

COVID-19 Stressors, Posttraumatic Growth, and Depression:

The Roles of Rumination and Distress Disclosure

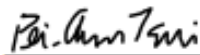
by

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A dissertation submitted to the faculty of Radford University in partial fulfillment of the requirements for the degree of Doctor in Psychology in the Department of Psychology

May 2023


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05/18/2023

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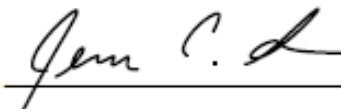
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Abstract

College students have experienced high rates of depression due to stress from the COVID-19 pandemic. The severity of the COVID-19 pandemic has been viewed as a traumatic event for individuals and collective trauma for the society. While individuals may experience negative impact in response to the stressors of the pandemic, it is possible that the psychological distress of the pandemic provides an opportunity for posttraumatic growth (PTG) to occur. Based on the theoretical framework of PTG, this study sought to examine intrusive rumination, deliberate rumination, and distress disclosure as moderators for the association between the COVID-19 stressors and psychological outcomes (i.e., PTG and depression). Participants were 111 undergraduate students at Radford University. Results indicated intrusive rumination moderated the relationship between COVID-19 stressors and PTG. Results also indicated distress disclosure moderated the relationship between COVID-19 stressors and PTG. These results indicate that decreasing the amount of intrusive rumination an individual is engaging in is helpful for the development of PTG when one encounters COVID-19 stressors. It also provides evidence that when individuals increase the amount of distress disclosure they engage in, they are more likely to experience greater PTG in the face of COVID-19 stressors.

Keywords: COVID-19 pandemic, intrusive rumination, deliberate rumination, distress disclosure, depression, posttraumatic growth, college students

Dedication

I dedicate this work to my family and to God. In everything I have done, the successes and the failures, my family and God have been there with me. My loved ones are the reason I have aimed higher and strived to achieve. With endless amounts of love and encouragement, my family has never faltered in their support of me. When doubt and fear threatened to drown me, the Spirit was there, whispering that I was not done yet, that there was more to give. I am deeply humbled by the faith my family has in me and I will continue to strive to be worthy of their love and faith. I will also work the rest of my life to be worthy of the faith and trust the Lord has gifted me in helping to heal His children here on earth.

Although it is my name that will appear on the degree, I would never have been brave enough or stalwart enough to complete my education without the love and care from family members and mentors throughout the many years it took to complete. Please accept my deepest gratitude and promise to keep you in my mind and heart as I continue to move forward.

Acknowledgement

It is my pleasure to express my gratitude to Jane Stafford, PhD. Her steady mentorship throughout my master's degree was tireless and forever shaped me as a clinician and a researcher. My gratitude also goes to all the faculty and staff who worked in the Applied Clinical Psychology program as well as those in the Office of Veteran and Military Student Success, who helped me lay the foundation for future learning of clinical expertise during my master's program.

My sincere appreciation goes to Pei-Chun Tsai, PhD, for working on this dissertation with me as my advisor and dissertation chair. Her style of mentorship made her easy to work with and helped me find the willpower to keep working and be successful on this project. I express my appreciation to the other members of my committee, Ben Biermeier-Hanson, PhD, and Janessa Steele, PhD. It is important that I express gratitude to current and past faculty of the Counseling Psychology doctoral program at Radford University. I appreciate the lessons I have learned from each of you, no matter how brief our encounters. I would like to acknowledge the Center for Gender Studies in choosing me as a recipient of the Kemp Award, which has helped fund this project.

Supervisors at my practicum placements at the VAMC in Salem, VA and at Tri-Area Community Health Centers were an integral part of my professional development throughout this doctoral program. These individuals worked to mentor me in ways that drew on my strengths so that I could be more successful as a clinician. They helped me learn balance between my professional and personal life while at the same time teaching me important clinical skills.

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CHAPTER ONE

STUDY OVERVIEW

Stress From COVID-19 and College Students

The COVID -19 variant of the SARS-CoV-2 virus is a highly infectious virus (Liu et al., 2020), first detected in China in late 2019 before spreading around the world. Restrictions and mandates were put into place by local and federal governments after the virus was introduced to the United States, in an effort to slow the spread of the virus (Charles et al., 2021). These restrictions were meant to protect the U.S. population by reducing the transmission of the COVID-19 virus; however, they had unintended deleterious psychological consequences (Bhattacharjee & Ghosh, 2021). For example, the restrictions and mandates increased social isolation, remote learning for students, economic pressures, and financial issues, and disrupted daily routines for people all across the United States (Waters et al., 2021). This led to an increase in psychological distress; specifically, there were increases in depression, anxiety, fear, loneliness, suicidal thoughts, insomnia, and overall stress in the general population (Bhattacharjee & Ghosh, 2021). College students have also experienced these negative impacts on their mental health, specifically in increased substance use, negatively impacted interpersonal functioning, increase depression, anxiety, and suicidality (Charles et al., 2021; Graupensperger et al., 2021; Kang & Kim, 2021; Wang et al., 2020; Waters et al., 2021). Tambling and colleagues (2020) have identified three domains that best describe stressors specific to college students: (a) Infection-Related Stress, (b) Daily Activity Stress, and (c) Financial and Resource-Related Stress.

Regarding infection-related stress, college students have reported they are much more distressed from the fear of contracting COVID-19 than of contracting the flu (Knowles &

Olatunji, 2021). This may in part be due to inflammatory news on the “killer virus” flooding news sources and social media (Wang et al., 2021). Reading or hearing news regarding the severity of COVID-19 infections and the contagiousness of the virus has been cited as the most commonly experienced stressor that people are suffering (Park et al., 2020).

With regard to daily activity stress, Americans have had to completely change their routines, including personal choices in health and hygiene due to mandates and restrictions (Park et al., 2020). While people are willing to change their habits, they do so based off of uncertain and ever-changing guidelines and information on COVID-19 (Faisal et al., 2021). For example, college students have reported increased depression, probably due to isolation mandates that limit social contact and close schools (Yang et al., 2021). Wang and colleagues (2020) posited that having to adjust one’s lifestyle while not having a clear understanding of why those changes need to be made likely contributes to increases in depression and anxiety.

Financial and resource-related stresses include job changes or job losses as a result of COVID-19 that have contributed to uncertainty and distress (Han & Hart, 2022). These stresses also include resource-related stress, for example, resources that were less available during the pandemic include access to healthcare, availability of personal protective items (i.e., masks), availability of cleaning supplies, and availability of healthy food due to decreased grocery store hours (Barbosa-Leiker et al., 2021). Park and colleagues (2020) reported that individuals who are under financial strain, and feel a lack of job security or a lack of resources, endorsed more pandemic-related stress than individuals who did not experience any of these stresses.

COVID-19 Stress and Its Impact on Psychological Outcomes

The greater the number of COVID-19 stressors an individual is experiencing, the more stress that person would be experiencing (First et al., 2021). The COVID-19 pandemic has

introduced high amounts of stress for a prolonged period of time (Horesh & Brown, 2020). There is a plethora of evidence that supports claims that COVID-19 qualifies as a global trauma (Bhattacharjee & Ghosh, 2021; Horesh & Brown, 2020; Masiero et al., 2020).

While negative psychological issues related to COVID-19 have been well-documented, researchers suggest some positive outcomes related to the pandemic. Some examples of these include reports of family bonding, flexibility at work, and self-paced learning (Waters et al., 2021). In research today, positive psychological outcomes from traumatic experiences are termed posttraumatic growth (PTG; Tedeschi & Calhoun, 1996). PTG denotes the individual having undergone a transformative process in which they experienced constructive growth as a result of living through a trauma (Tedeschi & Calhoun, 1996), and this growth has led to a more meaningful life (Tedeschi & Riffle, 2016). Due to the categorization of the COVID-19 pandemic as a trauma (Bridgland et al., 2021), it is reasonable to expect some individuals to experience PTG. In research with college students, both distress and PTG have been shown to coexist after a trauma (Taku et al., 2008; Taku et al., 2021). Thus, in the current study, participants received questionnaires to measure both depression and PTG.

Theory of Posttraumatic Growth

In the theory of PTG, an event qualifies as a trauma if it significantly disrupts one's assumptive world views or core beliefs (Ramos & Leal, 2013). The traumatic event does not have to qualify as a trauma based on the DSM-5 criteria of trauma (Tedeschi & Calhoun, 2004; Tedeschi & Moore, 2021). Broadening the definition allows for more events to qualify as traumatic (i.e., COVID-19 pandemic). In the current study, the terms traumatic event and stressful event were used interchangeably.

PTG is a multifaceted construct and consists of five domains. These domains include relating to others, personal strength, new possibilities, appreciation of life, and spiritual or existential change (Tedeschi & Calhoun, 1996). Not everyone reports growth in each area or in an equal amount in each area (Tedeschi & Riffle, 2016). When growth is reported in the relating to others domain, the individual often reports deeper and improved relationships with loved ones (Tedeschi & Moore, 2021). Growth in the personal strength domain may look like an increase in resilience and courage (Tedeschi & Calhoun, 2006). Someone who has experienced growth in the new possibilities domain may be seeing ways to accomplish new dreams after the trauma has disrupted their original path (Tedeschi & Moore, 2021). Growth in the appreciation of life domain may look like an individual rearranging their priorities in life (Tedeschi & Calhoun, 2006) or experiencing an increase in mindfulness (Tedeschi & Calhoun, 1996). An individual may experience growth in the domain of spiritual or existential change because traumas often bring up existential questions, and spiritual or existential beliefs are changed as a result of suffering trauma (Tedeschi & Riffle, 2016). While these five domains may not represent every way a person may grow after experiencing trauma, they do capture a significant range of common experiences (Calhoun et al., 2010). Organizing growth from trauma into the five domains helps researchers quantify the growth an individual may have experienced after a trauma (Tedeschi & Calhoun, 1996). These five domains are mirrored in the five factors of the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996), which are discussed later as a measure for the current study.

Posttraumatic Growth Model and Individual Characteristics

When an event is traumatic enough to challenge assumptive world beliefs, the process of PTG can begin (Tedeschi & Calhoun, 2004). Research involving college students suggests that

the distress from the disrupted core beliefs is correlated to PTG (Lindstrom et al., 2013). Therefore, the nature of the trauma is less important than the disruption it causes in the individual's core beliefs (Choi & In, 2019). Reconstructing the core beliefs that have been disrupted to accommodate the traumatic event is the process that leads to PTG (Calhoun & Tedeschi, 1999; Tedeschi & Moore, 2021).

The PTG model put forward by Tedeschi and Calhoun (2004) discussed individual characteristics that individuals have that directly influence the trajectory and the amount of growth or distress and individual experiences after a traumatic event (Tedeschi & Calhoun, 2004; Horesh & Brown, 2020). Intrusive rumination, deliberate rumination, and distress disclosure are three of these individual characteristics that research supports as predicting PTG (Ramos & Leal, 2013). These three variables were selected for the current study for a variety of reasons. After a traumatic event, college students reported experiencing both intrusive rumination and deliberate rumination (Wozniak et al., 2020) and distress disclosure (Lindstrom et al., 2013). These three variables predicted a large amount of the variance of the growth that college students reported after the trauma (Lindstrom et al., 2013; Wozniak et al., 2020). The amount of intrusive rumination, deliberate rumination, and distress disclosure an individual engages in impacts the amount of PTG they experience (Calhoun & Tedeschi, 2001; Lindstrom et al., 2013; Taku et al., 2009). Therefore, working to understand the way these variables act on the relationship between stressors and PTG or stressors and depression is important. Another reason these three factors were chosen for the current study is because they are easier to modify than other individual characteristics that affect PTG formation (e.g., age, gender). Mental health professionals are able to tailor interventions to enhance or reduce the amount of intrusive rumination, deliberate

rumination, and distress disclosure a client engages in, thereby influencing the amount of PTG the client experiences (Calhoun & Tedeschi, 1999).

It is important to note that the presence of PTG does not prevent the presence of distress (Ramos & Leal, 2013). College students who reported PTG also reported depression or distress related to the trauma they had experienced (Taku et al., 2008; Taku et al., 2021). For this reason, this study would examine both PTG and depression as outcome variables.

Rumination

Rumination is a form of cognitive processing that happens after a traumatic event has disrupted core beliefs (Calhoun et al., 2010; Dong et al., 2014; Tedeschi & Calhoun, 2004). In this study, two types of rumination were studied as separate variables: intrusive rumination and deliberate rumination (Calhoun et al., 2010; Taku et al., 2008). Models of PTG suggest that both intrusive rumination and deliberate rumination act on the pathway from traumatic distress to transformative growth (Freedle & Kashubeck-West, 2021; Lafarge et al., 2020). The amount an individual engages in intrusive rumination or deliberate rumination impacts the psychological outcomes an individual experiences (Calhoun et al., 2010; Taku et al., 2008). Therefore, the present study hypothesized intrusive rumination and deliberate rumination would serve as moderators that impact the direction and strength of the relationship between the predictor variable (i.e., the COVID-19 stressors) and the outcome variables (i.e., PTG and depression).

Intrusive Rumination as a Moderator. In the current study, intrusive rumination is conceptualized as repetitive or unwanted thoughts about the trauma a person has experienced (Cann et al., 2011). Intrusive thoughts happen as a result of the traumatic event disrupting or challenging our assumptive world views (Calhoun et al., 2010). Lafarge and colleagues (2020) suggested intrusive rumination hinders psychological growth after an individual experiences a

trauma. This is likely due to the negative or distressing content of the intrusive thoughts.

Students are reminded often of the trauma and the stress it has brought to their lives (Tambling et al., 2021). Hence, intrusive rumination is associated with greater distress and not PTG (Morris & Shakespeare-Finch, 2010; Taku et al., 2008). Therefore, it was hypothesized intrusive rumination would moderate the relationship between the COVID-19 stressors and PTG. Specifically, the negative association between the COVID-19 stressors and PTG would be stronger for college students at high levels of intrusive rumination than those at low levels of intrusive rumination.

