the particular stressor facing the adolescent. thus, in the context of the covid-19 global pandemic, which can be interpreted as a chronic situation of perceived stress, it is imperative that research examine the relative importance of adolescents’ parent and peer attachment relationships, and how these may differentially contribute to youth’s feelings of social connection.

fear of missing out

in addition to the role of secure attachment relationships, recent work has begun exploring an emerging construct; the fear of missing out (fomo; przbylski, murayama, dehaan, & gladwell, 2013), for understanding feelings of social connection and belonging. indeed, referring to the fears, worries, and anxieties people have about missing out (przbylski et al., 2013), fomo has been empirically linked to the need to belong, such that those with a higher need to feel connected and accepted by others also experience higher levels of fomo which, in turn, threatens their sense of social connection (beyens, frison, & eggermont, 2016; lal, altavilla, ronconi, & aceto, 2016). for adolescents, for whom, developmentally, being excluded or neglected from their peers is already stressful and threatening to their sense of social connection and belonging (frankel, 1990; leary, 1990), the experiences and consequences of fomo may be heightened.

while fomo was originally conceptualized to result from thwarted relatedness needs (przbylski et al., 2013), an emerging body of work has begun to conceptualize fomo within an attachment theory framework. this work has found a relationship between attachment insecurity and fomo, whereby those more prone to feelings of apprehension when close others are not available and/or will abandon them experience higher levels of fomo (holte & ferraro, 2020). specifically, the authors found that individuals with this attachment profile inherently worry about being separated from close others and fear missing out on spending enjoyable time with them. within this framework, it has been theorized that when people are anxious about their relationships (as in the case of attachment insecurity), they fear being socially excluded (i.e., they experience fomo). while this theorizing clearly links fomo with attachment insecurity, it is also possible that fomo reflects a unique dimension of the peer attachment dynamic, similar, yet independent from, attachment insecurity. from this perspective, fomo can be interpreted as an expression of the peer attachment dynamic, reflecting the fear of disruption to these attachment relationships (throuvala, janikian, griffiths, rennoldson, & kuss, 2019). in this way, while attachment insecurity refers to the perceived reliability and availability of close others (bowlby, 1969), fomo can be conceptualized as a unique fear of the disruption to these relationships, which is characterized by a pervasive apprehension that one is being socially excluded or left out (przbylski et al., 2013). thus, in the time of the covid-19 global pandemic, in which restrictions on physical peer interactions have likely threatened adolescents’ feelings of social connection, youth higher in fomo, as well as those with insecure peer attachment relationships, may be particularly vulnerable to feeling socially disconnected.

smartphone use & problematic use

another construct which may be particularly relevant to adolescents’ feelings of social connection amidst the covid-19 global pandemic, is technology engagement (e.g., smartphone use and problematic use). indeed, recent work has indicated that technology use has played a central role in supporting adolescents’ peer relationships amidst the pandemic. for example, a study conducted in ontario, canada, found that connecting with others virtually was an effective way for adolescents to combat feelings of loneliness during the initial covid-19 lockdown (ellis, dumais, & forbes, 2020). this is in line with previous work indicating that the use of technology to establish relationships
and connect with others is a strong motivation for technology engagement among adolescents (Anderson & Jiang, 2018), and that youth often turn to social media as a means of fostering feelings of social connection and intimacy (Michikyan & Suárez-Orozco, 2015). That said, despite the potential benefits of technology engagement for fostering youth’s feelings of social connection, extreme uses of technology, such as in the case of problematic smartphone use, can instead exacerbate adolescents’ feelings of social disconnection. Indeed, problematic smartphone use, broadly defined as a compulsive pattern of smartphone use which can result in negative consequences (Horwood & Anglim, 2018; Lepp, Li, & Barkley, 2016; Shin & Dey, 2013), has been associated with stress, anxiety, depression, and loneliness (see Busch & McCarthy, 2021 for a review). Thus, while smartphone use may be an adaptive means for adolescents to foster feelings of connection amidst the COVID-19 global pandemic, developing problematic patterns of smartphone use may place them at heightened risk factor for feeling socially disconnected.

