Effects of Pre-Existing Social Anxiety on Mental Health Outcomes
During the COVID-19 Pandemic

Jolie T.K. Ho & David A. Moscovitch

Department of Psychology and Centre for Mental Health Research and Treatment,
University of Waterloo

University of Waterloo, 200 University Ave W, Waterloo, Ontario, Canada, N2L 3G1

Corresponding author:

Jolie T.K. Ho

Department of Psychology & Centre for Mental Health Research and Treatment

University of Waterloo

200 University Ave W

Waterloo, ON N2L 3G1

Email: jtk2ho@uwaterloo.ca

Abstract

Background and objectives: Individuals with social anxiety (SA) have well-established fears of being negatively evaluated and of exposing self-perceived flaws to others. However, the unique impacts of pre-existing SA on well-being and interpersonal outcomes within the stressful context of the pandemic are currently unknown. **Design:** In a preregistered study that took place in May 2020, we surveyed 488 North American community participants online. **Methods:** We used multiple linear regression to analyze whether pre-existing SA symptoms predicted current coronavirus anxiety, loneliness, fears of negative evaluation, use of preventive measures, and affiliative outcomes, and whether pre-existing functional impairment and recent COVID-related stressors moderated these relations. **Results:** Results highlighted the negative effects of pre-existing social anxiety (SA) on current mental health functioning, especially for participants with higher pre-existing functional impairment and greater exposure to COVID-related stressors. Although participants with higher pre-existing SA reported currently feeling lonelier and more fearful of negative evaluation, they also endorsed greater efforts to affiliate with others. **Conclusions:** High SA individuals may have heightened desire for social support within the isolating context of the pandemic, in which COVID-related social restrictions enable greater avoidance of social evaluation but may also mask the enduring impairment associated with pre-existing SA.

Keywords: social anxiety, pandemic, COVID-19, impairment, stressors, social support

Effects of Pre-Existing Social Anxiety on Mental Health Outcomes During the COVID-19 Pandemic

The COVID-19 pandemic has taken a heavy toll on psychological well-being. Multiple studies have reported rising levels of anxiety and depression in the general population since the pandemic's inception, caused by a combination of social, cultural, economic, and health concerns (e.g., Dozois, 2020; Elton-Marshall et al., 2020; Gallagher, Zvolensky, Long, Rogers, & Garey, 2020; Loades et al., 2020). People with pre-existing emotional difficulties when the pandemic started may be especially susceptible to the negative effects of the COVID-19 context on mental health outcomes due to the risks of heightened loneliness and social isolation from social distancing (Banerjee & Rai, 2020; Galea, Merchant, & Lurie, 2020), increased fears of infection due to the virus' highly contagious nature (Ahorsu et al., 2020; Lee, 2020), and poor emotional adjustment to the inherently uncontrollable and unpredictable nature of the pandemic and its myriad stressors. However, despite the common perception that individuals with pre-existing mood and anxiety disorders have been the most vulnerable during the pandemic (e.g., Chatterjee & Malathesh, 2020; Taylor et al., 2020; Yao, Chen, & Xu, 2020), to date there has been relatively little research testing this assumption empirically.

One recent study that surveyed individuals with pre-existing mental health difficulties on their adjustment to the pandemic (Asmundson et al., 2020) found that those with pre-existing diagnoses of anxiety-related or mood disorders have experienced higher levels of coronavirus-related stress compared to healthy controls. Furthermore, those with anxiety-related disorders reported greater fears about danger and contamination, socioeconomic consequences, xenophobia, and traumatic stress symptoms. However, while such individuals endorsed greater efforts to utilize active coping strategies for managing their distress arising from isolation

measures (e.g., setting a schedule or routine, spending time on hobbies, playing video games), they reported no significant differences in the perceived helpfulness of their strategies compared to individuals with no current mental health diagnoses.

The reasons for these differences between individuals with and without pre-existing anxiety problems in coping with pandemic-related distress have not yet been established. It is possible that already-anxious individuals are inhibited by pre-existing functional impairment, which may constrain their ability to manage symptoms effectively during the pandemic. It is also possible that the nature of the pandemic context limits the effectiveness of the coping strategies they have within their coping repertoire. To this end, every individual's adjustment during the COVID-19 pandemic is impacted by the unique encounters he or she has had with specific COVID-related stressors such as contracting the illness, caring for dependents, or losing employment. A recent study of American adults found that those who believed they had contracted the coronavirus, received a confirmed diagnosis of COVID-19, or knew someone who died from COVID-19 reported higher levels of stress, elevated symptoms of anxiety and depression, and greater levels of functional impairment (Gallagher, Zvolensky, Long, Rogers, & Garey, 2020). Another study on a Canadian sample found that COVID-related stressors such as social isolation, challenges associated with obtaining basic necessities, unemployment, and frequent exposure to daily news about the coronavirus had strong negative effects on mental health (Dozois, 2020).

Clearly, the relations between pre-existing anxiety, impairment, and COVID-related stressors, on one hand, and mental health outcomes during the pandemic, on the other, warrant further research. In the present study, we focused attention on individuals with pre-existing symptoms of *social* anxiety and the extent to which such individuals may be uniquely vulnerable

to the mental health impact of the COVID-19 pandemic. Research on pre-pandemic social anxiety has consistently demonstrated that higher levels of symptoms confer a significantly elevated risk of negative self-perception, fears of negative evaluation in social situations, high levels of interpersonal distress and avoidance, and functional impairment across a variety of life domains (Alden & Taylor, 2004; Clark & Wells, 1995; Hofmann, 2007; Moscovitch, 2009; Rapee & Heimberg, 1997). What is unknown is how individuals with higher pre-existing symptoms of social anxiety have coped with the unique social context of the COVID-19 pandemic, and how the pandemic has shaped the nature of their current emotional and interpersonal functioning.