High levels of intrusive rumination have a negative effect on the psychological outcomes of college students who have experienced trauma. Liao and Wei (2011) found that college students who endorsed higher levels of rumination were more vulnerable to depression when they experienced intolerance of uncertainty compared to students who endorsed low levels of rumination. Following this reasoning, it was hypothesized that intrusive rumination would moderate the relationship between the COVID-19 stressors and depression. Specifically, the positive association between the COVID-19 stressors and depression would be stronger for college students at high levels of intrusive rumination than those at low levels of intrusive rumination.

Deliberate Rumination as a Moderator. In the current study, deliberate rumination would be conceptualized as purposefully thinking about the traumatic event in order to make sense out of what has happened (Taku et al., 2009). Deliberate rumination is cognitive processing in which the individual reconstructs their core beliefs after those beliefs have been challenged by a traumatic event (Taku et al., 2009). This happens in part when individuals take time to consider some of the positive outcomes of their traumatic experience (Cann et al., 2011). The more deliberate rumination an individual engages in, the more PTG that individual is likely

to experience (Zeng et al., 2021). Individuals who do not engage in deliberate rumination would be expected to have lower PTG (Zeng et al., 2021). Following this logic, it was hypothesized deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG. In particular, the negative association between the COVID-19 stressors and PTG would be stronger for college students at low levels of deliberate rumination than those at high levels of deliberate rumination.

Individuals who do not engage in deliberate rumination will not have pondered on the meaning of the traumatic event for themselves and the world (Cann et al., 2011). They avoided the cognitive work of understanding what happened and how it has impacted them and their future (Cann et al., 2011). Supporting these ideas, Xu and colleagues (2021) found that students who endorsed lower amounts of deliberate rumination also reported higher levels of depression. Thus, it was hypothesized that deliberate rumination would moderate the relationship between the COVID-19 stressors and depression. In particular, the positive association between the COVID-19 stressors and depression would be stronger for college students at low levels of deliberate rumination than those at high levels of deliberate rumination.

Distress Disclosure

Distress disclosure is conceptualized as the disclosure of distress (Kahn & Hessling, 2001) or unpleasant feelings (Coates & Winston, 1987) by the individual experiencing the distress to another. Other research has called this emotional disclosure (Ramos & Leal, 2013); however, the term distress disclosure was used for the current study. Examples of distress disclosure include talking to others about the traumatic events, writing about the trauma and how it has affected life (Levi-Belz, 2019), or praying about the event (Tedeschi & Calhoun, 2004).

Distress disclosure is a key component of the PTG model (Tedeschi & Calhoun, 2004). Disclosure facilitates cognitive processing of the traumatic event in that the individual has to form a narrative when they describe the traumatic event to others (Ramos & Leal, 2013; Tedeschi & Calhoun, 2004). Disclosure also facilitates feelings of social support and connectivity (Levi-Belz, 2016; Taku et al., 2021). In research by Taku and colleagues (2009), individuals who disclosed distress from a traumatic event showed higher levels of PTG. Increased social support may improve positive psychological outcomes for individuals feeling stress from the COVID-19 pandemic (Jin et al., 2021).

Distress Disclosure as a Moderator. College students who endorse higher levels of distress disclosure showed reduced cognitive distress (Radcliffe et al., 2007). College students who endorse lower levels of distress disclosure would experience higher levels of cognitive distress. This is because distress disclosure promotes PTG (Ramos et al., 2017). Thus, it was hypothesized distress disclosure would moderate the relationship between the COVID-19 stressors and PTG. In particular, the negative association between the COVID-19 stressors and PTG would be stronger for college students at low levels of distress disclosure than those at high levels of distress disclosure.

When individuals do not disclose distress, they are more prone to feelings of distress and depression. Research by Achterbergh and colleagues (2020) observed that individuals who did not disclose the distress they felt to their peer groups were more likely to experience depressive symptoms than individuals who had disclosed their distress. Following this line of research, it was hypothesized that distress disclosure would moderate the relationship between the COVID-19 stressors and depression. Specifically, the positive association between the COVID-19

stressors and depression would be stronger for college students at low levels of distress disclosure than those at high levels of distress disclosure.

Hypotheses

The current study aimed to examine the following hypotheses.

Hypothesis 1: Intrusive Rumination as a Moderator

H1_A: Intrusive rumination would moderate the relationship between the COVID-19 stressors and PTG. Specifically, the negative association between the COVID-19 stressors and PTG would be stronger for college students at high levels of intrusive rumination than those at low levels of intrusive rumination (see Figure 1).

H1_B: Intrusive rumination would moderate the relationship between the COVID-19 stressors and depression. Specifically, the positive association between the COVID-19 stressors and depression would be stronger for college students at high levels of intrusive rumination than those at low levels of intrusive rumination (see Figure 2).

Hypothesis 2: Deliberate Rumination as a Moderator

H2_A: Deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG. In particular, the negative association between the COVID-19 stressors and PTG would be stronger for college students at low levels of deliberate rumination than those at high levels of deliberate rumination (see Figure 3).

H2_B: Deliberate rumination would moderate the relationship between the COVID-19 stressors and depression. In particular, the positive association between the COVID-19 stressors and depression would be stronger for college students at low levels of deliberate rumination than those at high levels of deliberate rumination (see Figure 4).

Hypothesis 3: Distress Disclosure as a Moderator

H3_A: Distress disclosure would moderate the relationship between the COVID-19 stressors and PTG. In particular, the negative association between the COVID-19 stressors and PTG would be stronger for college students at low levels of distress disclosure than those at high levels of distress disclosure (see Figure 5).

H3_B: Distress disclosure would moderate the relationship between the COVID-19 stressors and depression. Specifically, the positive association between the COVID-19 stressors and depression would be stronger for college students at low levels of distress disclosure than those at high levels of distress disclosure (see Figure 6).

Figure 7

The Conceptual Model for Hypotheses H1a, H2a, and H3a in Which PTG is the Outcome Variable

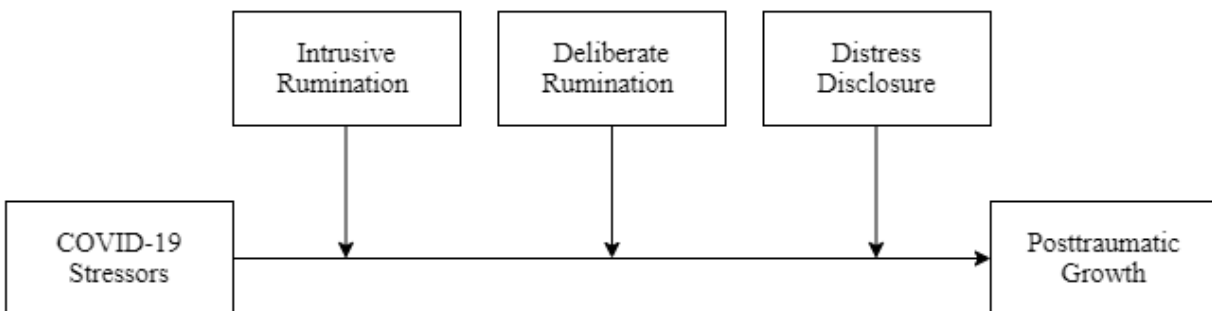
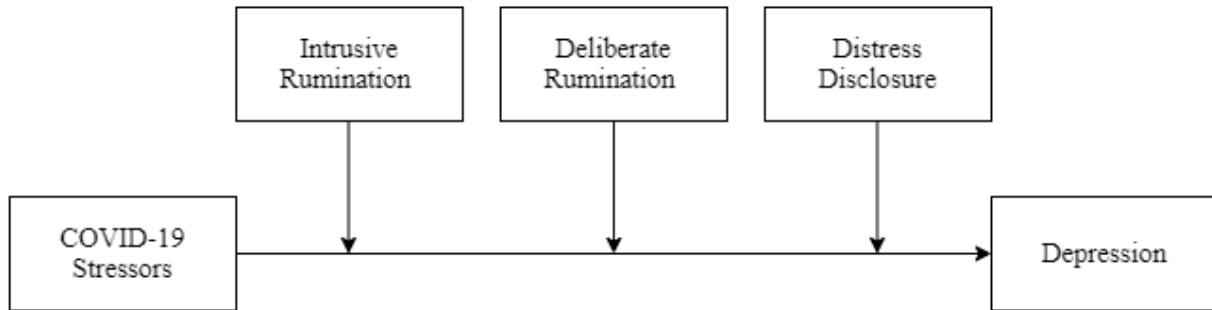


Figure 8

The Conceptual Model for Hypotheses H1a, H2a, and H3a in which Depression is the Outcome Variable

**Method*****Power Analysis***

It is well-established that the size of a research study sample has an impact on the strength of the results and the conclusions that can be drawn from them (Cohen, 1992). In order to estimate what size the sample needed to be to derive meaningful and significant results, a power analysis was completed using G*Power 3.1.9.7 online software (Faul et al., 2007, 2009). A significance level of .05 and a power of .80 were used for the analysis. To see a small effect size ($f^2 = .02$), 550 participants would be required. To see a medium effect size ($f^2 = .15$), 77 participants would be required. To see a large effect size ($f^2 = .35$), 36 participants would be required. This study aimed to detect small to medium effect sizes.

Participants

The current study recruited undergraduate student participants from Radford University via Student Research Participation (SONA) system and non-SONA recruitment through a link to the online Qualtrics survey. The eligible participants had to be over the age of 18 and enrolled in Radford University undergraduate class(es). When combined, the SONA and non-SONA surveys

included 167 initial participants. Thirty-eight participants were removed from the analysis to incorrectly answering the validity check item. Eighteen participants were removed because they did not complete the survey in that they answered less than 80% of the survey questions. After removing these individuals, 90 SONA participants and 21 non-SONA participants remained, totaling 111 participants included in the final data set. Mean age of participants was 19.95 years old ($SD = 1.96$, range = 18 to 32 years old). Eighty-six (77.5%) participants identified as female, 18 (16.2%) male, six (5.4%) non-binary, or one (.9%) other. Seventy-two (64.9%) participants identified as heterosexual, 25 (22.5%) bisexual, nine (8.1%) gay/lesbian, and five participants identified as other (i.e., “curious,” pansexual, asexual; 4.5%). The sample included 82 (73.9%) Caucasian/White, 11 (9.9%) Black or African American, six (5.4%) Latino/a or Hispanic, four (3.6%) Bi- or Multi-racial Americans, three (2.7%) Asian or Asian American, two (1.8%) Alaska Native or Native American, one (0.9%) Native Hawaiian or Pacific Islander, and two (1.8%) who identified as Other (i.e., mixed race indicated). Forty-one (36.9%) individuals in the sample identified as first-generation college students. The student sample included 51 (45.9%) freshmen, 21 (18.9%) sophomores, 20 (18%) juniors, 17 (15.3%) seniors, one (0.9%) fifth-year senior, and one identifying as other (i.e., transfer students; 0.9%). Eighty-five (76.6%) participants reported their relationship status as single, 24 (21.6%) in a domestic partnership, and two (1.8%) reported they were married. Eighty-seven (78.4%) lived off campus with parents at the beginning of the pandemic, 17 (15.3%) reported living in campus housing, four (3.6%) lived off campus with peers or roommates, two (1.8%) lived off campus with a significant other, and one (0.9%) lived off campus alone (see Table 1).

Procedure

After receiving approval from the Radford University Institutional Review Board, participants were recruited from the undergraduate student population at Radford University. To be eligible to participate in this study, individuals needed to be over 18 years old and enrolled as undergraduate students at Radford University. Students recruited for this study signed up through the Psychology Department SONA system or used a non-SONA link and utilized online software (www.qualtrics.com) to complete the survey. An informed consent page gave students information about the study and students had to agree to the informed consent before continuing on through the rest of the survey. If students did not want to participate after reading the informed consent, they were free to exit the survey. Those who participate were asked to fill out a questionnaire that included demographic information, the COVID-19 Stressors Scale, the Event Related Rumination Inventory (ERRI), the Distress Disclosure Index (DDI), the Post Traumatic Growth Inventory (PTGI), and the Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10). The survey also included an item designed to check the validity of survey data by assessing whether or not participants were attending to the survey (Oppenheimer et al., 2009). After completing the survey, participants were directed to a debriefing form. The participants received information about mental health resources they could contact if completing the survey has impacted them negatively at all. The survey was expected to take 15-25 minutes to complete. For students who completed the survey through SONA, incentives included one credit for psychology courses the students were enrolled in. For students who completed the survey using the non-SONA link, incentives included the opportunity to participate in a drawing to win one of five \$20 Amazon gift cards.

Participants were recruited using flyers sent to their student email accounts. These flyers included information on how to access the survey and a copy of them can be found in Appendix

F-I. The researcher sent these flyers to instructors at Radford University, and the instructors forwarded the emailed flyers to students. In addition, the researcher visited several classrooms during class time to verbally invite students to participate in the study. The researcher used a script in order to give each class the same information; scripts are found in Appendix B-C.

Measures

A complete copy of the survey is found in Appendix A.

Demographics. Participants were asked to complete self-report questionnaires that included the following items: age, sex, race/ethnicity, year in college (i.e., freshman, sophomore, etc.), sexual orientation, relationship status (i.e., single, married, separated, widow, etc.), and if the student is a first-generation college student or not. Participants were also asked about their housing situation during the beginning of the pandemic (i.e., in campus housing, off campus alone, off campus with parents, off campus with significant other, etc.).

