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Impact of Psychological Stress on Emotion Regulation Strategies during COVID-19 in Young Adults with Self-Reported Social Anxiety

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Abstract

Background: This study sought to evaluate the relations among expressive suppression (ES), cognitive reappraisal (CR), and stress during COVID-19 in young adults with self-reported social anxiety. We hypothesized that social anxiety would positively relate to ES but negatively relate to CR. Furthermore, we predicted that stress severity would moderate the relation between social anxiety and emotion regulation, where higher reports of stress and social anxiety would predict greater ES and lower CR. **Methods:** Participants were young adults (N = 84; 18-24 years old) who completed self-report measures of social anxiety, stress, and emotion regulation amid COVID-19. Zero-order correlations assessed relations among these variables. Moderation analyses assessed stress as a moderator of the relation between social anxiety and emotion regulation. **Results:** Results indicated that social anxiety was significantly correlated with ES but not CR. The relation between social anxiety and ES was moderated by stress severity, such that as stress increased, individuals with higher social anxiety engaged in less ES. Stress did not moderate the relation between social anxiety and CR. **Conclusions:** The current study suggests that self-reported social anxiety is positively associated with ES (but not CR) during COVID-19; however, individuals with high social anxiety and perceived stress engaged in less ES.

Keywords. social anxiety; expressive suppression; cognitive reappraisal; stress; COVID-19

Individuals with elevated social anxiety symptoms experience both psychological distress as well as functional impairment across multiple aspects of life, including work, school, and interpersonal relationships. Moreover, affected individuals also report higher levels of negative emotions and loneliness (Davidson, Hughes, George, & Blazer, 1994; Stein & Stein, 2008). Extensive prior work has suggested that socially anxious individuals use maladaptive emotion regulation strategies such as expressive suppression (ES), which refers to the effortful inhibition of emotion-expressive behavior in order to reduce negative emotions regarding feared social outcomes (Farmer & Kashdan, 2012; Gross & John, 2003). For example, a socially anxious individual engaging in ES of negative emotions such as embarrassment during a discussion with a co-worker may actively suppress or inhibit the emotion-expressive behavior of frowning and instead display a neutral facial expression (Gross & John, 2003). ES strategies have been observed more frequently in the context of social anxiety than other emotion regulatory strategies such as cognitive reappraisal (CR), which refers to the reinterpretation of emotions linked to a situation in order to alter their meaning (Gross & John, 2003; Werner, Goldin, Ball, Heimberg, & Gross, 2011). Over-reliance on ES has been associated with unfavorable consequences in socially anxious individuals, such as fewer daily positive experiences as well as diminished positive emotions (Goldin et al., 2014). Collectively, this work suggests that adults with elevated social anxiety symptoms disproportionately utilize ES as a preferred albeit potentially maladaptive coping strategy. However, systematic work evaluating ES strategies among socially anxious adults in the context of perceived psychological stress remains largely unexplored.

Studies examining utilization of ES in various clinical populations (e.g., depression, anxiety, PTSD) have found strong associations between ES and

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psychological stress-related symptoms such as re-experiencing, avoidance and hyperarousal (Moore, Zoellner & Mollenholt, 2008). One potential reason that this pattern could occur in individuals with social anxiety symptoms is that ES may prevent the use of more effective and potentially adaptive emotion regulation strategies such as CR. Specifically, CR (but not ES) has been shown to be beneficial in decreasing psychological symptoms during periods of high stress or under conditions of a stressor that is perceived as uncontrollable (Dryman & Heimberg, 2018; Kashdan & Breen, 2008). These effects may be particularly relevant amid the COVID-19 pandemic, which may be perceived by many as an uncontrollable stressor contributing to varying levels of psychological stress. As such, the present study sought to determine the impact of stress severity as a moderator of the relationship between self-reported social anxiety symptoms and emotion regulation strategies in order to better understand patterns of maladaptive coping during the pandemic (Cheng, Wang, & Ebrahimi, 2021).