The Current Study

As noted, the COVID-19 global pandemic has reduced the opportunities for physical social interactions, which has threatened the fundamental human need for social connection in an unprecedented way. For adolescents, the risks of this threat may be heightened as the need for social connection coincides with their developmental social goals (Duke, Skay, Pettingell, & Borowsky, 2009). As such, there is a dire need for research on adolescents’ feelings of social connection in the time of the COVID-19 pandemic. While recent quantitative work has focused on examining the impact of the COVID-19 global pandemic on adolescents’ mental health (see Loades et al., 2020 for a review), with a few studies looking at the role social connection (e.g., Magson et al., 2021; Scott et al., 2021), there has yet to be an empirical exploration of adolescents’ feelings of social connection and their relation to theoretically derived risk and/or protective factors in the time of the COVID-19 pandemic. This study aimed to fill this gap by exploring qualitative self-report data about how adolescents are getting along and connecting with others in the time of COVID-19 and examining potential risk and protective factors to these feelings of social connection. Two research questions guided this work: (1) “Are adolescents’ feeling socially connected to others in the time of the COVID-19 global pandemic?” and (2) “What are the unintended risk and protective factors that predict adolescents’ feelings of social disconnection in the time of the pandemic?” Specifically, conceptualizing adolescents’ feelings of social connection in the time of the COVID-19 global pandemic within an attachment theory framework, this study examined the role of parent/peer attachment, smartphone use and problematic use, and FoMO in determining adolescents’ feelings of social disconnection. Importantly, this is the first study to conceptualize FoMO as a fear of disruption to the peer attachment dynamic, which is similar to, yet independent from, peer attachment insecurity. As such, another aim of this work was to examine the independent effect of FoMO (i.e., over and above the influence of peer attachment and other variables) on adolescents’ feelings of social disconnection. Based on the theorizing of previous work, we hypothesize that secure parent/peer attachment relationships and smartphone use will serve as protective factors to adolescents’ feelings of social disconnection amidst the COVID-19 pandemic, while problematic smartphone use and FoMO will function as risk factors exacerbating youths’ feelings of social disconnection.

**METHODOLOGY**

**Study setting**

This study was conducted in British Columbia (B.C.), Canada. Data were collected at two time points: October 28th and December 7th, 2020. Participants were recruited from two secondary schools across two public school districts. One school was located in a large urban population center, while the other was located in a rural population center (Statistics Canada, 2017). At the time of data collection, classes at the urban school were taking place half of the time online and half of the time in-person, whereas classes at the rural school were taking place full-time in-person. Each school was operating under COVID-19 restrictions, which included mask wearing and physical distancing. At the time of data collection from the rural school in October, B.C. recorded 272 new cases of COVID-19 per day for a total of 14,381 confirmed cases (2390 active) (BC Centre for Disease Control, 2021). At this time, B.C. residents were asked to limit their social gatherings to only include their immediate household, plus six “safe guests” whom they included in their social bubble. Individuals were encouraged to avoid all nonessential travel, wear
masks in all public places, and no large gatherings were to take place (BC Centre for Disease Control, 2021). At the time of data collection from the urban school in December, B.C. recorded 647 new cases of COVID-19 per day for a total of 38,152 confirmed cases (9380 active) (BC Centre for Disease Control, 2021). At this time, in addition to the guidelines listed above, B.C. residents were asked to limit their social gatherings to only include their immediate household.

Methodological Framework
In order to develop a comprehensive understanding of key predictors of adolescents’ feelings of social connection during the COVID-19 global pandemic, we used a concurrent mixed-methods design (Creswell, Klassen, Plano Clark, & Smith, 2011; Creswell & Zhang, 2009). Consistent with this framework, both the quantitative and qualitative data were simultaneously collected, combined, and analyzed. By using this approach, the researchers were able to identify themes derived from the qualitative analysis and subsequently integrate them into the quantitative analysis, allowing for a more thorough understanding of adolescents’ feelings of social connection in the time of the pandemic, as well as the examination of potential risk and protective factors to youth’s feelings of social disconnection. Accordingly, the data for this study consisted of responses to self-report questionnaires and an open-ended survey question.

Participants
The initial sample was comprised of 997 high school students (n(urban school) = 656; n(rural school) = 341) between the ages of 11 and 18 (grades 8–12). For the purpose of this study, only participants who provided a response to the open-ended question (response rate = 74%) were included in the sample (n = 738). We tested for any differences between participants who responded to the open-ended question and those who did not. The results showed that only parent attachment (t = 2.43, p = .015; Mresponded = 15.48, SD = 6.89, Mnot-responded = 14.13, SD = 7.11) and peer attachment (t = 3.07, p = .002; Mresponded = 15.51, SD = 6.13, Mnot-responded = 14.01, SD = 5.73) were significantly different between participants who responded and those who did not. Furthermore, of the participants who provided a response, 56 did not address their feelings of social connection in their response to the open-ended question (e.g., discussed how their grades or mode of schooling had been impacted by COVID-19) and were removed from the final sample (see Section 2.6 Qualitative Analysis for further explanation). Thus, the final sample for both the qualitative and quantitative portions of the study consisted of 682 participants (see Table 1 for a summary of participant characteristics).

Design and Procedure
To assist with obtaining a representative sample within each school, we used a passive parental consent procedure (Pokorny, Jason, Schoeny, Townsend, & Curie, 2001; Shaw, Cross, Thomas, & Zubrick, 2015), which was approved by the University of British Columbia Behavioural Research Ethics Board and the participating school districts. Active informed assent was also obtained from participants prior to their participation. All students attending either school were invited to take part in the study provided that their parent(s) or guardian(s) did not oppose their participation. As a recruitment incentive, all students from each participating school were entered into a draw for a chance to win a smartphone.