COVID-19 Stressors. COVID-19 pandemic related stress was measured using the COVID-19 Stressors Scale (Park et al., 2020; Tambling et al., 2021). This is a 23-item self-report scale, which examines infection-related stress, daily activity stress, and financial and resource-related stress from the COVID-19 pandemic (Park et al., 2020; Tambling et al., 2021). Example items include “Risk of loved ones becoming infected,” “Changes to daily education routine (e.g., online instruction),” and “Loss of current job training opportunities or education benchmarks (e.g., certification, apprenticeship, internship or degree completion)” (Tambling et al., 2021). Participants were asked if they have or have not been affected by each item, and to what extent the experience was stressful (Tambling et al., 2021). Responses were collected using a Likert-type scale that ranges from 0 (I have not experienced this in the past week) to 5 (Yes, I have experienced this and extremely stressful). The total score ranged from 0 to 115. Higher scores

indicate greater feelings of stress. Evidence of construct validity for the COVID-19 Stressors Scale was supported by a significant positive association with the generalized anxiety and perceived stress (Tambling et al., 2021). The coefficient alpha was .96 among a sample of Americans (Tambling et al., 2021). The coefficient alpha for the total scale of the COVID-19 Stressors Scale in the present study was .94.

Rumination. The Event Related Rumination Inventory (ERRI) is a self-report, 20-item measure that was used to assess two types of rumination: intrusive and deliberate, with 10 items for each subscale (Cann et al., 2011). Intrusive rumination happens when an individual is experiencing unwanted and disturbing thoughts about the traumatic event that occurred, while deliberate rumination involves the individual pondering the traumatic event on purpose. Sample items of the intrusive rumination subscale are “Thoughts about the event came to mind and I could not stop thinking about them” and “I tried not to think about the event, but could not keep the thoughts from my mind.” Sample items of the deliberate rumination subscale are “I thought about whether my relationships with others have changed following my experience” and “I thought about what the experience might mean for my future.” Participants rated items on a 4-point Likert scale ranging from 0 (not at all) to 3 (often). The total score ranged from 0 to 30 for intrusive subscale and deliberate subscale, respectively. Higher scores on the intrusive rumination subscale of the ERRI suggest greater frequency of intrusive rumination, while higher scores on the deliberate rumination subscale of the ERRI suggest greater frequency of deliberate rumination (Cann et al., 2011). The evidence of construct validity for the intrusive rumination and deliberate rumination was supported by a significant positive association with core beliefs challenge and a significant negative association with found meaning (Groleau et al., 2013). The

coefficient alpha was .96 (intrusive) and .94 (deliberate) among college students (Hanley et al., 2017). The coefficient alpha for the present study was .95 (intrusive) and .93 (deliberate).

Distress Disclosure. Distress disclosure was measured using the Distress Disclosure Index (DDI). This scale is a 12-item self-report measure that uses a 5-point Likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree) (Kahn & Hessling, 2001). The total score ranged from 12 to 60. For this measure, the higher the score the more distress disclosure the participant engaged in (Kahn & Hessling, 2001). Sample items from the DDI are “When I feel upset, I usually confide in my friends” and “I prefer not to talk about my problems (reverse scored)” (Kahn & Hessling, 2001). The construct validity for the DDI was provided by significant positive correlations with well-being and life satisfaction as well as a significant negative association with depression (Ryan & Kahn, 2015). The coefficient alpha was .94 among college students (Garrison et al., 2014). The coefficient alpha for DDI in the present study was .91.

Posttraumatic Growth. The Posttraumatic Growth Inventory (PTGI) was used to measure PTG (Tedeschi & Calhoun, 1996). The PTGI is a 21-item self-report measure designed to capture the amount of PTG an individual has experienced after a traumatic event (i.e., a pandemic; Tedeschi & Calhoun, 1996). Participants rated items on a 6-point Likert scale ranging from 0 (did not experience this change) to 5 (I experienced this change to a great degree). The PTGI has five subscales, including Relating to Others (7 items), Personal Strength (4 items), Appreciation of Life (3 items), Existential or Spiritual Change (2 items), and New Possibilities (5 items). Sample items included “I more clearly see that I can count on people in times of trouble” (Relating to Others), “I developed new interests” (New Possibilities), “I have a greater feeling of self-reliance” (Personal Strength), “I have a better understanding of spiritual matters”

(Existential or Spiritual Change), and “I have a greater appreciation for the value of my own life” (Appreciation of Life). The total score was used in the current study. The total score can range from 0 to 105. Higher scores indicate greater PTG. The construct validity of the PTGI scale was supported by significant positive associations with the resilience (Schaefer et al., 2018), self-compassion, and positive reframing (Wong & Yeung, 2017). The coefficient alpha was ranged from .95 to .96 among college students (Shigemoto et al., 2017). The coefficient alpha for the total score of the PTGI in the present study was .97.

Depression. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale Revised (CESD-10; Björgvinsson et al., 2013; Miller et al., 2008; Radloff, 1977). This 10-item self-report measure is a brief measure designed to gauge the severity of depressive symptoms. Participants rated items on a 4-point Likert scale ranging from 0 (Rarely or none of the time [less than 1 day]) to 3 (All of the time [5-7 days]). Sample items include “I felt that everything I did was an effort” and “I was bothered by things that usually don’t bother me.” The total scores range from 0 to 30. Higher scores are indicative of greater frequency of depressive symptoms (Björgvinsson et al., 2013). The construct validity of the CESD-10 was provided by a significant positive association with suicidal behavior and significant negative associations with self-compassion and wellness behaviors (Rabon et al., 2018). The coefficient alpha was .85 among college students (Faisal et al., 2021). The coefficient alpha of the CESD-10 in the present study was .84.

Results

Preliminary Analysis

Missing data was calculated at the item level for each scale as follows: 1% for COVID-19 Stressors Scale, for the ERRI, 1% missing for the Intrusive Rumination subscale and 1%

missing for the Deliberate Rumination subscale, 1% missing for the DDI, 1% missing for the PTGI, and 1% missing for the CESD-10. Missing data was replaced by computing means for each participant's scores on the scales; then, their mean score for the specific scale was used to replace the missing data point (Parent, 2013).

The means, standard deviations, Cronbach's alpha, and correlations were calculated for the main variables in this study (see Table 2). The current study also examined whether the dependent variables (i.e., posttraumatic growth and depression) varied as a function of the demographic variables. In particular, Analysis of variance (ANOVA) tests were conducted to determine whether the variables of PTG and depression vary as a function of the categorical demographic variables (i.e., sex, ethnicity, sexual orientation, year in college, housing situation, and relationship status). Two *t*-tests were conducted to examine whether PTG and depression vary as a function of first-generation college student status. A correlation test was used to analyze whether age was associated with PTG and depression. If dependent variables varied as a function of demographic variables, then that demographic variable was considered a covariate in the subsequent data analysis.

For PTG as the outcome variable, the analysis showed no significant correlations between PTG and age ($r = -.14, p = .17$). The results from the Analysis of Variance tests indicated no significant differences for sex ($F[3, 107] = .65, p = .58$), ethnicity ($F[7, 103] = 1.61, p = .14$), sexual orientation ($F[3, 107] = .73, p = .54$), year in college ($F[5, 105] = 1.10, p = .37$), relationship status ($F[2, 108] = .76, p = .47$), or housing situation ($F[4, 106] = .64, p = .63$). The result from the *t*-test indicated no significant difference for first generation status, $t(109) = -1.00, p = .32$ (two-tailed).

For depression as the outcome variable, the analysis showed no significant correlation between depression and age ($r = -.09, p = .37$). Analysis of Variance results indicated no significant differences for sex ($F[3, 107] = 1.81, p = .15$), ethnicity ($F[7, 103] = .44, p = .87$), sexual orientation ($F[3, 107] = 2.07, p = .11$), year in college ($F[5, 105] = 1.23, p = .30$), relationship status ($F[2, 108] = 1.90, p = .16$), or housing situation ($F[4, 106] = .21, p = .93$).

The result from the t-test indicated no significant difference in depression scores between first generation college students and non-first generation college students ($t[109] = 1.01, p = .31$). The analysis also showed no significant differences in PTG between first generation students and students who were not first generation ($t[109] = -1.00, p = .32$).

A series of t-tests were conducted to examine whether the six main factors (i.e., COVID-19 stressors, intrusive rumination, deliberate rumination, distress disclosure, depression, and PTG) varied as a function of students being SONA participants or non-SONA participants. There were no significant differences between these two groups for COVID-19 stressors ($t[109] = 1.92, p = 0.06$), intrusive rumination ($t[109] = 0.88, p = 0.38$), deliberate rumination ($t[109] = 0.26, p = 0.80$), distress disclosure ($t[109] = -1.23, p = 0.22$), depression ($t[109] = 1.97, p = 0.051$), or PTG ($t[109] = 0.53, p = 0.60$).

Moderation Analysis

The moderation hypotheses were analyzed using PROCESS, an SPSS macro (Hayes, 2013). The moderation hypotheses in this study are ($H1_A$) Intrusive rumination would moderate the relationship between the COVID-19 stressors and PTG; ($H1_B$) Intrusive rumination would moderate the relationship between the COVID-19 stressors and depression; ($H2_A$) Deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG; ($H2_B$) Deliberate rumination would moderate the relationship between the COVID-19 stressors and

depression; ($H3_A$) Distress disclosure would moderate the relationship between the COVID-19 stressors and PTG; and ($H3_B$) Distress disclosure would moderate the relationship between the COVID-19 stressors and depression. If a zero is not included in the 95% CI of interaction term, it is the evidence of a significant moderation effect. Then, simple slopes analyses were used to explore the nature of interaction effects. Specifically, this study would probe the interaction with moderator values equal to one standard deviation above the mean and one standard deviation below the mean of the moderators (i.e., intrusive rumination, deliberate rumination, distress disclosure) to represent high and low levels, respectively.

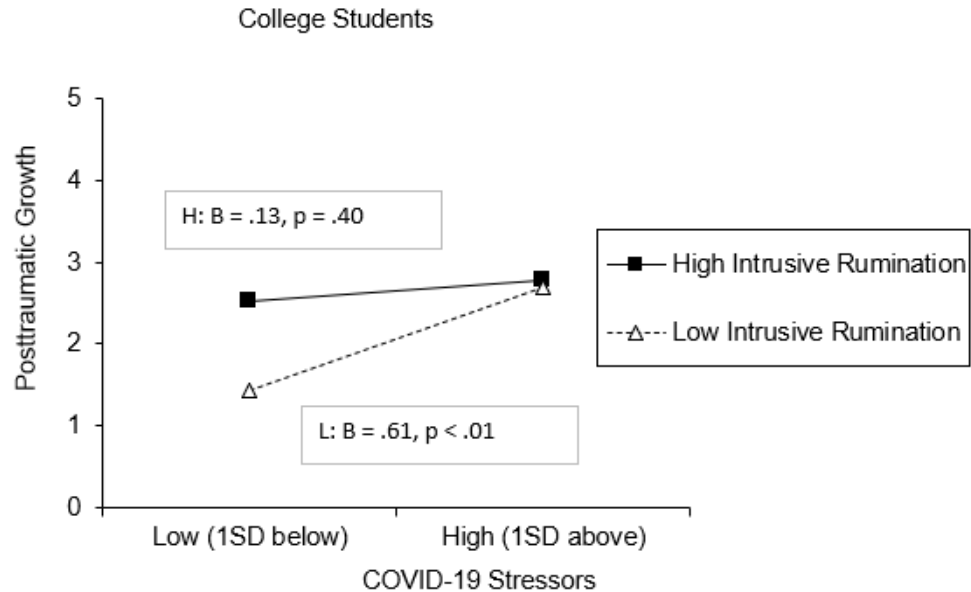
Hypothesis 1: Intrusive Rumination as a Moderator

H1A: Intrusive rumination would moderate the relationship between the COVID-19 stressors and PTG.

The results indicated that the moderation effect of intrusive rumination on the association between COVID-19 stressors and PTG was significant ($B = -0.30$, $SE = 0.14$, $p = 0.03$, 95% CI: [-0.57, -0.02], $\Delta R^2 = 0.04$), adding almost 4% of variance in predicting PTG (see Figure 9). The simple effects analysis showed that the association between COVID-19 stressors and PTG was significantly positive for those with low levels of intrusive rumination ($B = 0.61$, $SE = 0.18$, 95% CI: [0.25, 0.96]), but not for those with high levels of intrusive rumination ($B = 0.13$, $SE = 0.16$, 95% CI: [-0.18, 0.45]).

Figure 9

The Relationship Between COVID-19 Stressors and PTG at High Versus Low Levels of Intrusive



Rumination

H1B: Intrusive rumination would moderate the relationship between the COVID-19 stressors and depression.

The hypothesis that intrusive rumination would moderate the relationship between COVID-19 stressors and depression was not supported ($B = 0.12, SE = 0.07, p = .08, 95\% CI: [-0.02, 0.25]$). Results indicated that the interaction of college student COVID-19 stressors and intrusive rumination on depression was not significant.

Hypothesis 2: Deliberate Rumination as a Moderator

H2A: Deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG.

The hypothesis that deliberate rumination would moderate the relationship between COVID-19 stressors and PTG was not supported ($B = -0.01, SE = 0.14, p = 0.93, 95\% CI: [-0.29,$

0.27]). Results indicated that the interaction of college student COVID-19 stressors and deliberate rumination on PTG was not significant.

H2B: Deliberate rumination would moderate the relationship between the COVID-19 stressors and depression.

The hypothesis that deliberate rumination would moderate the relationship between COVID-19 stressors and depression was not supported ($B = 0.13$, $SE = 0.08$, $p = 0.10$, 95% CI: [-0.02, 0.28]). Results indicated that the interaction of college student COVID-19 stressors and deliberate rumination on depression was not significant.