Research on social anxiety in the pre-pandemic era reliably showed that socially anxious individuals worry excessively about negative evaluation in social situations and rely on maladaptive self-protective strategies to hide their self-perceived flaws that could be scrutinized by evaluative others (Moscovitch et al., 2013). It is possible that current pandemic-related preventive measures such as self-isolation, physical distancing, and mask-wearing—each of which enables varying degree of self-concealment—have reduced perceptions of social threat for socially anxious individuals, allowing them to feel safer and less socially distressed than they typically would. While it is true that using self-concealment strategies might allow socially anxious individuals to feel safer and more protected within evaluative social contexts, their use also tends to erode social performance and decrease the quality of social interactions (Rowa et al., 2015), often serving as a barrier to the formation of deeper and more meaningful social connections that are instrumental to well-being (Baumeister & Leary, 1995; Plasencia, Taylor, & Alden, 2016). As a result, socially anxious individuals tend to lead impoverished social lives and experience chronic feelings of loneliness and isolation (Alden, Regamball, & Plasencia, 2014).

It is currently unknown whether use of preventive measures during the pandemic may improve or exacerbate the poor quality of their social interactions. Relatedly, it is unknown whether socially anxious individuals, particularly those with higher levels of pre-pandemic functional impairment, may be able to access adequate social support during the pandemic. On one hand, the pandemic may have isolated socially anxious individuals further from opportunities for social connection and reward. Alternatively, socially anxious individuals who struggled significantly before the COVID-19 pandemic may feel relieved and comforted by pandemic-related social restrictions, which might improve their willingness to seek out and access the social support they need without having to confront the typical kinds of social situations they would normally fear and avoid. For example, the new norms and expectations that have arisen for social interaction during the pandemic may provide a socially acceptable context for restricting their social encounters to those with whom they feel most comfortable and in ways that enable them to exert more control over their self-presentation, for example via asynchronous or text-based communication rather than having to engage in synchronous or in-person interactions (see Kamalou et al., 2019).

In sum, the unique impact of pre-existing social anxiety on mental health and interpersonal outcomes during the pandemic remains unknown. Furthermore, little is understood about how pre-existing functional impairment and current COVID-related stressors may moderate the relations between longstanding symptoms of social anxiety and current functioning. The present pre-registered study aimed to address these gaps in knowledge. We surveyed a large sample of community participants from the United States and Canada in late May of 2020, at which point the United States had approximately 20,000 new cases per day and had just exceeded 100,000 total COVID-related deaths, while Canada was reporting approximately 900

new cases per day and had exceeded 6,000 total deaths (World Health Organization, 2020). At the time of data collection, states and provinces in both countries were beginning the process of lifting stay-at-home orders that had been in place since March and April.

Our overarching prediction was that pre-existing symptoms of social anxiety would be associated with poorer mental health and interpersonal outcomes during the pandemic. We tested four specific sets of hypotheses. First, that higher levels of pre-existing social anxiety symptoms would predict greater current levels of coronavirus-related anxiety and loneliness. Second, that individuals with higher pre-pandemic social anxiety would report greater use of COVID-related preventive measures and, in turn, decreases in current fears of negative evaluation during the unique pandemic context. Third, that pre-existing social anxiety would be associated with decreased social support seeking and less engagement in affiliative behaviours as well as reduced feelings of social pleasure within the pandemic context. Fourth and finally, we expected the relations between higher pre-pandemic social anxiety and poorer mental health and interpersonal outcomes to be exacerbated by both pre-existing levels of functional impairment and greater reported exposure to COVID-related stressors. Our complete pre-registered study design and hypotheses can be accessed at the Open Science Framework (https://osf.io/rjhgx/?view_only=5dc5b1312c9a4f0c962450d93e973be0).

Methods

Participants

We recruited 800 participants online from the United States and Canada using Amazon Mechanical Turk (MTurk). Data collection occurred during a single day on May 28, 2020. Users who had completed at least 100 human intelligence tasks (HITs) with an approval rating of at least 90% were invited to participate in an online survey about “Coping with anxiety during the

COVID-19 outbreak,” in which they provided demographic information and completed randomized measures of pre-existing anxiety symptoms and functional impairment over the past year as well as measures of current exposure to COVID-related stressors, coronavirus-related anxiety symptoms, use of pandemic-related preventive measures, engagement in and emotional responses to affiliation with others, current feelings of loneliness, and perceived changes in current fears of negative evaluation. Participants were excluded if they failed to answer at least 80% of the validity questions correctly (e.g., ‘Please choose “very characteristic of me”’), or if they were identified as bots through examination of response patterns and text-based responses. The final sample consisted of 488 participants. Details regarding the demographic characteristics of the sample can be found in Table 1. We targeted a sample size of 735 based on conservative *a priori* power analyses indicating this sample size would provide power greater than 0.80 to detect small to medium associations (r 's > 0.20) at alpha of .05. Post-hoc power analyses demonstrated that for our planned regression analyses involving a maximum of six predictor variables, our final sample provided power ranging from 0.85 to 1.00 at alpha of .05, given effect sizes (Cohen's f^2 values) ranging between 0.03 and 1.04 across analyses.

We also collected additional questionnaire data that were not relevant for the current paper and will be reported elsewhere (see https://osf.io/rjhgx/?view_only=5dc5b1312c9a4f0c962450d93e973be0). After completing the survey, participants were debriefed and remunerated US \$3.50 for their participation. This study was approved by the institution's research ethics board.

Measures

Pre-existing social anxiety symptoms. The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) is a 20-item self-report scale that assess social interaction fears, with

each item rated on a scale from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). Participants were asked to rate the items as applicable to them “in the year prior to the COVID-19 outbreak.” The SIAS has good test-retest reliability, convergent validity, and internal consistency, and can distinguish between individuals with and without social anxiety disorder (Mattick & Clarke, 1998). Because the four reverse-scored items of the scale have been shown to compromise validity (Rodebaugh, Woods, & Heimberg, 2007), only straightforward items were included in scoring the SIAS. Internal consistency of our sample was strong at $\alpha = .97$.

Pre-existing functional impairment from social anxiety. The Sheehan Disability Scale (SDS; Sheehan, 1996) is a three-item instrument that assesses functional impairment in three domains: work/ school, social, and family life. Participants rated the extent to which each domain was impaired by their concerns about social evaluation “in the year prior to the COVID-19 outbreak” on a visual analog-scale from 1 (*not at all*) to 10 (*extremely*). For participants who indicated that they had not worked or studied at all over the past year for reasons unrelated to social evaluation concerns, their rating for the work/school domain was imputed by calculating the mean of their ratings for the social life and family life domains. Internal consistency of the SDS in our sample was $\alpha = .89$.