On the day of data collection, participants were directed to a survey site (www.Qualtrics.com) where an anonymous questionnaire was accessed through their personal electronic devices (e.g., smartphone). The questionnaire was administered on a school-wide basis during class time while participants were either physically or virtually present. Data collection was supervised by teachers, and research assistants were available to answer questions about the survey via Zoom, Microsoft Teams, and/or text message.

Measures
Demographics. We asked participants to self-report their school, age, grade, gender, ethnicity, language(s) spoken at home, and whether or not they were born in Canada.

Smartphone use. To measure smartphone use, participants were asked to report their “average daily screen time” on their primary mobile device by accessing the preinstalled Screen Time application on iOS devices (i.e., iPhone/iPad) or the comparable Digital Wellbeing application on Android devices. This method of measuring smartphone use has been validated in previous work (Ellis, Davidson, Shaw, & Geyer, 2019).
**Problematic smartphone use.** Problematic smartphone use was measured using the Smartphone Addiction Scale—Short Version (SAS-SV; Kwon, Kim, Cho, & Yang, 2013). The measure is comprised of 10 items that are rated on a 6-point Likert scale, ranging from 1 (Strongly disagree) to 6 (Strongly agree). Sample items include “I use my phone longer than intended” and “I feel impatient and irritated when I am not holding my phone.” A composite variable was created by calculating the average score across all items.

**Parent and peer attachment.** In order to assess participants’ attachment to parents and peers, a shortened version of the Inventory of Parent and Peer Attachment was used (IPPA-SV; Raja, McGee, & Stanton, 1992). This measure includes two sections that target both parent attachment and peer attachment (12 items each) with subsequent sections (4 items each) that assess three distinct components of parent/peer attachment: communication (e.g., “If my parents know something is bothering me, they ask me,” “My friends encourage me to talk about my difficulties”), trust (e.g., “My parents respect my feelings,” “When I am angry about something my friends try to be understanding”), and alienation (e.g., “I don’t get much attention at home,” “I feel alone or apart when I am with my friends”). Items are rated on a 4-point Likert scale ranging from 1 (Never true for me) to 4 (Always true for me). Parent and peer attachment scores for each individual were computed by summing the trust and communication raw scores and subtracting from this sum the alienation raw score (Armsden & Greenberg, 1987).

**Fear of missing out.** Fear of missing out was measured using the Fear of Missing Out scale (Przybylski et al., 2013). The scale is comprised of 10 items rated on a 5-point Likert scale, ranging from 1 (Never) to 5 (All of the time). Sample items include “I get worried when I find out my friends are having fun without me,” “It bothers me when I miss an opportunity to hang out with friends,” and “I fear my friends have more rewarding experiences than me.” A composite variable was created by calculating the average score across all items.

**Feelings of social connection.** In order to assess how the COVID-19 global pandemic impacted participants’ ability to connect with others, participants were asked an open-ended question designed specifically for the current study. Participants were asked to describe in their own words “how you feel personally and how you get along

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**TABLE 1**

Characteristics of Participants

| Participants          | Urban School (n = 486) | Rural School (n = 196) | Total (n = 682) |
|-----------------------|------------------------|------------------------|-----------------|
| Age in years (mean, standard deviation) | 15.07 (1.49) | 15.29 (1.25) | 15.13 (1.43) |
| Grade (mean, standard deviation) | 10.06 (1.39) | 10.34 (1.17) | 10.14 (1.33) |
| Gendera               |                        |                        |                 |
| Boy                   | 251 (52%)              | 86 (44%)               | 337 (49.4%)     |
| Girl                  | 229 (47%)              | 102 (52%)              | 331 (48.6%)     |
| Nonbinary             | 7 (1%)                 | 6 (3%)                 | 13 (1.9%)       |
| Transgender           | 3 (1%)                 | 7 (4%)                 | 10 (1.5%)       |
| Other/Not sure        | 10 (2%)                | 8 (4%)                 | 18 (2.3%)       |
| Ethnicityb            |                        |                        |                 |
| Black                 | 14 (3%)                | 5 (3%)                 | 19 (2.8%)       |
| East Asian            | 312 (64%)              | 8 (4%)                 | 320 (47%)       |
| Indigenous            | 5 (1%)                 | 17 (9%)                | 22 (3.2%)       |
| Latin American        | 24 (5%)                | 9 (5%)                 | 33 (4.8%)       |
| South Asian           | 19 (4%)                | 6 (3%)                 | 25 (3.7%)       |
| Southeast Asian       | 22 (5%)                | 6 (3%)                 | 28 (4.1%)       |
| West Asian            | 28 (6%)                | 3 (2%)                 | 31 (4.6%)       |
| White                 | 96 (20%)               | 167 (85%)              | 263 (38.6%)     |
| Language spoken at home |                      |                        |                 |
| English               | 166 (34%)              | 181 (92%)              | 347 (50.9%)     |
| Not English           | 320 (66%)              | 15 (8%)                | 335 (49.1%)     |

a Some participants selected more than one gender.

b Some participants selected more than one ethnic identification.
with and connect with others since the start of COVID-19.”