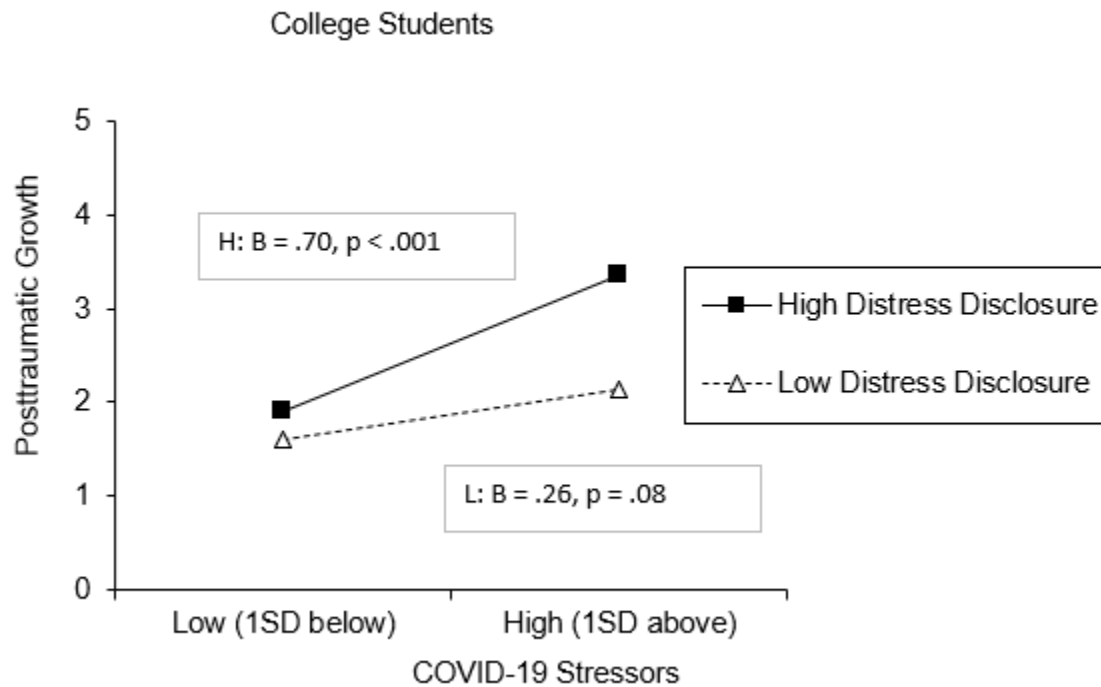
Hypothesis 3: Distress Disclosure as a Moderator

H3A: Distress disclosure would moderate the relationship between the COVID-19 stressors and PTG.

Results indicated that the moderation effect of distress disclosure on the association between COVID-19 stressors and PTG was significant ($B = 0.26$, $SE = 0.13$, $p = 0.04$, 95% CI: [0.01, 0.52], $\Delta R^2 = .03$), adding 3% of variance in predicting PTG (see Figure 10). The simple effects analysis showed that the association between COVID-19 stressors and PTG was significantly positive for those with high levels of distress disclosure ($B = 0.70$, $SE = 0.17$, $p < 0.01$, 95% CI: [0.37, 1.04]) but not for those with low levels of distress disclosure ($B = 0.26$, $SE = 0.14$, $p = 0.08$, 95% CI: [-0.03, 0.54]).

Figure 10

The Relationship Between COVID-19 Stressors and PTG at High Versus Low Levels of Distress Disclosure



H3B: Distress disclosure would moderate the relationship between the COVID-19 stressors and depression.

The hypothesis that distress disclosure would moderate the relationship between COVID-19 stressors and depression was not supported ($B = -0.04, SE = 0.07, p = 0.50, 95\% CI: [-0.17, 0.08]$). Results indicated that the interaction of college student COVID-19 stressors and distress disclosure on depression was not significant.

Discussion

The aim of this study was to explore intrusive rumination, deliberate rumination, and distress disclosure as moderators of the relationship between COVID-19 stressors and outcome variables such as posttraumatic growth (PTG) or depression. Results supported two out of the six hypotheses; the other four hypotheses were not supported by the data analyses.

Intrusive Rumination as a Moderator

Results confirmed Hypothesis 1A, which stated intrusive rumination would moderate the relationship between COVID-19 stressors and PTG. For students reporting low levels of intrusive rumination, the relationship between COVID-19 stressors and PTG was positively significant. For college students reporting higher levels of intrusive rumination, the relationship between COVID-19 stressors and PTG was not significant. Previous research supports these results in that lower rates of intrusive rumination were associated with higher PTG (Ramos et al., 2017).

Results did not confirm Hypothesis 1B, which stated intrusive rumination would moderate the relationship between COVID-19 stressors and depression. These results may suggest a more sophisticated association between COVID-19 stressors, intrusive rumination, and depression. The relationship between depression and intrusive rumination may not be easily explained with the moderation analysis used in the present study (Smith & Alloy, 2009). It is likely there may be a third variable that is unaccounted for by the current study's analyses (e.g., negative cognitive style) serving as another moderator in addition to intrusive rumination in the relationship between COVID-19 stressors on depression (Robinson & Alloy, 2003). Individuals who ruminate and have negative cognitive styles or ruminate on the negative attributions of a stressful event are at higher risk for developing depression. Perhaps the addition of negative

cognitive styles to the model may add to the predictive power to the moderation effects of rumination on depression (Robinson & Alloy, 2003). This may indicate a three-way interaction or moderated moderation (e.g., COVID-19 stressors x intrusive rumination x negative cognitive style on depression).

Deliberate Rumination as a Moderator

Results did not validate Hypothesis 2A, which stated deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG. Though deliberate rumination consistently predicts PTG (Calhoun et al., 2010; Tedeschi & Moore, 2021), not much is known about the stability of that relationship over time. Theoretical models suggest deliberate rumination is a factor later in the development of PTG (Calhoun et al., 2010; Tedeschi & Moore, 2021). The current study was conducted not long after the height of the COVID-19 pandemic, which may not have allowed enough time to pass to see deliberate rumination impact the relationship between COVID-19 stressors and PTG. A longitudinal research indicated the effects of deliberate rumination on development of PTG are inconsistent across time (Zhou & Wu, 2015). Deliberate rumination soon after the traumatic event did not predict PTG; however, deliberate rumination at measured 4.5 years after the event predicted PTG.

Results did not support Hypothesis 2B, which stated deliberate rumination would moderate the relationship between the COVID-19 stressors and depression. Deliberate rumination may act on depression in varied ways than were investigated in this study (Smith & Alloy, 2009). It is possible a third variable, such as self-efficacy, may serve as a moderator of deliberate rumination, suggesting a moderated moderation model (Xu et al., 2023). For undergraduate students experiencing stress from the COVID-19 pandemic, self-efficacy played a regulatory role in the association between deliberate rumination and PTG (Xu et al., 2023). This

suggests while students are experiencing deliberate rumination, individuals with higher self-efficacy could achieve greater PTG (Xu et al., 2023). These results may suggest a more sophisticated association among trauma, deliberate rumination, and depression (e.g., COVID-19 stressors x deliberate rumination x self-efficacy on depression).

Distress Disclosure

Results validated Hypothesis 3A, which stated distress disclosure would moderate the relationship between the COVID-19 stressors and PTG. College students reporting high levels of distress disclosure showed a significant positive relationship between COVID-19 stressors and PTG. Specifically, college students who disclosed more about pandemic-related distress reported more PTG when they experienced higher pandemic-related stress. However, for college students who reported low levels of disclosure of pandemic-related stress, the association between COVID-19 stressors and PTG was not significant. In line with previous research, this study suggested individuals with high levels of distress disclosure reported more PTG compared to those with low levels of distress disclosure (Freedle & Oliveira, 2021).

Results did not support Hypothesis 3B, which stated distress disclosure would moderate the relationship between the COVID-19 stressors and depression. This finding suggested there may be a third variable that is unaccounted for by the present study, such as shame or interpersonal shame that may serve as another moderator in addition to distress disclosure in the relationship between COVID-19 stressors on depression (Keum et al., 2021). It is probable college students with low levels of shame when engaging in distress disclosure related to COVID-19 stressors may experience low rates of depression. This suggests a three-way interaction or moderated moderation (e.g., COVID-19 stressors x distress disclosure x shame on depression).

Contributions and Implications

This study contributes to the PTG theoretical literature by adding evidence to the model of PTG where intrusive rumination and distress disclosure are factors in PTG development after individuals experience a trauma (Calhoun et al., 2010; Tedeschi & Moore, 2021). In particular, the current study provided empirical evidence that intrusive rumination and distress disclosure both have a moderating effect on the relationship between COVID-19 stressors and PTG.

In addition, this study expands the understanding of the role of deliberate rumination in PTG. Data for the current study was collected in spring of 2023, and while this was after the height of pandemic restrictions, many restrictions remained (i.e., mask mandates, mandatory vaccines, etc.). There may not have been enough time for deliberate rumination to influence PTG, as PTG models suggest deliberate rumination happens later in PTG development (Calhoun et al., 2010; Tedeschi & Moore, 2021).

Studies related to effects of the pandemic often focus on negative outcomes, such as increased hopelessness, chronic stress, substance use, and domestic violence (Bhattacharjee & Ghosh, 2021). This study highlights positive effects of suffering trauma. Positive and negative psychological outcomes may occur simultaneously, and are not mutually exclusive (Taku et al., 2008; Taku et al., 2021). Results of the present study suggest individuals should not over-emphasize either the positive or the negative outcomes of traumatic events and thereby bias the understanding of the trauma (Linley & Joseph, 2004).

Clinical Implications. Results of this study provided practical implications that may help clinicians in facilitating PTG after client experiences of trauma. When individuals enhance their distress disclosure, they are more likely to experience greater PTG development after

experiencing COVID-19 stressors. Decreasing the amount of intrusive rumination clients engage in is helpful for the development of PTG after experiencing COVID-19 stressors.

When experiencing COVID-19 stressors, college students who reported higher levels of distress disclosure also experienced higher amounts of PTG when compared to those who reported lower distress disclosure. This result is consistent with other research findings, where the process of growth involves the disclosure of distress (Freedle & Oliveira, 2021; Levi-Belz, 2019). Clinicians can assist in PTG development by providing psychoeducation designed to help clients acquire social support (Levi-Belz, 2019). Clinical interventions fostering social interactions would assist individuals in discussing distress (Tedeschi & Moore, 2021). In clinical settings, this may be through group therapy (Lai et al., 2021). Clinicians may also work on distress disclosure in session or using journal writing exercises (Keefe et al., 2008).

Results indicated decreasing intrusive rumination may help the individual develop higher levels of PTG in the face of COVID-19 stressors. Cognitive behavioral therapies or mindfulness-based therapies with interventions targeted at reducing intrusive rumination may be helpful for clients in decreasing frequency and severity of negative cognitions (i.e., intrusive rumination; Wang et al., 2021).

Limitations and Future Research Directions

The results of this study should be interpreted while understanding several limitations, including sample size, self-selection bias, and self-report questionnaires. Future studies may want to increase the sample size and include qualitative elements that may answer more questions about the individual's experiences after a pandemic. Data was collected from one university; future research might include multiple universities in order to collect a more representative sample.

PTG and depression are different factors that can exist simultaneously (Linley & Joseph, 2004; Taku et al., 2008; Taku et al., 2021). Moderators were chosen from the PTG literature (Tedeschi & Moore, 2021); consequently, the moderation factors may not interact with both depression and PTG in the same way. Future studies should choose factors explaining depression development from the depression literature. Data was collected in spring of 2023, and changes in lifestyles and government policies were still in effect (e.g., mask wearing, vaccine mandates, etc.). More time may need to pass before effects of deliberate rumination on development of PTG can be detected (Zhou & Wu, 2015). Future studies might look at longitudinal data (Levi-Belz, 2019) to further investigate the time line of growth after trauma.

CHAPTER TWO

REVIEW OF THE LITURATURE

This review of the literature would discuss adversity as a form of psychological stress that the COVID-19 pandemic has caused college students. Depression and posttraumatic growth (PTG) were explored as two potential outcomes of stress from COVID-19 pandemic. Individual characteristics that might facilitate or inhibit the development of PTG would be discussed. Rumination and distress disclosure would be introduced as potential moderators of the relationship between COVID-19 pandemic and PTG.

Stress from COVID-19 and College Students

The COVID-19 variant of the SARS-CoV-2 virus was first detected in late 2019 in China and it rapidly spread across the globe. This virus was not like similar, more common viruses; its highly infectious nature made it much more threatening to the health of everyone (Liu et al., 2020). After the virus was detected in the United States, mandates were put into place by local and federal agencies to slow the spread of the virus (Charles et al., 2021). While the restrictions and mandates were designed to reduce the transmission of COVID-19, the restrictions had many unintended consequences on the physical and psychological health on the U.S. population in general (Bhattacharjee & Ghosh, 2021). Some examples of these deleterious effects of the mandates and restrictions included increased anxiety, depression, fear, loneliness, insomnia, suicidal thoughts, and overarching stress (Bhattacharjee & Ghosh, 2021). In a review of the collective well-being of individuals, families, and communities during the COVID-19 pandemic, Waters and colleagues (2021) found a large number of studies have shown the adversity created by lockdowns, social isolation, economic pressure, remote learning, and other disruptions to the routines of life led to widespread increases in psychological distress, depression, and other

mental illnesses among the general public. The severe changes in lifestyle affected people whether or not they were ever infected with COVID-19 (Bhattacharjee & Ghosh, 2021).

The distress caused by the COVID-19 pandemic negatively impacted the mental health and well-being of young adults (Charles et al., 2021). For college-aged students in particular, the stress of both the COVID-19 virus and the restrictions enforced by the government have manifested in higher levels of depression, anxiety, poor sleep quality, and increased substance use due to the disruptions in occupations, academics, and interpersonal functioning (Charles et al., 2021; Graupensperger et al., 2021; Kang & Kim, 2021; Waters et al., 2021). Research specific to college students showed an increase in depression and suicidality in college-aged populations (Charles et al., 2021; Wang et al., 2020). Researchers have identified three domains that stressors occur in for college students: (a) Infection-Related Stress, (b) Daily Activity Stress, and (c) Financial and Resource-Related Stress (Tambling et al., 2021).