COVID-related stressors. The “stressful experiences” section of the Coronavirus Stressor Survey (CSS; McLean & Cloitre, 2020) probes whether participants themselves or people close to them have been exposed to any of the following six experiences: becoming ill from possible or certain exposure to coronavirus; being hospitalized from exposure to coronavirus; having a job that job requires possible exposure to coronavirus; losing a job or income due to the pandemic; experiencing increased responsibilities at home; and experiencing difficulties

accessing food, medication or other necessities during the pandemic. Participants indicated whether each experience has happened to them (assigned a score of 2), someone close to them (assigned a score of 1), or not at all (assigned a score of 0). Internal consistency of the CSS in our sample when scored in this way was $\alpha = .73$.

Current coronavirus anxiety. The Coronavirus Anxiety Scale (CAS; Lee, 2020) instructs participants to endorse how often they have experienced any of the following five concerns over the last 2 weeks, on a scale of 0 (*not at all*) to 4 (*nearly every day over the last 2 weeks*): “I felt dizzy, lightheaded, or faint, when I read or listened to news about the coronavirus,” “I had trouble falling or staying asleep because I was thinking about the coronavirus,” “I felt paralyzed or frozen when I thought about or was exposed to information about the coronavirus,” “I lost interest in eating when I thought about or was exposed to information about the coronavirus,” and “I felt nauseous or had stomach problems when I thought about or was exposed to information about the coronavirus.” Internal consistency of the sum-scored items in our sample was excellent, $\alpha = .93$.

Current loneliness. The Three-Item Loneliness Scale (Hughes, Waite, Hawkey, & Cacioppo, 1999) asks participants how often they feel that they lack companionship, feel left out, and feel isolated from others on a scale from 1 (*hardly ever*) to 3 (*often*). Internal consistency was $\alpha = .83$ in our sample.

Current use of preventive measures. Participants were asked to rate the frequency at which they used specific COVID-19 preventive measures over the past week on a scale of 0 (*never*) to 4 (*all the time*). As listed in Table S1, these included staying at home, maintaining distance from others when outside the home, wearing masks or gloves when outside the home, handwashing, cleaning in the home, and stocking up on food and other items. The final item,

“stocking up on food and other items,” was excluded from analysis due to having 61.43% of missing values. The scale demonstrated strong internal consistency, $\alpha = .90$.

Change in fear of negative evaluation. The Brief Fear of Negative Evaluation Scale (BFNE; Leary, 1983) is a 12-item, condensed version of the Fear of Negative Evaluation Scale (Watson & Friend, 1969) that has shown strong psychometric properties, including high convergent validity and good internal consistency (Duke et al., 2005). Participants typically rate the extent to which each statement applies to them (e.g., “I am afraid that people will find fault with me”) on a scale of 1 (*not at all*) to 5 (*extremely*). To assess how participants’ fear of negative evaluation may have changed since the start of the pandemic, we adapted the scale by asking participants to indicate their agreement with each statement “over the last week, as a result of social distancing” on a scale of 1 (*significantly less than before*) to 7 (*significantly more than before*), which was then rescaled to range from -3 to 3 for data analysis, with 0 representing no change. The adapted measure demonstrated good internal consistency in our sample ($\alpha = .81$).

Current affiliative behaviours. Participants rated various author-constructed items reflecting different ways they may have tried to connect with others over the prior week during the COVID-19 pandemic. As listed in Table S1, items included various forms of digital communication such as text messaging and posting on social media, as well as acceptable in-person activities such as visiting others while maintaining sufficient physical distance. Participants rated the frequency of their use of each type of affiliative behaviour over the last week on a scale of 0 (*never*) to 4 (*all the time*). They were also asked to rate the level of social connection they felt when they used each type of behaviour on a scale of 0 (*not at all connected*) to 4 (*extremely connected*). Finally, they indicated their emotional response to each type of behaviour from 0 (*high dislike/distress*) to 4 (*high enjoyment/reward*). To maximize

interpretability, we rescaled this measure to range from -2 to 2 for data analysis, with 0 representing a neutral emotional response and -2 represented the most extreme negative response. Frequency of affiliative behaviours and social connection from affiliative behaviours were highly correlated, $p = .87$, and thus were averaged into to create a composite score, which we labeled “affiliative frequency and connection.” This measure demonstrated excellent internal consistency, $\alpha = .93$. Emotional response to affiliation also demonstrated good internal consistency, $\alpha = .79$.

Data preparation and data analytic plan

Data were screened to determine whether they met the assumptions of normality; methods included visually examining the distribution of scores in histograms and the normal Q-Q plot, inspecting the standard error of skewness and kurtosis, and inspecting the data for discontinuous and extreme outliers. We then examined the extent and pattern of missing data. Little’s MCAR tests showed that all missing data were missing completely at random (MCAR). The frequency of missing data never exceeded 5% for any variable; thus, missing scale scores were replaced using expectation-maximization. The assumption of homoscedasticity was examined and deemed met in all cases based on bivariate scatterplots reflecting associations between independent and dependent variables.

Data were analyzed in IBM SPSS Statistics 23 (2015) using multiple linear regression to determine whether pre-existing social anxiety symptoms predicted current outcomes of interest, and whether pre-existing functional impairment and recent COVID-related stressors moderated these relations. Predictor variables were centred based on their respective grand means and entered hierarchically in a step-wise fashion, with pre-existing social anxiety, pre-existing functional impairment, and COVID-related stressors entered on the first three steps, respectively,

two-way interaction terms between pre-existing social anxiety and each moderator entered on the fourth step, and the three-way interaction term entered on the fifth step. The conditional effects of pre-existing social anxiety on current outcomes at varying levels of pre-existing impairment and COVID-related stressors were probed using the PROCESS macro (Hayes, 2013). All collinearity statistics were within acceptable range ($VIF < 4$, tolerance $> .20$; Hair, Black, Babin, & Anderson, 1995).

Results

Descriptive statistics and sample characteristics

Means and standard deviations for measures used in the present study appear in Table 2. Correlations between all independent and dependent variables can be found in Table S2.