Recent work has explored the relation between psychological stress and general mental health during COVID-19. For example, a study by Gallagher and colleagues (2020) indicated that increased levels of stress during COVID-19 were associated with heightened levels of anxiety and depression. Moreover, it has been shown that individuals who were diagnosed with an anxiety disorder prior to the COVID-19 pandemic had significantly worse mental health outcomes during COVID-19 as a result of increased stress (Asmundson et al., 2020). Further, a study by Quittkat and colleagues (2020) indicated that adults with anxiety disorders demonstrated significantly higher stress levels during COVID-19 as compared to healthy controls. These studies collectively suggest that underlying vulnerabilities and mechanisms of maintenance in the anxiety disorders may meaningfully interact with general stress caused by COVID-19. Consistent with this notion, a recent study by Ho and colleagues (2021) found that among adults reporting heightened social anxiety symptoms, retrospective reports of pre-pandemic social anxiety symptom severity predicted poorer mental health functioning, including increased feelings of loneliness and fear of negative evaluation, especially for those with exposure to specific COVID-related stressors (e.g., becoming ill, losing income. Another recent study suggested that social anxiety severity was significantly related to poorer self-reported physical and psychological health during the pandemic (Carlton et al., 2022). Finally, an additional study showed that individuals with SAD had increased rates of anxiety and depression as compared to their non-socially anxious peers and reported elevated rates of engagement in safety behaviors and maladaptive coping in response to stress from COVID-19 (Carlton et al., 2022). Taken together, this work suggests that adults reporting high levels of anxiety, and with elevated social anxiety in particular, may be at an increased risk for being negatively impacted by the pandemic.

Given prior work linking pandemic-driven stress to adverse outcomes among individuals with social anxiety, it is critical to examine specifically which emotion regulation strategies are utilized among this population to combat psychological stress (Carlton et al., 2022; Quittkat, 2022). Absence of such knowledge is potentially problematic in this or future pandemics, as a lack of detailed information of coping strategies among those with social anxiety may inhibit the development and implementation of therapeutic methods during acute (but potentially chronic) periods of stress. Accordingly, the aims of the current study were to (1) characterize the relations among self-reported social anxiety, stress, and emotion regulation strategies of CR and ES, and (2) assess the impact of stress severity on the relation between self-reported social anxiety and emotion regulation strategies of ES and CR during COVID-19. In line with previous work suggesting that socially anxious individuals utilize ES more frequently than other strategies and demonstrate an ineffective or reduced use of CR (Farmer & Kashdan, 2012; Kashdan & Breen, 2008), we hypothesized that self-reported social anxiety would be positively and significantly related to use of ES and negatively related to use of CR. Additionally, given prior work suggesting that ES is related to stress symptoms in various clinical populations (including anxiety disorders) and that individuals with high anxiety have demonstrated significantly higher stress levels during COVID-19 (Moore, Zoellner & Mollenholt, 2008; Quittkat et al., 2020), we hypothesized that perceived stress would moderate the relation between self-reported social anxiety symptoms and ES, such that higher stress and higher self-reported social anxiety would result in higher reports of ES. Furthermore, we predicted that perceived stress would moderate the relation between self-reported social anxiety symptoms and CR, such that higher stress and higher self-reported social anxiety would be associated with lower reports of CR.

Method

Participants

All procedures were reviewed and approved by the institutional review board (IRB) at Virginia Polytechnic Institute and State University and all participants provided written informed consent.

Table 1. Demographic statistics.

	Mean	*SD*
Age in Years		
Female (*n* = 60)	19.79	3.03
Male (*n* = 24)	20.88	4.94
Race		
White (*n* = 58)		
Black (*n* = 12)		
Asian/Pacific Islander (*n* = 6)		
Biracial/Multiracial (*n* = 5)		
Native American (*n* = 2)		
Preferred not to disclose (*n* = 1)		

Participants recruited were 103 young adults enrolled at a large southeastern university between the ages of 18 and 24 years. Of the 103 participants, 84 completed all measures and were included in the present study (M_{age} = 19.79, *SD* = 3.03) with a majority of participants identifying as women (72%) and White (70%). Demographic variables for the sample can be found in Table 1.