With regard to infection-related stress, college students reported distress from the fear of becoming infected with COVID-19 is higher than the distress from fear of becoming infected with the flu (Knowles & Olatunji, 2021). Due to restrictions on social contact, news is predominantly shared and consumed via the internet. Park and colleagues (2020) found that reading and hearing about the contagiousness of COVID-19 and about the severity of the virus were the most commonly experienced stressors that individuals were suffering. Specifically, over 96% of individuals endorsed hearing and reading about how bad the virus is to contract and how fast it spreads from one person to another (Park et al., 2020). The virus has been described using inflammatory vocabulary (i.e., “killer virus”) on social media outlets and many news sources, which may have contributed to increased psychological issues associated with infection-related stress in college students (Wang et al., 2021). In a review of how COVID-19 affects individuals,

infection-related stress can weaken the immune system, thereby making it easier for the individual who is distressed to become infected with the virus (Kempuraj et al., 2020). Infection-related stress not only increases psychological issues, it can also make someone more susceptible to contracting the virus (Kempuraj et al., 2020; Wang et al., 2021).

Regarding daily activity stress, Park and colleagues (2020) found that Americans have drastically changed their daily activities due to the COVID-19 pandemic. It seems that every aspect of life has changed due to government mandates as well as personal choices about health and hygiene. For example, more than 95% of Americans reported significant changes to their social habits including eating out, visiting friends and family members, limiting travel, and keeping a 6-foot distance from others (Park et al., 2020). Similarly, Americans have reported they work to keep themselves and their surroundings clean by disinfecting surfaces and avoiding touching their face (Park et al., 2020). While Americans are significantly changing the way they live and interact with each other in order to comply with suggested and mandated health guidelines, they report uncertainty in that they lacked of knowledge about COVID-19 (Faisal et al., 2021). Faisal et al. (2021) highlighted the discrepancy between knowledge and action in that less than 10% of college students felt they had a solid understanding of COVID-19, yet over 77% had changed their personal hygiene routines because of COVID-19. Put another way, college students are changing the way they live and function throughout their days while at the same time they feel they do not have an understanding of the driving force (i.e., COVID-19) behind the changes (Faisal et al., 2021). These changes in daily routines may contribute to daily activity stress (Faisal et al., 2021; Tambling et al., 2021). A meta-analysis of negative outcomes of the pandemic distress revealed that college students and medical personnel have very similar prevalence rates of depression, anxiety, and stress (Wang et al., 2021). Lack of peer

companionship and significantly reduced social activities due to social distancing mandates have contributed to increased depression (Wang et al., 2021). Separation from classmates and social groups as a result of school closures during the pandemic has caused increased stress and anxiety in college students (Yang et al., 2021). Having to adjust to mandates so quickly likely negatively affected anxiety and depression rates (Wang et al., 2021).

Financial and resource-related stress are not as universally stressful as infection-related stress or stress related to daily living; however, they stand out as some of the most stressful situations that individuals are dealing with (Park et al., 2020). This means that while not everyone has experienced financial stress due to the pandemic, those who have experienced financial troubles have been deeply distressed by those troubles. Many individuals have lost jobs, had to change jobs, or had to change the hours that they work at their jobs due to the pandemic (Han & Hart, 2022). These instabilities contribute to over uncertainty and increase distress (Han & Hart, 2022). Park and colleagues (2020) found that individuals with fewer resources reported higher numbers of stressors than individuals who reported they were secure in their resources. Additionally, those who reported financial strain, a lack of resources, and lack of job security were at greater risk for exposure to pandemic-related distress than those who were not worried about finances or resources (Park et al., 2020). Some examples of resources that were negatively impacted by COVID-19 include availability and access to healthcare, availability of healthy food due to decreased grocery store hours, availability of personal protective items (i.e., masks), and availability of cleaning supplies (Barbosa-Leiker et al., 2021). Overall, stressors related to COVID-19 are closely related to poorer well-being and mental health outcomes (Graupensperger et al., 2021). College students represent the future of society; therefore, the mental state of

college students should be important and any psychological issues should be addressed as quickly as possible (Wang et al., 2021).

COVID-19 Stress and its Impact on Psychological Outcomes

The outcome of someone's mental health after a crisis is determined by the amount of exposure to the stressors as well as the appraised stressfulness of their individual situation (Tambling et al., 2021). The pervasiveness of the impacts and the number of negative consequences the crisis (i.e., the pandemic) engendered for an individual will impact an individual's appraised stressfulness of the event (Tambling et al., 2021). Thus, perceived stress or appraised stressfulness of the COVID-19 pandemic plays a key role in psychological well-being (Tambling et al., 2021; Yang et al., 2021). First and colleagues (2021) found that individuals who had greater exposure to COVID-19 also experienced greater stress. With high levels of stress for prolonged periods of time, researchers have argued that COVID-19 represents a global trauma (Horesh & Brown, 2020) because "it has become a threat to the entire civilization" (Bhattacharjee & Ghosh, 2021).

Alongside this increase in depression and overall psychological distress due to the coronavirus pandemic, positive outcomes were documented for individuals and families (Waters et al., 2021). For example, increased work flexibility, self-paced learning, and family bonding have been identified as some of the positive outcomes of the coronavirus pandemic (Waters et al., 2021).

Posttraumatic Growth

While there is psychological distress that occurs because of an individual's experience of trauma, there is also the potential for growth to occur due to the individual's struggle with the trauma (Tedeschi & Calhoun, 1996). This growth, or positive change, only comes after exposure

to a trauma and the adversity caused by the trauma and has therefore been termed posttraumatic growth (PTG; Tedeschi & Calhoun, 1996). PTG happens when the outcome to a traumatic or distressing event is transformative and constructive (Tedeschi & Calhoun, 1996). This is not to be confused with a “happier or more carefree life”; in fact, PTG leads to a more meaningful life that is fulfilling (Tedeschi & Riffle, 2016).

Theory of Posttraumatic Growth. Tedeschi and Moore (2021) explored elements of the current PTG process model. The model begins with a traumatic event that causes a disruption in an individual’s core beliefs. In a review of PTG, Ramos and Leal (2013) discussed how PTG is triggered by traumatic events that shatter assumptive world views and disrupt our core beliefs or the mechanisms by which we see the world. In order to initiate PTG, the distressing event that an individual encounters does not have to be a *trauma* as defined by DSM-5 criteria (Tedeschi & Calhoun, 2004; Tedeschi & Moore, 2021). Many different kinds of highly challenging events can disrupt world views; some examples include natural disasters, combat situations, accidents, sexual assault, HIV infection, bereavement, chronic illness, bone marrow transplant, cancer, and myocardial infarction (Ramos & Leal, 2013). These stressful events produce feelings of distress, a sense of unpredictability, vulnerability, and that one does not have control over one’s own life (Ramos & Leal, 2013). Researchers have found evidence to support the categorization of the COVID-19 pandemic as a traumatic event for individuals (Bridgland et al., 2021; Sánchez-Gómez et al., 2021) as well as a collective trauma for society (Masiero et al., 2020). Findings from these studies support the idea that a trauma does not have to fit the parameters as defined by DSM-5 criteria in order to produce negative symptoms of PTSD (Bridgland et al., 2021; Sánchez-Gómez et al., 2021) or PTG (Tedeschi & Moore, 2021). The findings suggest an individual’s subjective evaluation of the emotional impact of the traumatic event (i.e., COVID-

19 pandemic) may be the mechanism of action by which posttraumatic stress or PTG is initiated (Bridgland et al., 2021). Wozniak and colleagues (2020) found evidence to support this in the experience of college students who had experienced a collective trauma. They found students were differentially affected by physical and emotional proximity to the trauma. In other words, emotional closeness to a trauma was disruptive to assumptive world views and being physically close to the trauma was disruptive to assumptive world views (Wozniak et al., 2020). In this study we used the terms “traumatic event,” “distressing event,” and “stressful event” interchangeably, as the PTG theory considers any event that challenges core beliefs to be capable of producing transformative change (Tedeschi & Moore, 2021).

Five Domains of Posttraumatic Growth. PTG is a multidimensional construct, made up of five domains. Tedeschi and Calhoun (1996) established five factors in the Posttraumatic Growth Inventory (PTGI) that measure the five domains that individuals experience growth in. These five areas are relating to others, new possibilities, personal strength, appreciation of life, and spiritual or existential change. Tedeschi and Moore (2021) discussed how these factors from the PTGI can be seen in the lives of the individuals who have experienced PTG. Interestingly, individuals who have survived a trauma can experience growth in each area, one area, or any combination of areas (Tedeschi & Riffle, 2016).

When someone experiences growth in how they *relate to others*, they often report feeling deeper emotional connections with their loved ones (Tedeschi & Moore, 2021). Individuals often report improvement in their relationships as a result of feeling more open, respect, distress disclosure, and compassion (Tedeschi & Moore, 2021). Individuals report that they have talked about their trauma with someone they are close to and the disclosure has been met with empathy

compassion, which serves to deepen the emotional connection in the relationship (Tedeschi & Moore, 2021).

The *new possibilities* domain is important because a trauma so often involves some kind of loss (Tedeschi & Moore, 2021). This loss might be physical capabilities the person had before the trauma such as the loss of a limb after an accident, or it could be the loss of a relationship (Ruff, 2013). Another kind of loss is the loss of the future a person had been striving toward; for example, the individual who lost a limb after an accident may need to mourn the limb they lost as well as the future they had planned on living (i.e., a lost future of a career in sports; Ruff, 2013). New and different possibilities come to light after the plans the individual has made are destroyed by the traumatic experience (Tedeschi & Moore, 2021). The new possibilities domain is important because it tells the individuals to what extent they have explored and accepted the need for new plans for their future.

Personal strength is a domain that may take time to manifest, as an individual may first feel they only need to survive the aftermath of the trauma as a victim or a survivor (Tedeschi & Moore, 2021). Eventually, the individual may recognize that they have not only survived, but they have become a psychologically stronger, more self-reliant and resilient person since going through the trauma (Tedeschi & Calhoun, 2006). They may feel an increase in courage that allows them to tackle new challenges more easily as a result of the growth in their personal strength (Tedeschi & Moore, 2021).

The *appreciation of life* domain is a reflection of how an individual's perspective can change after a traumatic event (Tedeschi & Moore, 2021). Individuals who experience significant change in this area report they have rearranged their priorities in life and they have more appreciation for each day (Tedeschi & Calhoun, 2006). They seem to have become more

mindful of the good things they experience and they have a reflective and grateful attitude (Tedeschi & Calhoun, 1996).

The domain of *spiritual and existential change* is measuring the extent the person who has gone through the trauma has considered or reconsidered questions related to the meaning of life (Tedeschi & Moore, 2021). Experiencing trauma brings up existential questions and may cause individuals to reconfigure beliefs regarding existential or spiritual matters (Tedeschi & Riffle, 2016). Change in spiritual or existential beliefs might be found in matters of forgiveness of others or forgiveness of self (Fisher & Exline, 2010).

Calhoun and colleagues (2010) reiterated that the five domains do not represent every different way an individual may experience growth after a trauma. Losses may lead to change that is stressor specific or personalized to what the person went through. For example, someone who experienced a loss may pursue a certain career in the medical field. However, these domains found in the PTGI capture a range of common experiences and give researchers a way to quantify growth after trauma (Calhoun et al., 2010).

Posttraumatic Growth Model and Individual Characteristics

Early theoretical models of PTG (Tedeschi & Calhoun, 1995) have been refined by researchers as empirical testing has brought insight to many components of the model. Below is an overview of the components of the model most relevant to this study.

Before an individual experiences a trauma, they have varying individual characteristics (i.e., personality traits, processing abilities, coping skills, social supports) and varying world beliefs that make up their schemas and assumptive world beliefs (Calhoun et al., 2010; Tedeschi & Calhoun, 2004). Tedeschi and Calhoun (2004) discussed how an event needs to be traumatic enough to significantly challenge an individual's assumptive world beliefs for the process of

PTG to begin. This is because reconstructing the core beliefs or schemas that have been challenged in a way that reconciles what happened and one's views or beliefs about the world, self, and others is the process that can lead to PTG (Calhoun & Tedeschi, 1999; Tedeschi & Moore, 2021).

Tedeschi and Moore (2021) described how the transformative process begins with this emotional distress from the challenged core beliefs. Research by Lindstrom and colleagues (2013) found support for this model of PTG development in college students and reported that significant challenges to assumptive world views is a very important correlate of PTG. The researchers posited that the discomfort caused by the differences between the previously held beliefs and the new information the trauma has stirred up is needed to begin the processes that lead to PTG (Lindstrom et al., 2021). This was supported by Choi and In (2019), whose results suggest that for college students, it's not as much the nature of the traumatic event that prompts PTG as it is the challenged or disruption to core beliefs that students need to heal from after experiencing a trauma. The disruption to an individual's most basic core beliefs and assumptions by a traumatic event causes significant distress for the individual and automatically causes the person to engage in coping in an effort to reduce the distress they experience (Cann et al., 2010).

In the model described by Tedeschi and Calhoun (2004), personality characteristics, rumination, disclosure of distress, social support, schema change, and narrative developments are what the researchers term *individual characteristics*. These are components are critical, as they have a direct impact on the amount of PTG that individual experiences (Tedeschi & Calhoun, 2004). Because these characteristics vary from person to person and directly impact the amount of PTG a person will experience after a trauma, there is a need to assess these characteristics (Horesh & Brown, 2020). In this study, rumination and distress disclosure are explored as

individual characteristics that may impact the amount of growth someone experiences after a trauma. Both rumination and distress disclosure have been shown to predict PTG (Ramos & Leal, 2013), and Tedeschi and Moore (2021) have identified these variables as major variables due to the empirical support for their key roles in the formation process of PTG.

In their study of the PTG process in college students, Lindstrom and colleagues (2013) identified cognitive processing as a key component in the growth that students reported experiencing. The researchers offer that there is a considerable amount of cognitive processing that takes place in an effort to reconstruct a workable set of core beliefs after a traumatic event. Several individual characteristics can assist with the cognitive processes of growing from adversity (Tedeschi & Moore, 2021). According to their research, one way this cognitive processing gets done is through rumination.