Coronavirus anxiety

We hypothesized that pre-existing social anxiety symptoms would predict greater coronavirus anxiety and that moderators would heighten the strength of the association. See Table S3 for multiple linear regression results. Consistent with our hypothesis, there was a positive main effect of social anxiety on coronavirus anxiety when entered on the first step, $R^2 = .36$, $F(1, 486) = 269.68$, $p < .001$. The positive main effect of pre-existing impairment explained significant additional variance in coronavirus anxiety when entered on the second step, $\Delta R^2 = .09$, $F(1, 485) = 77.14$, $p < .001$, as did the positive main effect of COVID-related stressors on the third step, $\Delta R^2 = .09$, $F(1, 484) = 92.70$, $p < .001$. Both pre-existing impairment and COVID-related stressors significantly moderated the relationship between social anxiety and coronavirus anxiety on the fourth step, $\Delta R^2 = .03$, $F(2, 482) = 13.68$, $p < .001$. Specifically, social anxiety had a significant positive conditional effect on coronavirus anxiety when either impairment or stressors were high. As shown in Figure 1, the magnitude of the positive

conditional effect was greatest when impairment and stressors were both high, $B = 0.12$, $SE = 0.02$, $t(482) = 7.68$, $p < .001$, followed by the conditional effect at low impairment and high stressors, $B = .10$, $SE = 0.02$, $t(482) = 5.62$, $p < .001$, and at high impairment and low stressors, $B = .10$, $SE = .02$, $t(482) = 5.47$, $p < .001$. There was no association between pre-existing social anxiety symptoms and current levels of coronavirus anxiety when both impairment and stressors were low.

Loneliness

We hypothesized that social anxiety would predict increased levels of current loneliness, and that this relationship would be further strengthened by impairment and stressors. As expected, social anxiety significantly predicted increased loneliness, $R^2 = .26$, $F(1, 486) = 171.28$, $p < .001$ (see Table S4). Impairment entered on the second step also had a positive main effect on loneliness, and explained a significant amount of additional unique variance, $\Delta R^2 = .02$, $F(1, 485) = 12.190$, $p = .001$, as did stressors when entered on the third step, $\Delta R^2 = .01$, $F(1, 484) = 5.71$, $p = .02$. Although each predictor variable on its own was significantly associated with loneliness when controlling for the others, there were no significant interaction effects, indicating that the relationship between social anxiety and loneliness was not moderated by either impairment or stressors.

Frequency of use of preventive measures

We hypothesized that social anxiety would predict greater use of preventive measures and that these effects would be moderated by impairment and COVID-related stressors. There was a significant, though small, main effect of pre-existing social anxiety in the first step, $R^2 = .01$, $F(1, 486) = 5.81$, $p = .02$ (see Table S5). Contrary to our hypothesis, greater social anxiety predicted less frequent use of preventive measures. When impairment was entered on the second

step, there was no significant additional variance explained. Similarly, there was no significant main effect of stressors on the use of preventive measures when entered on the third step. On the other hand, the two-way moderating effects of impairment and stressors entered on the fourth step contributed significantly to the model, $\Delta R^2 = .03$, $F(2, 482) = 5.18$, $p = .006$, with the interaction between social anxiety and impairment explaining significant variance in frequency of use of preventive measures. When simple slopes were probed, there was a significant negative conditional effect of social anxiety on use of preventive measures at low impairment ($B = -0.04$, $SE = 0.01$, $t(482) = -3.25$, $p = .001$), but no conditional association at high impairment ($B = 0.01$, $SE = 0.02$, $t(482) = 0.62$, $p = .53$).

Change in fear of negative evaluation (FNE)

We hypothesized that pre-existing social anxiety would predict a decrease in current FNE. Contrary to our hypothesis, in the regression model predicting change in FNE since the start of the pandemic (see Table S6), entering social anxiety on the first step resulted in a significant positive main effect such that greater pre-existing social anxiety predicted an increase in fear of negative evaluation during the pandemic, $R^2 = .15$, $F(1, 486) = 89.17$, $p < .001$. Including impairment as a predictor on the second step explained a marginally significant amount of additional variance in change in FNE, $\Delta R^2 = .01$, $F(1, 485) = 3.93$, $p = .05$. When stressors were entered on the third step, they did not significantly contribute to the model, and impairment ceased to be significant with both social anxiety and stressors in the model, though social anxiety remained a significant predictor. Further, contrary to hypotheses, impairment and COVID-related stressors did not moderate the relationship between pre-existing social anxiety and changes in FNE.

Affiliation measures

Affiliative frequency and connection. We anticipated the composite score of affiliative frequency and social connection to decrease as pre-existing social anxiety symptoms increased. Contrary to expectations, social anxiety had a positive main effect on affiliative frequency and social connection in the first step, explaining 14.7% of unique variance, $R^2 = .15$, $F(1, 486) = 84.72$, $p < .001$ (see Table S7). Entering impairment in the second step explained a significant amount of additional variance, $\Delta R^2 = .14$, $F(1, 485) = 93.12$, $p < .001$, as did entering stressors in the third step, $\Delta R^2 = .06$, $F(1, 484) = 41.24$, $p < .001$, with both having unexpected positive main effects on affiliative frequency and connection. However, after impairment and stressors were entered, social anxiety was no longer a significant predictor in the model. The moderating effects of impairment and COVID-related stressors explained an additional 8% of unique variance, $\Delta R^2 = .08$, $F(2, 482) = 31.10$, $p < .001$, as did the three-way interaction between social anxiety, impairment, and stressors entered on the final fifth step, $\Delta R^2 = .02$, $F(1, 481) = 13.24$, $p < .001$. Specifically, as shown in Figure 2, social anxiety had a positive conditional effect on affiliative frequency and connection at high levels of impairment, regardless of whether COVID-related stressors were either low, $B = 0.13$, $SE = 0.04$, $t(482) = 3.10$, $p = .002$, or high, $B = 0.19$, $SE = 0.04$, $t(482) = 5.37$, $p < .001$. Meanwhile, when impairment and stressors were both low, there was a negative conditional effect of social anxiety on affiliative behaviours, $B = -0.24$, $SE = 0.04$, $t(482) = -6.20$, $p < .001$. There was no significant conditional effect of social anxiety when impairment was low and COVID-related stressors were high.