Qualitative Data Analysis
A thematic content analysis was conducted on participants’ responses to the open-ended question using a combination of inductive and deductive approaches. Specifically, a subset of the data was inductively coded, and a codebook consisting of key themes for the thematic sorting was developed by the first author in consultation with two trained researchers (Mayring, 2014). As our analysis progressed, three broad thematic categories in relation to participants’ feelings of social connection during the pandemic were identified: (1) feeling socially disconnected, (2) feeling socially connected, and (3) feeling socially indifferent. In order to conduct further quantitative analyses related to participants’ feelings of social connection in the time of COVID-19, data were deductively organized into these three thematic categories by two trained researchers using a researcher-designed template in Microsoft Excel (2018). At this point, participants whose responses did not relate to their feelings of social connection in the time of the pandemic were removed from further analyses (n = 56). Inter-rater reliability tests were conducted on 30% of the coded responses. The kappas for the inter-rater reliability were calculated for each category (feeling socially disconnected, $k = .97$; feeling socially connected, $k = .89$; feeling socially indifferent, $k = .83$) and demonstrated almost perfect agreement between researchers (Viera & Garrett, 2005). Any coding disagreements were discussed at regularly scheduled team meetings until consensus was achieved.

RESULTS
Thematic Content Analysis
Our findings are discussed in light of three key themes that emerged in our content analysis of participants’ feelings of social connection: (1) feeling socially disconnected, (2) feeling socially connected, and (3) feeling socially indifferent. Each quotation is preceded by the participant’s gender and grade.

Feeling Socially Disconnected in the Time of COVID-19. In our analysis, 28% of participants described feeling socially disconnected in the time of COVID-19. These participants expressed that the COVID-19 pandemic made it considerably more difficult to maintain relationships and connect with others among ongoing restrictions that limited and discouraged face-to-face contact. Specifically, these participants described how the consequences of the pandemic translated directly into loneliness, social exclusion, anxiety, and difficulty expanding their social networks. For example, a boy in grade 9 described feeling isolated from his friends:

I’ve been feeling very lonely and excluded from my friends, I feel like I need to make new friends, but [it’s] really hard to do that right now.

There was also an underlying sentiment for some of these participants that they felt like they were missing out on experiences with their friends or that they were being purposefully excluded from social gatherings. In other words, some of these participants described experiences related to FoMO. For example, a girl in grade 11 described how she felt excluded from her friends’ social bubble:

My three very good friends don’t feel as close because two of the three friends are really close to each other and they are neighbors. They bubbled at the start so when I am with them I tend to feel left out. [...] I haven’t felt all that close to friends since the start of Covid 19.

Moreover, a large subset of those who described feeling disconnected also mentioned how virtual modes of communication (e.g., social media, text messaging) felt less intimate than connecting with others in-person and exacerbated their feelings of disconnection and isolation. In other words, many of these participants remarked that connecting with others virtually felt more effortful and less beneficial to supporting their mental health and well-being than in-person interactions. For example, a girl in grade 11 shared that it was difficult for her to adjust to socializing in virtual settings in the time of COVID-19:

Since the start of Covid-19, it’s been more difficult to keep in contact with others. Having physical contact is extremely different than connecting [through] social media for me. Since I haven’t been able to meet the majority of my friends face to face, I feel less connected with them. [...] All of the things I used to do in person, in which I get to spend
time with others, is now online, which has been hard for me to adapt to. Meeting online has taken away social interaction, which has contributed to my increasing levels of anxiety.

Similarly, a boy in grade 12 described his experiences of social anxiety and exclusion during the COVID-19 pandemic:

Since the start of Covid 19, I have felt very lonely and disconnected from everyone else. I personally have felt like others have stopped talking to me or engaging with me outside of social media because they have better things to do or I am just not worth their time.

**Feeling Socially Connected in the Time of COVID-19.** Despite a group of participants describing feeling socially disconnected, the majority of participants (64%) said that they felt connected to others in the time of COVID-19. These participants explained that they were able to maintain their relationships with family and friends and connect with others, despite restrictions put in place in response to the pandemic. Specifically, many of these participants described that virtual modes of communication played an integral role in facilitating their relationships in the time of COVID-19. Accordingly, some of these participants expressed that their in-person interactions were replaced or heavily supplemented by virtual interactions which, subsequently, helped foster their feelings of intimacy and connection with others. For example, some participants specifically mentioned that social media, text messaging, video calling (e.g., FaceTime), video games, and other online platforms (e.g., Reddit, Discord) helped facilitate a sense of interpersonal intimacy in their virtual connections. A boy in grade 11 explained:

[...] The only thing covid changed was not being able to see my friends as much in real life and not being able to do sports. But through social media and playing video games I can still connect with my friends without actually seeing them.