The PTG pathway has been supported in research on college students, where disruptions in the student's core beliefs by trauma have promoted both deliberate and intrusive rumination (Choi & In, 2019). Previous research has shown the correlation between intrusive rumination and deliberate rumination to be small among college students who have experienced a trauma and therefore it is useful to study these concepts separately (Taku et al., 2008). Other research showed individuals concurrently experiencing intrusive and deliberate rumination (Lafarge et al., 2019). In this study, rumination was distinguished into intrusive rumination and deliberate rumination, both of which play important and distinct roles in the cognitive processing of a traumatic event (Taku et al., 2009).

Tedeschi and Moore (2021) explained that intrusive rumination describes the process by which thoughts and memories related to the trauma intrude into the individual's mind. These intrusive ruminations are uninvited and unwanted (Cann et al., 2011). These ruminations are the

mind working to regain psychological equilibrium after the disruption of core beliefs (Tedeschi & Moore, 2021). While intrusive rumination is part of normal cognitive processing after a traumatic event disrupts core beliefs, when college students engaged in intrusive rumination for prolonged periods, it led to distress (Choi & In, 2019). Intrusive rumination has been found to be positively associated with distress in college students when the rumination is frequent (Taku et al., 2008). The researchers found the more recent intrusive rumination college students experienced, the greater amounts of distress they experienced. Other research has suggested intrusive rumination negatively predicts PTG (Lagarge et al., 2019). This means that the more an individual experiences intrusive rumination, the less growth they will experience (Lagarge et al., 2019).

Choi and In (2019) found that for college students, deliberate rumination is cognitive processing that is stimulated by the disruption of core beliefs. Students may engage in deliberate rumination on purpose as they think about the traumatic event and what it means for their life (Choi & In, 2019). Freedle and Kashubeck-West (2021) discussed how this type of rumination involves reflecting on the traumatic experience in a productive way that facilitates growth and meaning-making. They go on to describe how deliberate rumination may help individuals accommodate or assimilate new world beliefs into their existing cognitive structures (Freedle & Kashubeck-West, 2021). Other research has supported deliberate rumination as important in growth because of its positive impact on PTG for the general population (Lafarge et al., 2019) and for college students (Zeng et al., 2021).

As trauma survivors work to manage their emotional distress, they may reach out to their social supports with whom they disclose about the trauma they have experienced and how the trauma does and does not fit into their core beliefs (Tedeschi & Moore, 2021). Disclosure of

distress has been associated with higher levels of PTG (Dong et al., 2014). One way distress disclosure may positively influence PTG is in how it may foster feelings of connectedness. So, a person who engages in more distress disclosure may experience more PTG. Dong and colleagues (2014) found evidence that supports this in that distress disclosure was significantly related to higher levels of perceived social support for individuals who had recently suffered a trauma. This highlights the possible role of distress disclosure in promoting beneficial cognitive processing and ultimately, PTG (Dong et al., 2014).

Intrusive rumination, deliberate rumination, and distress disclosure were selected as variables for this study for several reasons. First, research suggests these variables are related to each other, while also being distinct enough to warrant separate evaluation. Wozniak and colleagues (2020) found that for college students experiencing a collective trauma, those who experienced more intrusive rumination also experienced more deliberate rumination. This suggests that intrusive rumination and deliberate rumination have a positive relationship and that they coexist as cognitive processes after a traumatic event. Lindstrom and colleagues (2013) found the more that college students reported deliberate rumination, the more they also reported distress disclosure. Their results indicate that not only might an increase in deliberate rumination increase distress disclosure, but the relationship may work in the opposite direction, in that the more a student engages in distress disclosure, the more they might engage in deliberate rumination. The researchers found that these three variables predicted a substantial amount of the variance in growth reported by college students after a traumatic event. For college students, working to understand the trauma and focusing on the positives in the trauma may be key to laying a foundation where PTG can grow (Lindstrom et al., 2013). These findings are consistent with the PTG model put forward by Calhoun and colleagues (2010) in that intrusive rumination,

deliberate rumination, and distress disclosure are primary components of pathways leading to PTG. It was unclear how intrusive rumination, deliberate rumination, and distress disclosure would contribute to the formation of PTG for college students experiencing stress from the COVID-19 pandemic. Exploring and differentiating between cognitive processes that are maladaptive and adaptive helps clinicians to tailor mental health treatments to the needs of each client (Morris & Shakespeare-Finch, 2010).

Brailovskaia and colleagues (2021) discussed the potential psychological burden (i.e., distress) a traumatic event places on an individual. They went on to suggest it is important to investigate what individual characteristics contribute to the likelihood of this distress. Investigation of factors that impact the stress individuals feel from COVID-19 is important (Brailovskaia et al., 2021). If these individual characteristics are identified, interventions can be created to mitigate the psychological stress individuals are feeling (Brailovskaia et al., 2021). This is another reason these three individual characteristics were included in this study. The frequency that an individual engages in intrusive rumination, deliberate rumination, and distress disclosure have been shown to impact the amount of PTG an individual experiences (Calhoun & Tedeschi, 2001; Lindstrom et al., 2013; Taku et al., 2009). Intrusive rumination, deliberate rumination, and distress disclosure are all factors that are changeable. Mental health professionals can positively affect a person's relationship with rumination and distress disclosure through therapeutic interventions, thereby increasing the amount of PTG an individual experiences as a result of a traumatic event (Calhoun & Tedeschi, 1999). Szabo and colleagues (2017) suggested reducing rumination may reduce posttraumatic stress symptoms, no matter how much time has passed since the trauma. Managing emotional distress through rumination and distress disclosure are cognitive processes that are crucial to how PTG develops for individuals

(Tedeschi & Calhoun, 2004). Research indicates social settings that are supportive and accepting can facilitate PTG (Dong et al., 2014). This means if clinicians can create an environment that is conducive to distress disclosure, they would be creating an environment that facilitates social support and PTG (Dong et al., 2014). Intrusive rumination, deliberate rumination, and distress disclosure are individual characteristics that can be addressed in therapy to promote cognitive flexibility as well as innovative behaviors that can facilitate PTG (Cann et al., 2010).

The presence of PTG in an individual does not preclude feelings of distress or suffering (Ramos & Leal, 2013). In other words, college students can simultaneously experience feelings of transformation and growth while they also experience feelings of depression or distress related to the traumatic event they have endured (Taku et al., 2008; Taku et al., 2021). Therefore, participants in the current study received questionnaires related to PTG and depression. Tedeschi and Calhoun (2004) suggested that because growth is triggered by the cognitive struggle that is the result of a traumatic event challenging core beliefs, the distress of the struggle and the growth that is the result necessarily coexist. Research has suggested distinct variables are associated with distress and PTG, which highlights the independence of the two constructs and the components that promote or reduce each construct after a trauma (Morris & Shakespeare-Finch, 2010). Choi and In (2019) supported this finding in research on college students where PTG and distress develop from differing cognitive pathways. This means students may experience both growth and distress related to the same traumatic experience. It also means clinicians and administrators who work with college students cannot assume distress will automatically decrease if PTG is increasing (Choi & In, 2019). This is why both measures of PTG and depression were given to the participants in the current study. Intrusive rumination, deliberate rumination, and distress

disclosure are discussed in the next sections in order to better understand their roles as moderators in the association between the COVID-19 stressors and PTG or depression.

Rumination

Rumination has the capacity to facilitate the development of PTG in that it acts on the path from psychological distress caused by an event to transformative growth (Zeng et al., 2021). Rumination is a multifaceted concept that can be defined as the internal, cognitive processing that an individual engages in after a trauma (Calhoun et al., 2010; Dong et al., 2014; Tedeschi & Calhoun, 2004). Two distinct types of rumination have been separated out and can be individually measured: intrusive rumination and deliberate rumination (Calhoun et al., 2010; Taku et al., 2008). Intrusive and deliberate rumination can happen concurrently (Freedle & Kashubeck-West, 2021; Lafarge et al., 2020). Correlational analyses have indicated the relationship between intrusive rumination and deliberate rumination is relatively small, suggesting that it is useful and prudent to separately examine the two types of rumination (Taku et al., 2008). Research by Lafarge et al. (2020) and Freedle and Kashubeck-West (2021) support the idea that intrusive and deliberate rumination should be studied as two separate entities due to findings that suggest each of the two types of rumination contribute to PTG in a unique way.

Moderators impact the direction and strength of the relationship between the predictor variable and the outcome variable (Baron & Kenny, 1986). According to models of PTG, both intrusive and deliberate rumination play integral roles in the processes that determine the degree of growth a person experiences after a life crisis or trauma (i.e., PTG; Calhoun et al., 2010; Tedeschi & Calhoun, 2004). Therefore, the present study aimed to examine whether intrusive rumination and deliberate rumination served as moderators that impact the direction and strength of the relationship between the predictor variable (i.e., the COVID-19 stressors) and the outcome

variables (i.e., PTG and depression). To follow is an explanation of the individual characteristics and a description of where each factor fits in the current study.

Intrusive Rumination as a Moderator. Intrusive rumination is conceptualized as unwanted and repetitive thoughts about the traumatic event (Cann et al., 2011). Research suggests these automatic, intrusive thoughts are important in that the thoughts are an indication to the individual experiencing them that the event or trauma had a significant impact (Taku et al., 2009). If the event had not disrupted core beliefs, the intrusive thoughts would not be there (Taku et al., 2009). Intrusive rumination occurs because an event has challenged existing world beliefs, such as a pandemic, and most often happens immediately after the trauma is experienced (Calhoun et al., 2010). These ruminations unconsciously steal the stage of the mind and demand the individual pay attention to the disruption they have experienced (Calhoun et al., 2010; Tedeschi & Calhoun, 2004). This disruption and the intrusive thoughts happen after core beliefs are challenged by a trauma, and it is this disruption that begins the process of PTG (Tedeschi & Moore, 2021).

Psychological outcomes were expected to be different for college students who endorse high intrusive rumination when compared to those who endorse lower intrusive rumination (Taku et al., 2008). It was hypothesized that intrusive rumination would moderate the relationship between the COVID-19 stressors and PTG. Specifically, the negative association between the COVID-19 stressors and PTG would be stronger for college students at high levels of intrusive rumination than those at low levels of intrusive rumination. In support of this hypothesis, Taku and colleagues (2008) found that intrusive rumination was associated with greater distress for individuals after a trauma had occurred. Similarly, Morris and Shakespeare-Finch (2010) found that intrusive rumination was highly correlated with the experience of

distress. Students who report high intrusive rumination think more about how the stressful event has negatively impacted their lives and have greater difficulty concentrating due to distracting thoughts about their stressful experience (Tambling et al., 2021). Lafarge and colleagues (2020) explained that this may be because intrusive rumination hinders growth after a stressful event. For example, if students are distracted by these negative thoughts throughout the day (Tambling et al., 2021), thinking about new possibilities could be very difficult (Tedeschi & Calhoun, 1996). The distracting thoughts happen even when the student actively tries not to think of the stressful event, but they are reminded often about the negative impact the stressful events have caused them (Tambling et al., 2021). The intrusive ruminations keep negative thoughts, such as infection risks (Tambling et al., 2021), at the forefront of the student's mind. These intrusive thoughts leave no room for the student to consider how they have grown as an individual, for example, how their compassion for others has grown or how they feel more self-reliant than they did before (Tedeschi & Calhoun, 1996).

It was hypothesized that intrusive rumination would moderate the relationship between the COVID-19 stressors and depression. Specifically, the positive association between the COVID-19 stressors and depression would be stronger for college students at high levels of intrusive rumination than those at low levels of intrusive rumination. The more intrusive rumination a student engaged in, the more they had trouble keeping their mind on tasks they are trying to accomplish. Intrusive rumination also increased fear and hopelessness about the future. Empirically, Liao and Wei (2011) revealed college student participants at high levels of rumination were found to be more vulnerable to depression when encountering intolerance of uncertainty compared to those at low levels of rumination. In their study, rumination influenced the association by strengthening the positive relationship between intolerance of uncertainty and

depression. Thus, more intrusive rumination had a negative effect on the student's psychological outcomes (Liao & Wei, 2011).

Deliberate Rumination as a Moderator. Taku and colleagues (2009) suggested that deliberate rumination is constructive in that the individual is purposefully thinking about the traumatic to make sense out of what happened. Deliberate rumination is conceptually similar to positive reappraisal in that it is a cognitive process that requires effort and has a positive relationship with mental health (Jin et al., 2021; Taku et al., 2009). Jin and colleagues (2021) suggested that positive reappraisal would improve the mental state of individuals during the COVID-19 pandemic. In an empirical study, Taku and colleagues (2009) sought to understand how individuals were using deliberate rumination to improve their worldview and therefore their psychological well-being. Their findings suggested deliberate rumination after a traumatic event may facilitate cognitive processing of the trauma as the person reconstructs their worldviews. Students with a greater amount of deliberate rumination were expected to have a different psychological outcome than students who report low amounts of deliberate rumination (Tedeschi & Calhoun, 1996). They were expected to have taken time to purposefully consider if there are positive things to be found in their stressful experiences (Cann et al., 2011).

In this study, deliberate rumination was expected to moderate the relationship between the COVID-19 stressors and PTG. In particular, the negative association between the COVID-19 stressors and PTG would be stronger for college students at low levels of deliberate rumination than those at high levels of deliberate rumination. Research by Zeng et al. (2021) indicated that the negative impacts of COVID-19 stress on college students could be alleviated by utilizing positive psychological interventions that target cognitive processes such as rumination. This research indicated the more deliberate rumination an individual engaged in, the greater the

amount of PTG that individual experienced (Zeng et al., 2021). That is, the more deliberate rumination an individual engaged in, the more positive their psychological outcomes were (Zeng et al., 2021).