Emotional response to affiliation. We hypothesized that pre-existing social anxiety would predict a more negative emotional response to affiliation. Contrary to our hypothesis, when emotional response to affiliative behaviours was the outcome variable, the main effect of social anxiety in the first step was non-significant (see Table S8). However, there was a small,

positive effect of impairment on the second step, $\Delta R^2 = .01$, $F(1, 485) = 6.13$, $p = .01$. There was also a small but significant positive main effect of stressors when entered in the third step, $\Delta R^2 = .02$, $F(1, 484) = 12.29$, $p < .001$. When the moderating effects of impairment and COVID-related stressors were entered in the fourth step, an additional 9% of variance was explained, $\Delta R^2 = .09$, $F(2, 482) = 26.08$, $p < .001$, but only impairment (and not stressors) significantly moderated the relationship between social anxiety and emotional response. Probing of simple slopes revealed a surprising cross-over interaction: at low impairment, higher levels of social anxiety were associated with less positive emotional responses to affiliation ($B = -0.12$, $SE = 0.02$, $t(482) = -4.99$, $p < .001$); meanwhile, at high impairment, higher levels of social anxiety predicted more positive emotional responses to affiliation ($B = 0.10$, $SE = 0.03$, $t(482) = 3.71$, $p < .001$). The three-way interaction was not significant.

Discussion

The present study examined the effects of pre-existing social anxiety symptoms on mental health and interpersonal outcomes during the pandemic, as well as the potential moderating roles of pre-existing functional impairment and COVID-related stressors. Results partially supported hypotheses and emphasize several unique challenges that the COVID-19 pandemic has posed for socially anxious individuals.

First, as hypothesized, higher levels of pre-existing social anxiety predicted greater current levels of coronavirus anxiety, especially when pre-existing impairment and COVID-related stressors were high, with the final model explaining a large amount (56.2%) of the variance overall. These findings are consistent with recent research showing that individuals with a pre-existing anxiety-related diagnosis have been more negatively impacted by COVID-19-related stress than healthy controls (Asmundson et al., 2020). Since individuals with high levels

of impairment experience social anxiety as interfering in various life domains (Aderka et al., 2012), they may be ill-equipped to cope with the additional stress of the pandemic.

Second, supporting our hypothesis, increased pre-existing social anxiety predicted increased feelings of loneliness during the pandemic, with pre-existing impairment and COVID stressors each independently explaining a significant though small amount of incremental variance. These findings are consistent with evidence from prior research showing that social anxiety, when compared to other mental health symptoms such as depression and paranoia, has unique longitudinal effects on loneliness (Lim et al., 2016). It is reasonable to imagine that those experiencing higher and more impairing levels of social anxiety are more likely to avoid the types of situations that would provide increased opportunities for social contact that could reduce loneliness. Greater exposure to COVID-related stressors may have also contributed to increased loneliness by forcing people to self-quarantine and feel more isolated as a result.

Third, contrary to our hypothesis, pre-existing social anxiety predicted less use of preventive measures, such as social distancing or mask-wearing, especially at lower levels of impairment; however, these effect sizes were small, with only 2.1% of variance explained by the final model. In fact, there was restricted variance overall, with most participants near ceiling in their reported frequency of preventive measures use, perhaps due to data collection occurring at a time during the pandemic when rate of transmission was high, lockdown rules were still in place in certain locations, and scientific knowledge about how the disease spreads was more rudimentary than it is currently.

Fourth and also contrary to our hypothesis, pre-existing levels of social anxiety predicted heightened fears of negative evaluation since the start of the pandemic, with a medium effect size and no reliable contributions from impairment or stressors. A scarcity of opportunities for

genuine, authentic social interaction during the pandemic may have increased the weight of each individual social interaction, with socially anxious individuals experiencing evaluative concerns with greater intensity during each experienced social encounter. It is also possible that heightened fears of negative evaluation may be related to confronting novel socially threatening situations that have only arisen as a result of the pandemic. For example, socially anxious individuals may fear others' ridicule criticism or rejection if their behaviour fails to comply with pandemic-specific norms (e.g., failing to wear a mask when it is required or wearing a mask when it is unexpected, or providing others with too much or too little physical distance)—situations which would not have elicited evaluative concerns in the past. Whatever the reason, the fact that fears of negative evaluation have increased rather than decreased among those with higher levels of pre-existing vulnerabilities suggest that the core symptoms of social anxiety have not been abated by pandemic-related social restrictions.

Fifth, in contrast to our hypothesis, higher levels of social anxiety, a greater degree of impairment, and more exposure to COVID-stressors each independently predicted *greater* affiliative efforts during the pandemic. Moreover, the three variables interacted with one another such that high socially anxious individuals whose symptoms caused the greatest functional impairment reported engaging the most frequently in affiliative behaviours during the pandemic, particularly if they had experienced more COVID-related stressors. High levels of loneliness during the pandemic could be driving socially anxious individuals to affiliate more with others, with the potential rewards of social connection (in the face of isolation and loneliness from COVID-19) outweighing the risks of negative evaluation. This trade-off may be unique to the pandemic context, given previous research demonstrating socially anxious individuals' tendency to avoid and withdraw from social opportunities to connect with others (Heeren & McNally,

2018; Kirk, Meyer, Whisman, Deacon, & Arch, 2019). Furthermore, the nature of social interactions during the pandemic may inherently offer greater opportunities for self-protection by lowering the typical costs of self-concealment and emboldening socially anxious individuals to pursue more social opportunities than they typically would, even in the presence of intensified evaluative concerns. Kashdan et al. (2011) noted that socially anxious individuals tend to rely on maladaptive self-regulatory strategies when they try to avoid negative evaluation, resulting in the depletion of valuable resources required to attend to foster meaningful social connections with others and derive pleasure from such interactions. During the pandemic, socially anxious individuals may be inconspicuously co-opting newly introduced social norms as self-regulatory strategies—such as communicating online, interacting from a physical distance, or conversing from behind a mask—allowing them to remain concealed while still conforming to societal expectations. These pandemic-specific norms for interaction and communication may be helping to facilitate increased engagement in affiliative behaviours for those with higher levels of pre-existing impairment who would likely rely the most on protective self-regulatory strategies. Consistent with the view that people commonly seek out the company of others under stressful circumstances (Rimé, 2009; Schachter, 1959), the moderating role of COVID-related stressors suggests that such experiences may further encourage people to obtain social support to cope during difficult times.