Moreover, a subgroup of participants explained that they felt closer with fewer friends or family. These participants expressed that, though they had fewer social contacts during the pandemic, the relationships that they had maintained were strengthened as a result. For example, a boy in grade 12 said:

Virtual connections have enormously grown, existing connections have been strengthened, relationships (family and friends) have been deepened, and our appreciation for every and each thing there is has increased.

Similarly, some of these participants described putting more effort (e.g., initiating conversations, consistently checking in with friends) into their closest relationships, which translated into deeper, more meaningful interactions. For example, a girl in grade 9 explained how her proximity to those in her bubble (i.e., those whom she was able to continue to interact with in-person in the time of the pandemic) influenced the intimacy of her relationships:

I feel closer to my family and bubble of friends, but farther from people outside of my bubble.

**Feeling Socially Indifferent in the Time of COVID-19.** Lastly, 8% of participants described feeling indifferent in terms of their feelings of social connection in the time of the pandemic. Specifically, these participants did not describe feeling either socially connected or disconnected from others. Typical responses of participants in this group included things like: “It’s about the same as it was before,” “Just like normal,” or “Same.” While a few participants provided further elaboration and described additional factors to consider when connecting with others during the pandemic (e.g., safety, local restrictions), they ultimately did not describe whether they were feeling socially connected or disconnected in the time of the pandemic. For example, a girl in grade 9 explained:

I feel it’s harder to talk to people just for safety’s sake but it hasn’t really changed much for me personally.

**Quantitative Analysis**

We further conducted a quantitative analysis to explore the potential risk and protective factors to adolescents’ feelings of social connection in the time of COVID-19 through a process of
quantitative data integration (Creswell & Zhang, 2009). Given that there were no differences between participants from the socially indifferent group and the socially connected group on all other variables, we recoded the three groups in two groups prior to quantitative analyses (i.e., binary outcome; 0 and 1), with the baseline group including the socially connected and the socially indifferent groups (0; \( n = 494 \)), and the other group containing those who were categorized as socially disconnected (1; \( n = 188 \)). Specifically, we employed a binomial logistic regression analysis to test six variables as predictors of the disconnected group (see Table S1 for the correlations among these variables). For all the variables, missing data rates ranged from 0.1% to 8.9% for each study variable. Little’s (1988) MCAR test was not significant, \( \chi^2 (15) = 20.36, p = .16 \), suggesting that the pattern of missingness was not systematic. Given the large sample size, listwise deletion was used in the analysis. Results of the analysis are presented in Table 2, along with means, standard deviations, range, and alphas for all variables. We also tested if the data met the assumption of collinearity. Results indicated that multicollinearity was not a concern (Tolerances: .71–.96; VIFs = 1.05–1.40).

In terms of socio-demographic differences between the two groups (i.e., gender, age, ethnicity, school, being born in Canada and language spoken at home), results showed that school, \( \chi^2 (1, N = 682) = 5.26, p = .022 \), being born in Canada, \( \chi^2 (1, N = 682) = 8.15, p = .004 \), and language spoken at home, \( \chi^2 (1, N = 682) = 6.19, p = .013 \), were significantly different between groups. Given that these three variables were highly correlated (\( r = .48–.56, p < .001 \)), we decided to only include school in the analysis as a covariate on the first step. We also tested models including all socio-demographic variables as control variables, all of which were not significant and did not impact the model or pattern of findings (see Table S2). Smartphone use, problematic smartphone use, parent attachment, and peer attachment were entered as a block on the second step. Fear of missing out was entered as a block on the third step. This procedure yielded odd ratios with 95% confidence intervals for each variable. Following this, factor blocks were entered sequentially, and at each step differences in the \(-2 \) log-likelihood values were checked against chi-square tables to see if the addition of the new block of variables improved model fit. When used as a categorical predictor, rural school served as the reference category for school.

Findings from the binary logistic regression modeling for those who felt socially disconnected in the time of COVID-19 are shown in Table 3. In the model excluding the other predictors, the controlled variable (i.e., school) was not significant (Model 1) (model fits: \(-2 \) log likelihood = 654.46, Nagelkerke \( R^2 = .005 \), \( \chi^2(1) = 2.99, p = .08 \)). Entering smartphone use, problematic smartphone use, parent attachment, and peer attachment (Model 2) improved model fit (model fits: \(-2 \) log likelihood = 626.79, Nagelkerke \( R^2 = .053 \), \( \chi^2(4) = 30.67, p < .001 \)), and peer attachment was significant. Entering FoMO (Model 3) again improved model fit (model fits: \(-2 \) log likelihood = 621.69, Nagelkerke \( R^2 = .06 \), \( \chi^2(6) = 35.76, p < .001 \)), and peer attachment (OR = 0.93) was associated with a reduction in the likelihood of reporting feeling socially disconnected in the time of COVID-19, while being from the urban school (OR = 1.3) and fear of missing out (OR = 1.38) were associated with an increased likelihood of reporting feeling socially disconnected, over and above other predictors in the time of the COVID-19 global pandemic.