Deliberate rumination would moderate the relationship between the COVID-19 stressors and depression. In particular, the positive association between the COVID-19 stressors and depression would be stronger for college students at low levels of deliberate rumination than those at high levels of deliberate rumination. Xu and colleagues (2021) investigated moderating factors of college students experiencing depression related to the COVID-19 pandemic. They found deliberate rumination moderated the relationship between the student's depression and their psychological resilience. The researchers found students who reported higher depression also experienced less deliberate rumination. Deliberate rumination happens when students have pondered the meaning on their experience (Cann et al., 2011). They have worked to understand what happened and what that experience means for their future (Cann et al., 2011). These deliberate ruminations do not support thoughts about depression and fear, but they do promote hopefulness and other positive feelings (Björgvinsson et al., 2013).

Distress Disclosure

Distress disclosure is defined as the process through which an individual lets themselves be known to others (Jourard, 1971). In this study, it was important that we differentiate general social disclosure from disclosures about a stressful event (i.e., distress disclosure). While these concepts are related, distress disclosure is conceptually defined here as the disclosure of distress (Kahn & Hessling, 2001) or unpleasant feelings (Coates & Winston, 1987) by the individual experiencing the distress to another. Other literature has termed this emotional disclosure (Ramos & Leal, 2013); however, for this study, the term distress disclosure was used.

Disclosing emotional distress related to the traumatic event one has been through is a key component of the PTG model (Tedeschi & Calhoun, 2004). Individuals who disclose distress after a trauma show higher PTG in several specific domains: relating to others, spiritual or existential change, appreciation of life, and new possibilities (Taku et al., 2009). Disclosing psychological distress is viewed as a form of social support (Calhoun et al., 2010; Levi-Belz, 2019; Tedeschi & Calhoun, 2004). Examples of this include writing about the traumatic event, talking to others about the traumatic event (Levi-Belz, 2019), or praying about the event (Tedeschi & Calhoun, 2004). Disclosure facilitates cognitive processing in that the individual is describing the traumatic event to others in a story format, also called forming a narrative (Ramos & Leal, 2013). In this way, distress disclosure both supports the development of a narrative around the trauma (Tedeschi & Calhoun, 2004) and facilitates feelings of connectivity and social support (Levi-Belz, 2016; Taku et al., 2021). Research suggests increased feelings of social support improves psychological outcomes for individuals living with COVID-19 stress (Jin et al., 2021).

Distress Disclosure as a Moderator. In a review of the literature, distress disclosure has been associated with a host of positive psychological outcomes such as reduced distress, increased physical functioning, and increased functioning of one's immune system (Ramos & Leal, 2013). Additionally, disclosing personally distressing information (i.e., talking and sharing about personal experiences) predicted PTG in that the participants who tended to disclose more frequently also reported higher levels of PTG (Freedle & Oliveira, 2021). Thus, the amount of distress disclosure affects the relationship between the experience of trauma and PTG (Dong et al., 2014). Research has shown that self-disclosure plays an important role in the formation of PTG after a variety of stressful experiences and for a variety of populations (Freedle & Oliveira,

2021; Levi-Belz, 2016; Levi-Belz, 2019). Specifically, disclosing distress may increase one's sense of belongingness and social support, thereby fostering feelings of togetherness and intimacy (Levi-Belz, 2019). In addition, Radcliffe et al. (2007) indicated college students who disclose stressful experiences via writing showed reductions in cognitive distress (i.e., cognitive intrusions and avoidance). Distress disclosure facilitates social intimacy and feelings of acceptance from others (Tedeschi & Calhoun, 2004). Research by Jin et al. (2021) indicated individuals who felt they had more social support would have improved mental health during the COVID-19 pandemic.

A study by Ramos and colleagues (2017) discussed distress disclosure promoted PTG. Specifically, the intervention that was used with the experimental group fostered distress disclosure among the sample population. Results showed higher levels of PTG in the intervention group when compared to the control group, who were not encouraged to self-disclose (Ramos et al., 2017). Those who were not encouraged to disclose actually disclosed less and individuals who disclosed less had lower PTG. Individuals who disclose less report they do not seek out others to talk to when they are upset or distressed (Kahn & Hessling, 2001). They prefer not to talk to others about their problems or their bad mood (Kahn & Hessling, 2001). According to PTG models, if individuals are not talking to others, they would not feel an increase in connectedness or closeness. This will not lead to accepting that they need others or feeling they can count on others during times of trouble (Tedeschi & Calhoun, 1996). Therefore, it was hypothesized that distress disclosure moderated the relationship between the COVID-19 stressors and PTG. In particular, the negative association between the COVID-19 stressors and PTG would be stronger for college students at low levels of distress disclosure than those at high levels of distress disclosure.

Achterbergh and colleagues (2020) found that disclosure of distress played a role in the strength of depression. Specifically, young adults who did not disclose their distress to their social groups were more likely to experience an increase in depressive symptoms. When individuals did not disclose their troubles to others, they were more likely to feel lonely, fearful, hopeless, and restless. Accordingly, it was hypothesized that distress disclosure would moderate the relationship between the COVID-19 stressors and depression. Specifically, the positive association between the COVID-19 stressors and depression would be stronger for college students at low levels of distress disclosure than those at high levels of distress disclosure.

Hypotheses

Against aforementioned backdrop, the current study examined the following hypotheses.

Hypothesis 1: Intrusive Rumination as a Moderator

H1_A: Intrusive rumination would moderate the relationship between the COVID-19 stressors and PTG. Specifically, the negative association between the COVID-19 stressors and PTG would be stronger for college students at high levels of intrusive rumination than those at low levels of intrusive rumination (see Figure 1).

H1_B: Intrusive rumination would moderate the relationship between the COVID-19 stressors and depression. Specifically, the positive association between the COVID-19 stressors and depression would be stronger for college students at high levels of intrusive rumination than those at low levels of intrusive rumination (see Figure 2).

Hypothesis 2: Deliberate Rumination as a Moderator

H2_A: Deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG. In particular, the negative association between the COVID-19 stressors and PTG

would be stronger for college students at low levels of deliberate rumination than those at high levels of deliberate rumination (see Figure 3).

H2_B: Deliberate rumination would moderate the relationship between the COVID-19 stressors and depression. In particular, the positive association between the COVID-19 stressors and depression would be stronger for college students at low levels of deliberate rumination than those at high levels of deliberate rumination (see Figure 4).

Hypothesis 3: Distress Disclosure as a Moderator

H3_A: Distress disclosure would moderate the relationship between the COVID-19 stressors and PTG. In particular, the negative association between the COVID-19 stressors and PTG would be stronger for college students at low levels of distress disclosure than those at high levels of distress disclosure (see Figure 5).

H3_B: Distress disclosure would moderate the relationship between the COVID-19 stressors and depression. Specifically, the positive association between the COVID-19 stressors and depression would be stronger for college students at low levels of distress disclosure than those at high levels of distress disclosure (see Figure 6).

CHAPTER THREE

METHOD

Power Analysis

It is well-established that the size of a research study sample has an impact on the strength of the results and the conclusions that can be drawn from them (Cohen, 1992). In order to estimate what size the sample needed to be to derive meaningful and significant results, a power analysis was completed using G*Power 3.1.9.7 online software (Faul et al., 2007, 2009). A significance level of .05 and a power of .80 were used for the analysis. To see a small effect size ($f^2 = .02$), 550 participants would be required. To see a medium effect size ($f^2 = .15$), 77 participants would be required. To see a large effect size ($f^2 = .35$), 36 participants would be required. This study aimed to detect small to medium effect sizes.

Participants

The current study recruited undergraduate student participants from Radford University via Student Research Participation (SONA) system and non-SONA recruitment through a link to the online Qualtrics survey. The eligible participants had to be over the age of 18 and enrolled in Radford University undergraduate class(es). When combined, the SONA and non-SONA surveys included 167 initial participants. Thirty-eight participants were removed from the analysis to incorrectly answering the validity check item. Eighteen participants were removed because they did not complete the survey in that they answered less than 80% of the survey questions. After removing these individuals, 90 SONA participants and 21 non-SONA participants remained, totaling 111 participants included in the final data set. Mean age of participants was 19.95 years old ($SD = 1.96$, range = 18 to 32 years old). Eighty-six (77.5%) participants identified as female, 18 (16.2%) male, six (5.4%) non-binary, or one (.9%) other. Seventy-two (64.9%) participants

identified as heterosexual, 25 (22.5%) bisexual, nine (8.1%) gay/lesbian, and five participants identified as other (i.e., “curious,” pansexual, asexual; 4.5%). The sample included 82 (73.9%) Caucasian/White, 11 (9.9%) Black or African American, six (5.4%) Latino/a or Hispanic, four (3.6%) Bi- or Multi-racial Americans, three (2.7%) Asian or Asian American, two (1.8%) Alaska Native or Native American, one (0.9%) Native Hawaiian or Pacific Islander, and two (1.8%) who identified as Other (i.e., mixed race indicated). Forty-one (36.9%) individuals in the sample identified as first-generation college students. The student sample included 51 (45.9%) freshmen, 21 (18.9%) sophomores, 20 (18%) juniors, 17 (15.3%) seniors, one (0.9%) fifth year senior, and one identifying as other (i.e., transfer students; 0.9%). Eighty-five (76.6%) participants reported their relationship status as single, 24 (21.6%) in a domestic partnership, and two (1.8%) reported they were married. Eighty-seven (78.4%) lived off campus with parents at the beginning of the pandemic, 17 (15.3%) reported living in campus housing, four (3.6%) lived off campus with peers or roommates, two (1.8%) lived off campus with a significant other, and one (0.9%) lived off campus alone (see Table 1).

Table 1*Participant Demographic Information*

Variable	<i>n</i>	%
Gender Identity		
Female	86	77.5%
Male	18	16.2%
Non-binary	6	5.4%
Other ^a	1	0.9%
Sexual Orientation		
Heterosexual	72	64.9%
Bisexual	25	22.5%
Gay/Lesbian	9	8.1%
Other ^b	5	4.5%
Race/Ethnicity		
Caucasian/White	82	73.9%
Black/African American	11	9.9%
Latino/a or Hispanic	6	5.4%
Bi- or Multi-racial	4	3.6%
Asian/Asian American	3	2.7%
Alaska Native/Native American	2	1.8%
Native Hawaiian/Pacific Islander	1	0.9%
Other ^c	2	1.8%
Year in Program		
Freshmen	51	45.9%
Sophomore	21	18.9%
Junior	20	18%
Senior	17	15.3%
5th year senior	1	0.9%
Other ^d	1	0.9%
Relationship Status		
Single	85	76.6%
In a domestic partnership	24	21.6%
Married	2	1.8%
Housing Situation		
Off campus with parents	87	78.4%
Campus housing	17	15.3%
Off campus with peers or roommates	4	3.6%
Off campus with significant other	2	1.8%
Off campus alone	1	0.9%
1st Generation College Student Status		
1 st Generation	41	36.9%
Not 1 st Generation	70	63.1%
SONA vs. Non-SONA		
SONA	90	81.1%
Non-SONA	21	18.9%

^aParticipants responding “Other” to gender identity did not indicate their gender identity.

^bParticipants responding “Other” to sexual orientation indicated “curious,” pansexual, or asexual.

^cParticipants responding “Other” to race/ethnicity indicated mixed race heritage.

^dParticipants responding “Other” to year in program indicated transfer student status.

Procedure

After receiving approval from the Radford University Institutional Review Board, participants were recruited from the undergraduate student population at Radford University. To be eligible to participate in this study, individuals needed to be over 18 years old and enrolled as undergraduate students at Radford University. Students recruited for this study signed up through the Psychology Department SONA system or used a non-SONA link and utilized online software (www.qualtrics.com) to complete the survey. An informed consent page gave students information about the study and students had to agree to the informed consent before continuing on through the rest of the survey. If students did not want to participate after reading the informed consent, they were free to exit the survey. Those who participate were asked to fill out a questionnaire that included demographic information, the COVID-19 Stressors Scale, the Event Related Rumination Inventory (ERRI), the Distress Disclosure Index (DDI), the Post Traumatic Growth Inventory (PTGI), and the Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10). The survey also included an item designed to check the validity of survey data by assessing whether or not participants were attending to the survey (Oppenheimer et al., 2009). After completing the survey, participants were directed to a debriefing form. The participants received information about mental health resources they could contact if completing the survey has impacted them negatively at all. The survey was expected to take 15-25 minutes to complete. For students who completed the survey through SONA, incentives included one credit for psychology courses the students were enrolled in. For students who completed the

survey using the non-SONA link, incentives included the opportunity to participate in a drawing to win one of five \$20 Amazon gift cards.

Participants were recruited using flyers sent to their student email accounts. These flyers included information on how to access the survey and a copy of them can be found in Appendix F-I. The researcher sent these flyers to instructors at Radford University, and the instructors forwarded the emailed flyers to students. In addition, the researcher visited several classrooms during class time to verbally invite students to participate in the study. The researcher used a script in order to give each class the same information; scripts are found in Appendix B-C.

Measures

A complete copy of the survey is found in Appendix A.

Demographics. Participants were asked to complete self-report questionnaires that included the following items: age, sex, race/ethnicity, year in college (i.e., freshman, sophomore, etc.), sexual orientation, relationship status (i.e., single, married, separated, widow, etc.), and if the student is a first-generation college student or not. Participants were also asked about their housing situation during the beginning of the pandemic (i.e., in campus housing, off campus alone, off campus with parents, off campus with significant other, etc.).

COVID-19 Stressors. COVID-19 pandemic related stress was measured using the COVID-19 Stressors Scale (Park et al., 2020; Tambling et al., 2021). This is a 23-item self-report scale, which examines infection-related stress, daily activity stress, and financial and resource-related stress from the COVID-19 pandemic (Park et al., 2020; Tambling et al., 2021). Example items include “Risk of loved ones becoming infected,” “Changes to daily education routine (e.g., online instruction),” and “Loss of current job training opportunities or education benchmarks (e.g., certification, apprenticeship, internship or degree completion)” (Tambling et al., 2021).