Procedure

Data were collected during the spring of 2021 amid the COVID-19 pandemic (February to April). During this time, local public health guidelines regarding COVID-19 included mask-wearing and social distancing. Additionally, the COVID-19 vaccine became widely available to the public beginning in January through March locally. Of the 84 participants, 28.6% indicated that they received their first vaccination at the time of study (n = 24). Participants were recruited from an undergraduate sample that self-selected to complete the study for course credit and thus we did not specifically recruit from a selected sample within a socially anxious population. During this time period, the undergraduate sample was engaging in remote classes held via Zoom, as the campus was closed to in-person instruction. We anticipated that this isolation led to various outcomes, such as increased displacement or psychological distress (see Giovenco et al., 2022). Participants' scores on the DASS-21 indicated normal (0-14) to moderate (19-25) stress (Mean = 12.76, SD = 8.74) (Lovibond & Lovibond 1995; Henry & Crawford, 2005). Regarding self-reported social anxiety, 49 participants met the suggested cutoff of 30 or greater for the presence of mild social anxiety on the LSAS (Mean = 59.10, SD = 18.54), while 22 participants met the suggested cutoff of 60 or greater for the presence of moderate social anxiety (Mean = 76.82, SD = 10.28) (Mennin et al., 2002).

Measures

Descriptions of all measures are included below, and descriptive statistics for each measure are provided in Table 2.

Depression Anxiety and Stress Scale-21 item version (DASS-21; Lovibond & Lovibond, 1995).

The DASS-21 assesses current levels of depression, anxiety, and stress. For this study, only the stress subscale was used. Representative items include "I found myself getting upset by quite trivial things" and "I tended to over-react to situations". In the present study, participants were asked to rate how much each statement applied to them over the past week on a 0 ("Did not apply for me at all") to 3 scale ("Applied to me very much, or most of the time"). The stress subscale is sensitive to levels of chronic, nonspecific arousal and assesses difficulty relaxing, nervous arousal, and being easily upset/agitated/over-reactive and impatient. In the present study, the DASS-21 demonstrated good internal consistency for the stress subscale (α = .79). Higher scores on the DASS-21 represent higher levels of stress. The stress subscale score on the DASS-21 is multiplied by 2 in order to be comparable to the DASS means norms, which are based on the 42-item version of the scale. Thus, possible scores range from 0 to 42 (Lovibond & Lovibond 1995; Henry & Crawford, 2005).

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003)

The ERQ is a 10-item instrument that assesses respondents' preference to regulate their emotions by the 6 item CR scale (i.e., changing the meaning of or reinterpreting an emotion-eliciting event) and the 4 item ES scale (i.e., the inhibition of emotion-expressive

Table 2. Descriptive statistics for all study variables.

	Mean	*SD*
LSAS		
Total Score	40.70	26.54
ERQ		
Expressive Suppression	16.11	4.59
Cognitive Reappraisal	27.98	5.55
DASS-21		
Stress	12.76	8.74

behavior). Participants were asked to rate items related to cognitive reappraisal (e.g., "When I want to feel more positive emotion [such as joy or amusement], I change what I'm thinking about" or "When I want to feel less negative emotion [such as sadness or anger], I change what I'm thinking about" and ES (e.g., "When I am feeling positive emotions, I am careful not to express them" or "When I am feeling negative emotions, I am careful not to express them") from 1 (Strongly disagree) to 7 (Strongly agree). In the present study, internal consistency across subscales was acceptable (Cognitive Reappraisal, α = .71; Expressive Suppression, α = .76).

Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987).

The LSAS is a 24-item scale that assesses the role of social anxiety in a variety of situations in respondents' lives. Respondents are asked to rate each item based on the degree to which they fear each situation by using a 0 (None) to 3 (Severe) scale and how often they tend to avoid it using a 0 (Never) to 3 (Usually) scale. Representative items include "Being the center of attention" and "Meeting strangers." For this study, a total score consisting of both subscales was utilized and internal consistency was excellent (α = .96).

Data Analytic Plan

To test hypothesis 1, we utilized Pearson zero-order correlations to examine the relation between social anxiety symptoms, as measured by the LSAS, and emotion regulation strategies, as measured by the ES and CR subscales of the ERQ. To test hypothesis 2, a moderation analysis was conducted using Hayes PROCESS macro (Hayes, 2012; model 1) in SPSS 27 to determine if stress moderated the relation between (1) self-reported social anxiety symptoms and ES and (2) self-reported social anxiety symptoms and CR.

Results

Correlations

All correlations are displayed in Table 3. Results indicated that self-reported social anxiety was associated significantly with ES, r = .29, p = .01, but not with CR, r = -.06, p = .59. Additionally, stress was associated positively with self-reported social anxiety, r = .63, p <.001; however, stress was not associated with ES, r = .03, p = .76, or CR, r = -.03, p = .80. Lastly, ES and CR were not associated significantly with one another, r = .13, p = .22.