### Table 2

| Variable                          | n     | M     | SD     | Min | Max     | Cronbach’s \( \alpha \) |
|-----------------------------------|-------|-------|--------|-----|---------|-------------------------|
| **Smartphone Use (minutes)**      | 163   | 458   | 320.81 | 149.31 | 164.78 | 60                      |
| **Smartphone Addiction**          | 181   | 478   | 2.36   | 0.78 | 0.79    | 1.00                      |
| **Parent Attachment**             | 187   | 491   | 14.07  | 6.91 | 6.81    | –8.00                     |
| **Peer Attachment**               | 188   | 489   | 13.56  | 6.41 | 5.85    | –6.00                     |
| **Fear of Missing Out**           | 188   | 492   | 2.49   | 0.77 | 0.75    | 1.00                      |
| **School**                        | 189   | 489   | NA     | NA   | NA      | 1                        |

**Note.** C = Communication subscale; T = Trust subscale; A = Alienation subscale; Dis = Socially disconnected group; Other = Baseline group including the connected and the socially indifferent groups.
DISCUSSION

Findings from the current study indicated that most adolescents (64%) felt connected to others in the time of COVID-19. That said, a notable subgroup of adolescents (28%) explicitly described feeling socially disconnected in the time of the pandemic. Given the understanding that those who felt disconnected from others are likely to be the most vulnerable and susceptible to maladaptive outcomes (Asher & Parker, 1989; Coie et al., 1990, 1995), this study also examined potential risk and protective factors to experiencing feelings of social disconnection in the time of the COVID-19 global pandemic. Here, findings indicated that secure peer attachment relationships served as a protective factor to adolescents’ feelings of social disconnection (i.e., those with secure peer attachment relationships were less likely to feel disconnected from others), whereas FoMO served as an independent risk factor to feeling socially disconnected, over and above other variables (i.e., those who were higher in FoMO were more likely to feel disconnected from others, over and above the security of their attachment relationships and other variables). This suggests that FoMO plays a unique and important role in contributing to adolescents’ feelings of social disconnection in the time of COVID-19. Moreover, being from the rural school was identified as a protective factor to feeling socially disconnected in the time of COVID-19. This is likely due to the fact that students from this school were attending classes full-time in-person, and thus had more opportunities to connect with others in person.

Feelings of Social Connection in the Time of COVID-19

Findings from this work indicated that most adolescents still felt connected to others in the time of the COVID-19 global pandemic. This is encouraging given concerns around the impact of the pandemic on youths’ feelings of connection to others, and the well-established importance of these feelings of social connection to adolescents’ psychological adjustment and well-being (Loukas, Ripperger-Suhler, & Horton, 2009; McGraw, Moore, Fuller, & Bates, 2008; Witherspoon, Schotland, Way, & Hughes, 2009). Notably, those who described feeling socially connected during the pandemic mostly attributed this sense of connection to their virtual communications and relationships with close friends and/or family. This first finding underscores the importance of technology in fostering adolescents’ feelings of social connection in the time of the pandemic. This is in line with previous work demonstrating a deliberate and successful use of technology as a means of satisfying adolescents’ need for social connection and belonging (Grieve, Indian, Witteveen, Tolan, & Marrington, 2013; Hsu, Chang, & Wu, 2020). Additionally, the finding that adolescents who described feeling socially connected in the time of the pandemic mentioned feeling closer with close friends and/or family emphasizes the importance of these relationships in fostering youths’ feelings of social connection in chronic situations of perceived stress (e.g., a global pandemic).

Feelings of Social Disconnection in the Time of COVID-19

Despite the majority of adolescents describing feeling socially connected, a notable subgroup explicitly described feeling disconnected from others in the time of COVID-19. This is cause for concern given the known association between feelings of social disconnection in adolescence and negative outcomes (e.g., depression, anxiety, aggression,

| Variable                  | Model 1 |                   | Model 2 |                   | Model 3 |                   |
|---------------------------|---------|------------------|---------|------------------|---------|------------------|
|                           | β       | OR               | CI      | p                | β       | OR               | CI      | p                | β       | OR               | CI      | p                |
| School                    | .18     | 1.12             | 0.97–1.4| .09              | .27*    | 1.31             | 1.05–1.6| .02              | .29*    | 1.34             | 1.06–1.6| .01              |
| Problematic Smartphone Use| −.05    | 0.94             | 0.72–1.2| .68              | −.16    | 0.85             | 0.64–1.1| .25              |         |                   |         |                   |
| Smartphone Use            | .001    | 1.00             | 0.99–1.0| .75              | .001    | 1.00             | 0.99–1.0| .71              |         |                   |         |                   |
| Parent Attachment         | −.02    | 0.98             | 0.95–1.0| .15              | −.01    | 0.98             | 0.95–1.0| .32              |         |                   |         |                   |
| Peer Attachment           | −.07**  | 0.93             | 0.90–0.96| <.001           | −.07**  | 0.93             | 0.89–0.97| <.001           | .32*    | 1.38             | 1.0–1.8| .023             |
| Fear of Missing Out       |         |                   |         |                   |         |                   |         |                   |         |                   |         |                   |