Our results also showed that the degree of affiliation-derived enjoyment experienced by participants with higher levels of social anxiety depended on their degree of impairment: individuals with higher pre-existing social anxiety who were more impaired experienced *more* positive emotional responses to affiliation, whereas those who were not as impaired by their social anxiety reported significantly less positive reactions towards affiliation. It is unclear

whether highly impaired, socially anxious participants truly experienced genuine social pleasure and reward, or only perceived pandemic-specific affiliative behaviours as positive in the sense that they tend to confer greater levels of social safety relative to the pre-pandemic in-person interactions that would be appraised as more threatening and exposing (Moscovitch, 2009) and therefore less pleasurable (Gilboa-Schechtman, Shachar, & Sahar, 2014; Kashdan, 2004).

Although empirical testing of these competing possibilities remains an important target for future research, there is clear support in the existing literature for the idea that greater physical distance may reduce perceptions of social threat for socially anxious individuals (Azriel, Lazarov, Segal, & Bar-Haim, 2020; Givon-Benjio, Oren-Yagoda, Aderka, & Okon-Singer, 2020; Kamalou et al., 2019; Rinck et al., 2010). Even though fears of negative evaluation have persisted during the pandemic, it is possible that socially anxious individuals feel that physical distancing measures help keep others at a safer social distance, thereby promoting greater affiliative attempts. It is also possible that high socially anxious individuals may also be selectively interacting with people with whom they feel closest and most comfortable—also known as “safety people”—further lowering the bar for affiliation by providing familiarity and comfort (Hofmann, 2014). Those who are most highly impaired may also be the most likely to resort to close others for reliance and support, potentially explaining the positive association between impairment and pleasurable emotional responses to affiliation observed in our sample. We did not collect data on the specific targets of their affiliative efforts nor on participants’ perceived purpose of such efforts, but the increase in reported attempts to connect more with others during the pandemic may represent a “cry for help” that reflects a greater current need for support among those with higher and more impairing pre-pandemic symptoms of social anxiety.

This may have been particularly true during a time when lockdown prevented many people from accessing the normal medical and psychiatric treatment services they may have needed.

In sum, although socially anxious individuals reported that they have been engaging in more affiliative behaviours during the COVID-19 pandemic, their increased levels of anxiety, loneliness, and fear of negative evaluation suggest that they continue to experience significant functional impairment despite the “safe cover” of pandemic-related restrictions. Our results suggest that highly impaired socially anxious individuals are as, if not more lonely and fearful as ever during the pandemic, bringing into question the true efficacy of their affiliative behaviours in fulfilling their social needs.

Several limitations of our research should be noted. Pre-existing social anxiety symptoms and functional impairment were assessed retrospectively, resulting in potential biases. Given the cross-sectional, correlational nature of the study, we were unable to take into account the rapidly evolving COVID-19 context over a longer period of time or to incorporate a longitudinal design that would incorporate repeated measurement of key constructs over time and enable us to draw conclusions about directional effects and causality. In the present study, COVID-related stressors experienced directly by participants were assigned a higher score than stressors affecting close others in participants’ lives. However, recent studies of the relationship between COVID-19 risk factors and the likelihood of experiencing anxiety symptoms amongst Canadians found that participants were more likely to feel anxious when someone close to them was at high risk for contracting COVID-19; meanwhile, those who were themselves at high risk were less likely to feel as anxious, perhaps due to increased perceived control over their own situations (Dozois, 2020; Elton-Marshall et al., 2020). Future studies should study perceptions of social safety and threat during the pandemic, socially anxious individuals’ relationships with the specific targets of

their affiliative efforts, the motives and goals behind their engagement in affiliative behaviours, and the longitudinal effects of the pandemic as it evolves, including the impact of re-opening on symptoms of social anxiety as society returns to pre-pandemic social norms and expectations.

Despite these limitations, results of the present study indicate that the COVID-19 pandemic has posed unique challenges to those with high levels of pre-existing social anxiety, and especially those with higher pre-existing anxiety-related functional impairment and greater exposure to COVID-related stressors. Individuals with longstanding symptoms of social anxiety have been more anxious about COVID-19, lonelier, and more fearful of negative evaluation during the current pandemic crisis. They have made increased efforts to connect with others, perhaps signalling a greater need for social support. Future research is required to continue to track the outcomes of this vulnerable group as the pandemic evolves and to investigate the factors that may promote and inhibit treatment seeking, access, and utilization.

Authorship

J.H. and D.M. developed the study concept together and both authors contributed to the study design. J.H. completed data collection and performed the data analysis and interpretation under D.M.'s supervision. J.H. drafted the manuscript and D.M. provided critical revisions. Both authors approved the final version of the manuscript for submission.

Acknowledgements

This work was supported by Social Sciences and Humanities Research Council of Canada [Insight Grant 435-2018-0959]. The authors wish to thank Molly Scarfe for her assistance with the study.

Declaration of conflicting interest

The authors declare no conflicts of interest with respect to the authorship or the publication of this article.

References

- Aderka, I. M., Hofmann, S. G., Nickerson, A., Hermesh, H., Gilboa-Schechtman, E., & Marom, S. (2012). Functional impairment in social anxiety disorder. *Journal of Anxiety Disorders, 26*(3), 393–400. <https://doi.org/10.1016/j.janxdis.2012.01.003>
- Ahorsu, D. K., Lin, C. Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The Fear of COVID-19 Scale: Development and initial validation. *International Journal of Mental Health and Addiction. https://doi.org/10.1007/s11469-020-00270-8*
- Alden, L. E., Regamball, M. J., & Plasencia, L. (2014). Relational processes in social anxiety disorder. In J. W. Weeks (Ed.), *The Wiley Blackwell Handbook of Social Anxiety Disorder* (pp. 159–178). <https://doi.org/10.1002/9781118653920>
- Asmundson, G. J. G., Paluszek, M. M., Landry, C. A., Rachor, G. S., McKay, D., & Taylor, S. (2020). Do pre-existing anxiety-related and mood disorders differentially impact COVID-19 stress responses and coping? *Journal of Anxiety Disorders, 74*. <https://doi.org/10.1016/j.janxdis.2020.102271>
- Azriel, O., Lazarov, A., Segal, A., & Bar-Haim, Y. (2020). Visual attention patterns during online video-mediated interaction in socially anxious individuals. *Journal of Behavior Therapy and Experimental Psychiatry, 69*. <https://doi.org/10.1016/j.jbtep.2020.101595>
- Banerjee, D., & Rai, M. (2020). Social isolation in Covid-19: The impact of loneliness. *International Journal of Social Psychiatry, 66*(6), 525-527. <https://doi.org/10.1177/0020764020922269>
- Baumeister, R., & Leary, M. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529.