Moderation Analyses

Hayes PROCESS macro (model 1) was used to assess the potential moderational role of stress in the relation between self-reported social anxiety and ES. Results indicated that stress severity moderated the relation between self-reported social anxiety and ES, b = .01, SE = .00, t = 2.25, p = .03 (see Figure 1). Conditional effects of the predictor (self-reported social anxiety symptoms) at values of the moderator (stress severity) revealed that higher stress was significantly associated with these effects; 50th percentile [DASS-21 score of 6], effect = .06, SE = .02, p = .01; 84th percentile [DASS-21 score of 12], effect = .12, SE = 03, p <.01. Specifically, as stress severity increased, participants with higher self-reported social anxiety were less likely to use ES, b = -.58, p < .01.

Although CR did not demonstrate significant relations with self-reported social anxiety or stress, analyses were conducted to assess the potential moderational role of stress in the relation between self-report social anxiety and CR. Results indicated that stress severity did not moderate the relation between self-reported social anxiety and CR, b = .01, SE = .01, p = .12.

Discussion

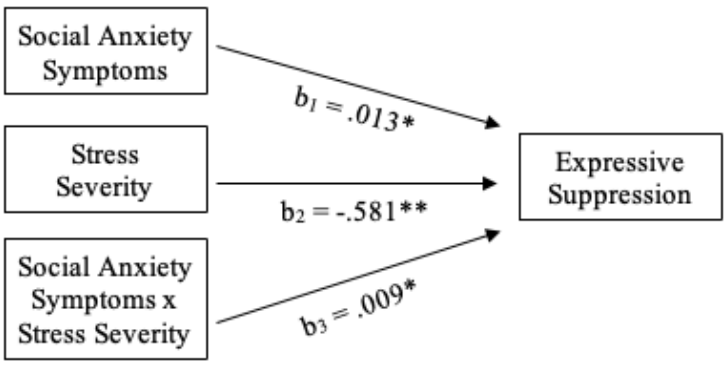
The present study sought to examine emotion regulation strategies and their relation to stress during COVID-19 in a sample of young adults with self-reported social anxiety. Given that adults with elevated social anxiety symptoms frequently report engaging with ES rather than CR (Farmer & Kashdan, 2012), we hypothesized that self-reported social anxiety would be significantly and positively related to ES but significantly and negatively related to CR. Results

Table 3. Correlations for Social Anxiety, Expressive Suppression, Cognitive Reappraisal and Stress.

Variables	1	2	3	4
1. Social Anxiety (LSAS)	---			
2. Expressive Suppression (ERQ)	.29**	---		
3. Cognitive Reappraisal (ERQ)	-.06	.13	---	
4. Stress (DASS-21)	.63**	.03	-.03	---

Note. Correlations are significant at **p ≤ 0.01 (2-tailed) level.

Figure 1. Moderation model examining stress severity as a potential moderator of the relation between self-reported social anxiety symptoms and expressive suppression.



Note. **Significant at the p < .01 level; *Significant at the p < .05 level.

partially supported this hypothesis, such that social anxiety symptoms positively correlated with ES (r = .33, p < .001,) but were not associated with CR as predicted (r = -.05, p = .66.). These findings partially replicate those found in the literature indicating that socially anxious individuals report engaging in ES and demonstrate a reduced use of CR. Overall, these findings add to the literature that socially anxious individuals continue to engage in ES as an emotion regulation strategy during times of acute stress, such as the COVID-19 pandemic.

An additional aim of the current study was to evaluate stress as a moderator in the relation between self-reported social anxiety and emotion regulation strategies. Provided that individuals with social anxiety symptoms report infrequent or ineffective use of CR (Farmer & Kashdan, 2012), we hypothesized that stress would moderate the relation between self-reported social anxiety and CR, such that higher reports of stress and social anxiety would predict lower reports of CR. However, results indicated that self-reported social anxiety and CR were not significantly related to one another, and that stress severity did not moderate this relationship between self-reported social anxiety and CR. In light of literature suggesting that CR is a common strategy amongst individuals with minimal to no reported symptoms of social anxiety, an explanation for our finding could include that our sample reported relatively high levels of social anxiety. Indeed. roughly 58% of our sample met the LSAS cutoff for mild and 26% for moderate social anxiety symptoms. Additionally, those with high self-reported social anxiety symptoms report that engaging in CR does not reduce emotional or social distress in their day to day lives (Farmer & Kashdan, 2012), and thus participants in this study may not identify with this strategy.