Note. CI is the 95% confidence interval for OR.
* p < .05, ** p < .001.
Others (Bowlby, 1969), FoMO refers to a unique trait encompassing a fear of disruption to attachment relationships, which is conceptually distinct from the perceived reliability and availability of these attachment relationships (i.e., attachment security/insecurity).

While this study specifically examined adolescents’ feelings of connection to others in the time of the pandemic, implications of this work extend beyond this context. For instance, building on previous work inversely linking FoMO and feelings of social connection and belonging (Beyens et al., 2016; Lai et al., 2016), findings from this study suggest that the fear of being socially excluded is an important factor contributing to adolescents’ feelings of social disconnection. These findings also hold important implications for intervention and prevention efforts by suggesting that programs aimed at fostering adolescents’ feelings of social connection should target their feelings of FoMO, as youth higher in FoMO are inherently more likely to feel disconnected from others.

**FoMO & Feelings of Social Disconnection**

The main finding of this work was that FoMO was a unique predictor of adolescents’ feelings of social disconnection in the time of COVID-19. Importantly, while secure peer attachment relationships were inversely related to feeling socially disconnected in the time of COVID-19 expressed concerns around feeling socially excluded or left out from social interactions with their peers. These descriptions appeared to exemplify a mechanism through which FoMO may have contributed to youths’ feelings of social disconnection in the time of the pandemic. This was further supported from the results from our quantitative analyses described below.

**Attachment Relationships & Feelings of Social Disconnection**

The finding that adolescents’ feelings of social disconnection were inversely related to the security of their peer attachment relationships aligns with the theorizing of attachment theory, which suggests that attachment predispositions (i.e., attachment security vs. insecurity) guide expectations about the availability and accessibility of support from close others (Bowlby, 1969), and likely play a key role in predicting feelings of social connection throughout the lifespan. Moreover, given that social connection is essential to psychological adjustment and well-being in adolescence (Loukas et al., 2009; McGraw et al., 2008; Witherspoon et al., 2009), this finding is also supported by previous work linking attachment security in adolescence with positive outcomes (Allen et al., 2007; Seiffge-Krenke, 2006; Shomaker & Furman, 2009). Given that the findings from this study suggested that it was the security of peer attachment...
relationships, and not attachment relationships with parents or guardians that were related to youths’ feelings of social connection in the time of the COVID-19 pandemic, these results contribute to the growing body of work examining the relative importance of peer attachment relationships in adolescence which serve as important sources of social support, intimacy, and connection (Allen & Tan, 2016; Bokhorst et al., 2010; Collins & Laursen, 2004; Collins et al., 2009). Specifically, the inverse link between the security of adolescents’ peer attachment relationships and their feelings of social disconnection in the time of the pandemic clearly emphasizes the importance of these relationships. In line with the theorizing of Zeifman and Hazan (2008), this inverse link exemplifies how the strength and security of peer attachment relationships can serve as a protective factor in situations of chronic perceived stress (e.g., a global pandemic). This has important implications for intervention and prevention programs aimed at promoting adolescents’ resiliency in the face of stress by suggesting that these efforts should target the security of adolescents’ peer attachment relationships as this may lead them to stronger feelings of social connection (i.e., a known predictor of positive developmental and mental health outcomes; e.g., Loukas et al., 2009).

Smartphone Use & Problematic Use in the Time of COVID-19

Additionally, findings from the current study indicated that both smartphone use and problematic use were not significantly associated with adolescents’ feelings of social disconnection in the time of the COVID-19 global pandemic. This suggests that while adolescents’ may be using social media to connect with others in the time of COVID-19 (Ellis et al., 2020), the amount of time that they spent engaging with their smartphones did not influence their feelings of social connection. This may be due to a possible ceiling effect whereby after a certain amount of use, the benefits of using the smartphone on youths’ feelings of social connection plateau, or simply because the amount of time adolescents spend using their smartphones is not related to their feelings of social connection (i.e., what you are doing on their smartphones may be more important; Elhai, Levine, Dvorak, & Hall, 2017). Nevertheless, given that previous work has established that adolescents use technology to satisfy their need for connection and belonging (Grieve et al., 2013; Hsu et al., 2020), future work should continue to explore this relationship while including a more nuanced exploration of how youth are engaging with their devices (e.g., texting or video calling their peers, actively sharing vs. passively consuming content on social media).