- Chatterjee, S., & Malathesh, B. C. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. *Asian Journal of Psychiatry*, 51, 101990.
- Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In Heimberg R.G, Liebowitz M.R, Hope D.A, & Schneier F.R (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 69–93). The Guilford Press.
- Dozois, D. J. A., & Mental Health Research Canada. (2020). Anxiety and depression in Canada during the COVID-19 pandemic: A national survey. *Canadian Psychology/Psychologie canadienne*. Advance online publication. <http://dx.doi.org/10.1037/cap0000251>
- Duke, D., Krishnan, M., Faith, M., & Storch, E. A. (2006). The psychometric properties of the Brief Fear of Negative Evaluation Scale. *Journal of Anxiety Disorders*, 20(6), 807–817. <https://doi.org/10.1016/j.janxdis.2005.11.002>
- Elton-Marshall, T., Wells, S., Jankowicz, D., Nigatu, Y. T., Wickens, C. M., Rehm, J., & Hamilton, H. A. (2020). Multiple COVID-19 risk factors increase the likelihood of experiencing anxiety symptoms in Canada. *Canadian Journal of Psychiatry*. <https://doi.org/10.1177/0706743720949356>
- Erzen, E., & Çikrikci, Ö. (2018). The effect of loneliness on depression: A meta-analysis. *International Journal of Social Psychiatry*, Vol. 64, pp. 427–435. <https://doi.org/10.1177/0020764018776349>
- Galea, S., Merchant, R. M., & Lurie, N. (2020). The mental health consequences of COVID-19 and physical distancing: The need for prevention and early intervention. *JAMA Internal Medicine*, 180(6), 817-818. <https://doi.org/10.1001/jamainternmed.2020.1562>

- Gallagher, M. W., Zvolensky, M. J., Long, L. J., Rogers, A. H., & Garey, L. (2020). The impact of Covid-19 experiences and associated stress on anxiety, depression, and functional impairment in American adults. *Cognitive Therapy and Research*.
<https://doi.org/10.1007/s10608-020-10143-y>
- Gilboa-Schechtman, E., Shachar, I., & Sahar, Y. (2014). Positivity impairment as a broad-based feature of social anxiety. In J. W. Weeks (Ed.), *The Wiley Blackwell Handbook of Social Anxiety Disorder* (pp. 409–432). John Wiley & Sons, Ltd.
<https://doi.org/10.1002/9781118653920>
- Givon-Benjio, N., Oren-Yagoda, R., Aderka, I. M., & Okon-Singer, H. (2020). Biased distance estimation in social anxiety disorder: A new avenue for understanding avoidance behavior. *Depression and Anxiety*. <https://doi.org/10.1002/da.23086>
- Hair, Jr, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1995). *Multivariate data analysis* (3rd ed.). New York, NY: Macmillan.
- Hayes, A. F. (2013). *Methodology in the social sciences. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.
- Heeren, A., & McNally, R. J. (2018). Social anxiety disorder as a densely interconnected network of fear and avoidance for social situations. *Cognitive Therapy and Research*, 42(1), 103–113. <https://doi.org/10.1007/s10608-017-9876-3>
- Hofmann, S. G. (2007). Cognitive factors that maintain social anxiety disorder: A comprehensive model and its treatment implications. *Cognitive Behavioral Therapy*, 36(4), 193–209.
- Hofmann, S. G. (2014). Interpersonal emotion regulation model of mood and anxiety disorders. *Cognitive Therapy and Research*, 38(5), 483–492. <https://doi.org/10.1007/s10608-014-9620-1>

- Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T. (1999). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging, 26*(6), 655-672. [https://doi.org/ 10.1177/0164027504268574](https://doi.org/10.1177/0164027504268574)
- IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.
- Kamalou, S., Shaughnessy, K., & Moscovitch, D. A. (2019). Social anxiety in the digital age: The measurement and sequelae of online safety-seeking. *Computers in Human Behavior, 90*, 10–17. <https://doi.org/10.1016/j.chb.2018.08.023>
- Kashdan, T. B. (2004). The neglected relationship between social interaction anxiety and hedonic deficits: Differentiation from depressive symptoms. *Journal of Anxiety Disorders, 18*(5), 719–730. <https://doi.org/10.1016/j.janxdis.2003.08.001>
- Kashdan, T. B., Weeks, J. W., & Savostyanova, A. A. (2011). Whether, how, and when social anxiety shapes positive experiences and events: A self-regulatory framework and treatment implications. In *Clinical Psychology Review* (Vol. 31, Issue 5, pp. 786–799). <https://doi.org/10.1016/j.cpr.2011.03.012>
- Kirk, A., Meyer, J. M., Whisman, M. A., Deacon, B. J., & Arch, J. J. (2019). Safety behaviors, experiential avoidance, and anxiety: A path analysis approach. *Journal of Anxiety Disorders, 64*, 9–15. <https://doi.org/10.1016/j.janxdis.2019.03.002>
- Leary, M. R. (1983). A Brief Version of the Fear of Negative Evaluation Scale. *Personality and Social Psychology Bulletin, 9*(3).
- Lee, S. A. (2020). Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. *Death Studies. https://doi.org/10.1080/07481187.2020.1748481*