Given prior work suggesting that ES is related to stress symptoms in anxious adults and that individuals with anxiety disorders demonstrate significantly higher stress levels during COVID-19 (Moore, Zoellner & Mollenholt, 2008; Quittkat et al., 2020), we hypothesized that stress severity would moderate the relation between self-reported social anxiety and ES. Results from our moderation model suggested that level of stress severity did indeed moderate the relation between self-reported social anxiety and ES. However, participants with higher self-reported social anxiety symptoms and higher perceived levels of stress reported less ES, contrary to our hypotheses. This finding suggests that young adults with self-reported social anxiety who reported higher stress severity were *less* likely to engage in ES. Given social distancing recommendations and periods of isolation during COVID-19, explanations for this could include the possibility that young adults with self-reported social anxiety experiencing increased levels of stress during this time did not have opportunities to engage in ES as a coping strategy or experienced an overall disruption in coping strategies altogether. Still, it is possible that ES becomes less effective and therefore less favored as a coping strategy as acute stress increases among adults with self-reported social anxiety. Future work should evaluate the long-term impact of acute stress on changes in coping skills, both adaptive and maladaptive, in socially anxious individuals, especially as social isolation recommendations from COVID-19 guidelines continue to shift. It should be noted that the present study did not obtain baseline measures of ES prior to the pandemic, and thus interpretations regarding changes in ES as compared to pre-pandemic times are not able to be assessed in this work. Future work should consider utilizing retrospective interviews with participants to determine engagement in coping strategies prior to the pandemic for a more robust evaluation of changes in ES during acute stress.

As with any study, results presented here should be evaluated in light of study limitations. The present study utilized participant self-report ratings across spring 2021 (February to April of 2021). Thus, this study did not collect baseline data prior to the start of the pandemic and analyses comparing baseline to present stress, social anxiety, and emotion regulation strategies were therefore not possible. In addition, the current study recruited young adults who were enrolled in a rural southeastern university with a predominant number of participants identifying as White females. As such, the results of the study presented here may not generalize to other diverse or underrepresented individuals, or to younger or older populations. Future work may wish to evaluate findings of the present study in non-White community samples with various educational backgrounds. An additional limitation of the present study is that it was conducted as a non-experimental design, which does not allow for determination of a causal relationship between levels of stress, self-reported social anxiety, and ES. Thus, it is possible that other commonly reported factors during the pandemic may be contributing to our results, such as the relation between anxiety and increased isolation, changes in work or finances, death of a loved one, or becoming ill. Future work may wish to consider other variables during COVID-19 that may potentially mediate the results between stress, self-reported social anxiety, and coping strategies. In addition, this present study did not evaluate possible comorbidities of social anxiety, such as depression or generalized anxiety. As such, it is possible that comorbid conditions may have affected levels of stress or coping skills, which should be evaluated in the future in comparison to social anxiety with non-comorbid conditions. Lastly, it should be noted that our final sample size of 84 may lack power for a moderation effect, and thus moderation analyses were run in an exploratory nature and suggest additional work is needed to replicate these preliminary findings.

Conclusion

The present study evaluated the relation between social anxiety, stress and emotion regulation strategies during COVID-19 in a sample of young adults with self-reported social anxiety. Results align with prior work suggesting that individuals with self-reported social anxiety engage more so in expressive suppression than cognitive reappraisal. Additionally, this effect was moderated by stress, and contrary to our expectation, as stress increased individuals with social anxiety were *less* likely to engage in expressive suppression. Taken together, the results of the present study suggest that individuals with social anxiety continue to engage in expressive suppression during times of acute stress, albeit less for those with higher levels of stress.

Additional Information

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Conflict of Interest

The authors declare that they have no conflicts of interest.

Ethical approval

This research was approved by the institutional review board at Virginia Polytechnic Institute and State University (IRB#: 20-1039).

Data Availability

Data available upon request. Please contact the corresponding author.

Author Credit Statement

All authors were involved in the conception, drafting, and revisions of the article. All authors approved the submitted version.

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