The finding that problematic smartphone use was not associated with feelings of social disconnection is in contrast to the theorizing of previous work that has linked problematic smartphone use with stress, anxiety, depression, and loneliness (Busch & McCarthy, 2021). Rather, findings from this work indicated that while problematic smartphone use may be associated with these negative outcomes, it was not related to adolescents’ feelings of social disconnection in the time of the COVID-19 global pandemic. This may be due to the fact that extreme patterns of smartphone use were actually serving a protective factor by providing opportunities for youth to connect with their peers virtually or simply because problematic smartphone use was not a relevant factor contributing to adolescents’ feelings of social connection in the time of the pandemic. Either way, this finding is critical given recent media concerns around the perceived risks associated with adolescents’ increased technology engagement in the time of COVID-19 (e.g., “Smartphone addiction,” 2020). Not only do the findings from this study refute this, as noted, it is possible that the increased technology engagement for adolescents during the pandemic may have served as an important protective factor. Future work should continue to investigate adolescent smartphone use to identify ways to maximize its protective effects while minimizing any associated harms.

LIMITATIONS & FUTURE DIRECTIONS

Despite the many strengths to this work, including the use of a strong theoretical rationale, empirically derived measures, and a large and diverse sample, findings from this work must be viewed in light of certain methodological limitations. Firstly, our sample predominantly identified as East Asian and therefore, the results should be considered with caution due to considerations surrounding generalizability. That said, our statistical model was tested when controlling for age, gender, ethnicity, school, being born in Canada, and language spoken at home and none of these variables were significant, nor did they impact our model or the pattern of findings. Second, our results indicated that there were significant differences in terms of parent and peer attachment between participants who responded to the open-ended question (i.e., those who were included in our analyses) and those who did not. As such, given our finding that peer attachment insecurity was
associated with feelings of social disconnection, it is possible that our results underrepresented the extent this relationship by inadvertently excluding those who may be most at risk. Third, our study relied on self-report measures, so it is possible that participants may have misinterpreted questions due to recall bias, social desirability bias, or simply misunderstood the self-assessment measures. That said, we took a mixed methods approach in order to probe for potential nuances within the data. More specifically, we chose to include an open-ended question that gave participants the space to provide details about their feelings of connectedness in their own words. This approach allowed for a simple and straightforward breakdown of potentially difficult concepts that may have been leading or unclear in the quantitative questionnaire. Fourth, since the data were cross-sectional, it is impossible to provide causal connections. This means that our ability to make causal inferences is limited and it remains possible that there are other factors at play. Future studies may want to consider conducting longitudinal analyses, given that the COVID-19 global pandemic likely could have longer-term impacts on other areas of development such as personality or school connectedness, both of which may contribute to adolescents’ feelings of social disconnection. Moreover, while this study looked at the direct effects of parent/peer attachment, smartphone use and problematic use, and FoMO in relation to adolescents’ feelings of social connection, there are strong theoretical links between these constructs which warrant further investigation. Specifically, future work should explore the interconnection among these variables through mediation analyses. A final limitation is that we chose to measure participant’s smartphone use using their overall smartphone screen time, which precluded us from knowing the specific activities adolescents were using their devices for, whether it was to connect with others, watch movies, game, or scroll through social media. Further studies may want to incorporate a more comprehensive approach to determining how and why teens are using their smartphones as this can have important implications for their feelings of social connection.

CONCLUSION

Findings from this work suggest that while the majority of adolescents felt connected to others in the time of the COVID-19 global pandemic, a subset of youth felt socially disconnected, and previous work indicates that these are likely to be those most at risk for maladaptive outcomes (Asher & Parker, 1989; Coie et al., 1990, 1995). Most notably, findings from this work suggest that FoMO may play a particularly important role in contributing to adolescents’ feelings of social disconnection in the time of the pandemic—which holds valuable theoretical implications for youths’ feelings of social connection more broadly. Indeed, while secure peer attachment relationships appeared to serve as a protective factor to youths’ feelings of social disconnection, FoMO predicted adolescents’ feelings of social disconnection over and above the impact of these secure attachment relationships. From an attachment theory perspective, this suggests that the fear of disruption to peer attachment relationships outweighs the security of the relationships themselves. In this way, FoMO appears to be an important and independent factor predicting adolescents’ feeling of social disconnection in the time of the pandemic. These findings have important implications for the theoretical conceptualization of FoMO as an enduring trait characterized by a pervasive fear of the disruption to peer attachment relationships, as well as for intervention and prevention efforts targeting adolescents’ feelings of social connection in times of chronic perceived stress (e.g., a global pandemic). Importantly, these findings suggest that such efforts should target adolescents’ feelings of FoMO, along with the security of their attachment relationships, as a means of fostering their resiliency.

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