- Lim, M. H., Rodebaugh, T. L., Zyphur, M. J., & Gleeson, J. F. M. (2016). Loneliness over time: The crucial role of social anxiety. *Journal of Abnormal Psychology, 125*(5).
<http://dx.doi.org/10.1037/abn0000162>
- Loades, M., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., ... Chatburn, M. (2020). Rapid systematic review: The impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *American Academy of Child and Adolescent Psychiatry*.
- Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy, 36*(4), 455-470. [https://doi.org/10.1016/S0005-7967\(97\)10031-6](https://doi.org/10.1016/S0005-7967(97)10031-6)
- McLean, C. P. & Cloitre, M. (2020) Coronavirus Stressor Survey.
- Moscovitch, D. A. (2009). What Is the Core Fear in Social Phobia? A New Model to Facilitate Individualized Case Conceptualization and Treatment. *Cognitive and Behavioral Practice, 16*(2), 123–134. <https://doi.org/10.1016/j.cbpra.2008.04.002>
- Moscovitch, D. A., Rowa, K., Paulitzki, J. R., Ierullo, M. D., Chiang, B., Antony, M. M., & McCabe, R. E. (2013). Self-portrayal concerns and their relation to safety behaviors and negative affect in social anxiety disorder. *Behaviour Research and Therapy, 51*(8), 476–486. <https://doi.org/10.1016/j.brat.2013.05.002>
- Plasencia, M. L., Taylor, C. T., & Alden, L. E. (2016). Unmasking one's true self facilitates positive relational outcomes: Authenticity promotes social approach processes in social anxiety disorder. *Clinical Psychological Science, 4*(6), 1002–1014.
<https://doi.org/10.1177/2167702615622204>

- Rimé, Bernard. (2009). Emotion elicits the social sharing of emotion: Theory and empirical review. *Emotion Review*, 1, 60-85. <https://doi.org/10.1177/1754073908097189>
- Rinck, M., Rörtgen, T., Lange, W. G., Dotsch, R., Wigboldus, D. H. J., & Becker, E. S. (2010). Social anxiety predicts avoidance behaviour in virtual encounters. *Cognition and Emotion*, 24(7), 1269–1276. <https://doi.org/10.1080/02699930903309268>
- Rowa, K., Paulitzki, J. R., Ierullo, M. D., Chiang, B., Antony, M. M., McCabe, R. E., & Moscovitch, D. A. (2014). A False Sense of Security: Safety Behaviors Erode Objective Speech Performance in Individuals With Social Anxiety Disorder. *Behavior Therapy*.
- Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: a cognitive account. *Behavioural Psychotherapy*, 19, 6–19.
- Saltzman, L. Y., Hansel, T. C., & Bordnick, P. S. (2020). Loneliness, isolation, and social support factors in post-covid-19 mental health. *Psychological Trauma: Theory, Research, Practice, and Policy*. <https://doi.org/10.1037/tra0000703>
- Schachter, S. (1959). The psychology of affiliation: Experimental studies of the sources of gregariousness. Stanford Univer. Press.
- Sheehan, D. V., Harnett-Sheehan, K., & Raj, B. A. (1996). The measurement of disability. *International Clinical Psychopharmacology*, 11(Suppl 3), 89–95. <https://doi.org/10.1097/00004850-199606003-00015>
- Taylor, S., Landry, C. A., Paluszek, M. M., Fergus, T. A., McKay, D., & Asmundson, G. J. G. (2020). Development and initial validation of the COVID Stress Scales. *Journal of Anxiety Disorders*, 72. <https://doi.org/10.1016/j.janxdis.2020.102232>
- World Health Organization (2020). *Coronavirus disease (COVID-19) Situation Report-130*.

Yao, H., Chen, J.-H., & Xu, Y.-F. (2020). Patients with mental health disorders in the COVID-19 epidemic. *The Lancet*, 7.

Table 1
Sample Demographic Characteristics

Variable	Participants, <i>n</i> (%)
Country	
USA	470 (96.3%)
Canada	18 (3.7%)
Age	
18-24	56 (11.5%)
25-39	274 (56.1%)
40-59	128 (26.2%)
60+	46 (9.4%)
Gender	
Female	234 (48.0%)
Male	249 (51.0%)
Non-binary	3 (0.6%)
Other	2 (0.4%)
Ethnicity	
White	292 (59.8%)
Black	92 (18.9%)
Asian	60 (12.3%)
Hispanic Latino	18 (3.7%)
Non-Hispanic Latino	3 (0.6%)
Native American	3 (0.6%)
Multiracial	15 (3.1%)
Other	6 (1.2%)
Income	
< \$20,000	94 (19.3%)
\$20-49,999	162 (33.2%)
\$50-74,999	114 (23.4%)
\$75-99,999	73 (15.0%)
\$100-149,999	34 (7.0%)
>\$150,000	11 (2.3%)
Education	
Graduated high school or high school grade equivalent	33 (6.8%)
Part college or university	56 (11.5%)
Graduated 2 year college or university	43 (8.8%)
Graduated 4 year college or university	228 (46.7%)
Part graduate/ professional school	33 (6.8%)
Completed graduate/ professional school	95 (19.5%)
Relationship status	
Married or cohabiting	300 (61.5%)
Committed relationship	53 (10.9%)
Dating	16 (3.3%)
Not dating or married/cohabiting	119 (24.4%)

Table 2*Descriptive Statistics for Study Variables*

Variable	Mean	SD	Min	Max	Possible range
1. Pre-pandemic social anxiety (SIAS)	25.86	19.28	0	68	0 – 68
2. Pre-pandemic functional impairment (SDS)	7.48	7.65	0	27	0 – 30
3. COVID-related stressors (CSS)	3.42	2.78	0	12	0 – 12
4. Coronavirus anxiety (CAS)	6.75	4.80	3	23	0 – 20
5. Frequency of preventive measures	20.13	3.38	8	25	5 – 25
6. Affiliative frequency and connection	31.19	9.60	12	56.5	12 – 60
7. Emotional response to affiliation	4.53	6.81	-19	24	-24 – 24
8. Δ fear of negative evaluation (BFNE)	-0.37	10.15	-36	36	-36 – 36
9. Loneliness (3-Item Loneliness Scale)	5.27	1.90	3	9	3 – 9

Note. SIAS = Social Interaction Anxiety Scale, SDS = Sheehan Disability Scale, CSS = Coronavirus Stressor Survey, CAS = Coronavirus Anxiety Scale, BFNE = Brief Fear of Negative Evaluation Scale

Figure 1. The moderating effects of pre-existing impairment and COVID-related stressors on the relationship between pre-existing social anxiety and coronavirus anxiety.

Figure 2. The moderating effects of pre-existing impairment and COVID-related stressors on the relationship between pre-existing social anxiety and frequency and social connection of affiliative behaviours.