Participants were asked if they have or have not been affected by each item, and to what extent the experience was stressful (Tambling et al., 2021). Responses were collected using a Likert-type scale that ranges from 0 (I have not experienced this in the past week) to 5 (Yes, I have experienced this and extremely stressful). The total score ranged from 0 to 115. Higher scores indicate greater feelings of stress. Evidence of construct validity for the COVID-19 Stressors Scale was supported by a significant positive association with the generalized anxiety and perceived stress (Tambling et al., 2021). The coefficient alpha was .96 among a sample of Americans (Tambling et al., 2021). The coefficient alpha for the total scale of the COVID-19 Stressors Scale in the present study was .94.

Rumination. The Event Related Rumination Inventory (ERRI) is a self-report, 20-item measure that was used to assess two types of rumination: intrusive and deliberate, with 10 items for each subscale (Cann et al., 2011). Intrusive rumination happens when an individual is experiencing unwanted and disturbing thoughts about the traumatic event that occurred, while deliberate rumination involves the individual pondering the traumatic event on purpose. Sample items of the intrusive rumination subscale are “Thoughts about the event came to mind and I could not stop thinking about them” and “I tried not to think about the event, but could not keep the thoughts from my mind.” Sample items of the deliberate rumination subscale are “I thought about whether my relationships with others have changed following my experience” and “I thought about what the experience might mean for my future.” Participants rated items on a 4-point Likert scale ranging from 0 (not at all) to 3 (often). The total score ranged from 0 to 30 for intrusive subscale and deliberate subscale, respectively. Higher scores on the intrusive rumination subscale of the ERRI suggest greater frequency of intrusive rumination, while higher scores on the deliberate rumination subscale of the ERRI suggest greater frequency of deliberate

rumination (Cann et al., 2011). The evidence of construct validity for the intrusive rumination and deliberate rumination was supported by a significant positive association with core beliefs challenge and a significant negative association with found meaning (Groleau et al., 2013). The coefficient alpha was .96 (intrusive) and .94 (deliberate) among college students (Hanley et al., 2017). The coefficient alpha for the present study was .95 (intrusive) and .93 (deliberate).

Distress Disclosure. Distress disclosure was measured using the Distress Disclosure Index (DDI). This scale is a 12-item self-report measure that uses a 5-point Likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree) (Kahn & Hessling, 2001). The total score ranged from 12 to 60. For this measure, the higher the score the more distress disclosure the participant engaged in (Kahn & Hessling, 2001). Sample items from the DDI are “When I feel upset, I usually confide in my friends” and “I prefer not to talk about my problems (reverse scored)” (Kahn & Hessling, 2001). The construct validity for the DDI was provided by significant positive correlations with well-being and life satisfaction as well as a significant negative association with depression (Ryan & Kahn, 2015). The coefficient alpha was .94 among college students (Garrison et al., 2014). The coefficient alpha for DDI in the present study was .91.

Posttraumatic Growth. The Posttraumatic Growth Inventory (PTGI) was used to measure posttraumatic growth (PTG; Tedeschi & Calhoun, 1996). The PTGI is a 21-item self-report measure designed to capture the amount of PTG an individual has experienced after a traumatic event (i.e., a pandemic; Tedeschi & Calhoun, 1996). Participants rated items on a 6-point Likert scale ranging from 0 (did not experience this change) to 5 (I experienced this change to a great degree). The PTGI has five subscales, including Relating to Others (7 items), Personal Strength (4 items), Appreciation of Life (3 items), Existential or Spiritual Change (2 items), and

New Possibilities (5 items). Sample items included “I more clearly see that I can count on people in times of trouble” (Relating to Others), “I developed new interests” (New Possibilities), “I have a greater feeling of self-reliance” (Personal Strength), “I have a better understanding of spiritual matters” (Existential or Spiritual Change), and “I have a greater appreciation for the value of my own life” (Appreciation of Life). The total score was used in the current study. The total score can range from 0 to 105. Higher scores indicate greater PTG. The construct validity of the PTGI scale was supported by significant positive associations with the resilience (Schaefer et al., 2018), self-compassion, and positive reframing (Wong & Yeung, 2017). The coefficient alpha was ranged from .95 to .96 among college students (Shigemoto et al., 2017). The coefficient alpha for the total score of the PTGI in the present study was .97.

Depression. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale Revised (CESD-10; Björgevinnsson et al., 2013; Miller et al., 2008; Radloff, 1977). This 10-item self-report measure is a brief measure designed to gauge the severity of depressive symptoms. Participants rated items on a 4-point Likert scale ranging from 0 (Rarely or none of the time [less than 1 day]) to 3 (All of the time [5-7 days]). Sample items include “I felt that everything I did was an effort” and “I was bothered by things that usually don’t bother me.” The total scores range from 0 to 30. Higher scores are indicative of greater frequency of depressive symptoms (Björgevinnsson et al., 2013). The construct validity of the CESD-10 was provided by a significant positive association with suicidal behavior and significant negative associations with self-compassion and wellness behaviors (Rabon et al., 2018). The coefficient alpha was .85 among college students (Faisal et al., 2021). The coefficient alpha of the CESD-10 in the present study was .84.

CHAPTER FOUR

RESULTS

Preliminary Analysis

Missing data was calculated at the item level for each scale as follows: 1% for COVID-19 Stressors Scale, for the Event Related Rumination Inventory (ERRI), 1% missing for the Intrusive Rumination subscale and 1% missing for the Deliberate Rumination subscale, 1% missing for the Distress Disclosure Index (DDI), 1% missing for the Posttraumatic Growth Inventory (PTGI), and 1% missing for the Center for Epidemiologic Studies Depression Scale Revised (CESD-10). Missing data was replaced by computing means for each participant's scores on the scales; then, their mean score for the specific scale was used to replace the missing data point (Parent, 2013).

The means, standard deviations, Cronbach's alpha, and correlations were calculated for the main variables in this study (see Table 2). The current study also examined whether the dependent variables (i.e., posttraumatic growth and depression) varied as a function of the demographic variables. In particular, Analysis of variance (ANOVA) tests were conducted to determine whether for the variables of posttraumatic growth (PTG) and depression vary as a function of the categorical demographic variables (i.e., sex, ethnicity, sexual orientation, year in college, housing situation, and relationship status). Two *t*-tests were conducted to examine whether PTG and depression vary as a function of first-generation college student status. A correlation test was used to analyze whether age was associated with PTG and depression. If dependent variables varied as a function of demographic variables, then that demographic variable was considered a covariate in the subsequent data analysis.

For PTG as the outcome variable, the analysis showed no significant correlations between PTG and age ($r = -.14, p = .17$). The results from the Analysis of Variance tests

indicated no significant differences for sex ($F[3, 107] = .65, p = .58$), ethnicity ($F[7, 103] = 1.61, p = .14$), sexual orientation ($F[3, 107] = .73, p = .54$), year in college ($F[5, 105] = 1.10, p = .37$), relationship status ($F[2, 108] = .76, p = .47$), or housing situation ($F[4, 106] = .64, p = .63$). The result from the t -test indicated no significant difference for first generation status, $t(109) = -1.00, p = .32$ (two-tailed).

For depression as the outcome variable, the analysis showed no significant correlation between depression and age ($r = -.09, p = .37$). Analysis of Variance results indicated no significant differences for sex ($F[3, 107] = 1.81, p = .15$), ethnicity ($F[7, 103] = .44, p = .87$), sexual orientation ($F[3, 107] = 2.07, p = .11$), year in college ($F[5, 105] = 1.23, p = .30$), relationship status ($F[2, 108] = 1.90, p = .16$), or housing situation ($F[4, 106] = .21, p = .93$).

The result from the t -test indicated no significant difference in depression scores between first generation college students and non-first generation college students ($t[109] = 1.01, p = .31$). The analysis also showed no significant differences in PTG between first generation students and students who were not first generation ($t[109] = -1.00, p = .32$).

A series of t -tests were conducted to examine whether the six main factors (i.e., COVID-19 stressors, intrusive rumination, deliberate rumination, distress disclosure, depression, and PTG) varied as a function of students being SONA participants or non-SONA participants. There were no significant differences between these two groups for COVID-19 stressors ($t[109] = 1.92, p = 0.06$), intrusive rumination ($t[109] = 0.88, p = 0.38$), deliberate rumination ($t[109] = 0.26, p = 0.80$), distress disclosure ($t[109] = -1.23, p = 0.22$), depression ($t[109] = 1.97, p = 0.051$), or PTG ($t[109] = 0.53, p = 0.60$).

Table 2

Means, Standard Deviations, and Correlations of the Main Variables

	1	2	3	4	5	6
1. COVID	-----					
2. ERRI-I	.45***	-----				
3. ERRI-D	.39***	.63***	-----			
4. PTGI	.35***	.32**	.55***	-----		
5. DDI	.03	.04	.07	.27**	-----	
6. CESD-10	.23*	.39***	.30**	-.01	-.27**	-----
<i>Mean</i>	1.91	1.23	1.63	2.25	2.87	1.45
<i>SD</i>	1.04	.80	.77	1.35	.85	.65
<i>α</i>	.94	.95	.93	.91	.97	.84

Note. $N = 111$. COVID = COVID -19 Stressors Scale; ERRI-I= Event Related Rumination Inventory- intrusive rumination subscale; ERRI-D= Event Related Rumination Inventory- deliberate rumination subscale; DDI= Distress Disclosure Index; PTGI= Posttraumatic Growth Inventory; CESD-10= Center for Epidemiologic Studies Depression Scale Revised.

* $p < .05$, ** $p < .01$, *** $p < .001$

Moderation Analysis

The moderation hypotheses were analyzed using PROCESS, an SPSS macro (Hayes, 2013). The moderation hypotheses in this study are ($H1_A$) Intrusive rumination would moderate the relationship between the COVID-19 stressors and PTG; ($H1_B$) Intrusive rumination would moderate the relationship between the COVID-19 stressors and depression; ($H2_A$) Deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG; ($H2_B$) Deliberate rumination would moderate the relationship between the COVID-19 stressors and depression; ($H3_A$) Distress disclosure would moderate the relationship between the COVID-19 stressors and PTG; and ($H3_B$) Distress disclosure would moderate the relationship between the COVID-19 stressors and depression. If a zero is not included in the 95% CI of interaction term, it is the evidence of a significant moderation effect. Then, simple slopes analyses were used to explore the nature of interaction effects. Specifically, this study would probe the interaction with moderator values equal to one standard deviation above the mean and one standard deviation below the mean of the moderators (i.e., intrusive rumination, deliberate rumination, distress disclosure) to represent high and low levels, respectively.

Analyses exploring the subscales of the Posttraumatic Growth Inventory (PTGI) and the subscales of the COVID-19 Stressors Scale revealed inconsistent patterns in the results. Hence, this study aggregated the subscale scores as a total score for the data analysis.

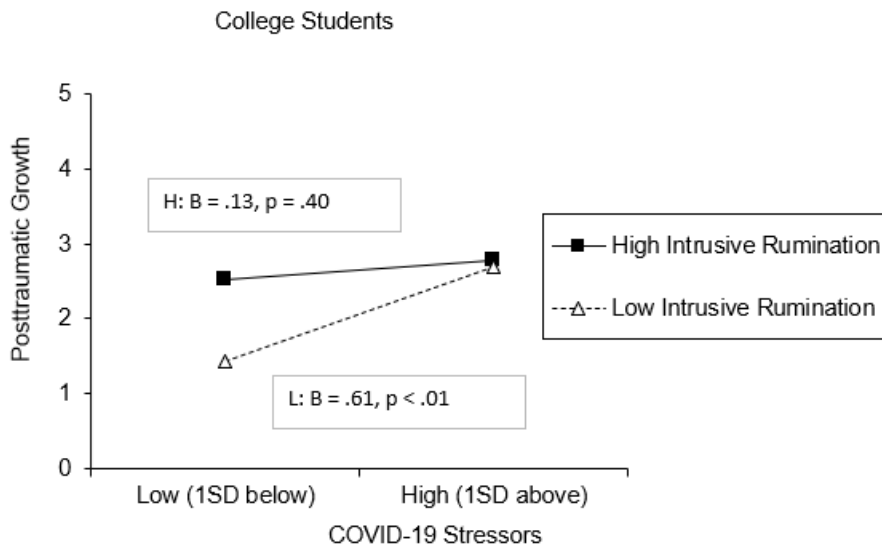
Hypothesis 1: Intrusive Rumination as a Moderator

H1A: Intrusive rumination would moderate the relationship between the COVID-19 stressors and PTG.

The results indicated that the moderation effect of intrusive rumination on the association between COVID-19 stressors and PTG was significant ($B = -0.30$, $SE = 0.14$, $p = 0.03$, 95% CI: [-0.57, -0.02], $\Delta R^2 = 0.04$), adding almost 4% of variance in predicting PTG (see Figure 9). The simple effects analysis showed that the association between COVID-19 stressors and PTG was significantly positive for those with low levels of intrusive rumination ($B = 0.61$, $SE = 0.18$, 95% CI: [0.25, 0.96]), but not for those with high levels of intrusive rumination ($B = 0.13$, $SE = 0.16$, 95% CI: [-0.18, 0.45]).

Figure 9

The relationship between COVID-19 stressors and PTG at high vs low levels of intrusive rumination



H1B: Intrusive rumination would moderate the relationship between the COVID-19 stressors and depression.

The hypothesis that intrusive rumination would moderate the relationship between COVID-19 stressors and depression was not supported ($B = 0.12$, $SE = 0.07$, $p = .08$, 95% CI: [-0.02, 0.25]). Results indicated that the interaction of college student COVID-19 stressors and intrusive rumination on depression was not significant.

Hypothesis 2: Deliberate Rumination as a Moderator

H2A: Deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG.

The hypothesis that deliberate rumination would moderate the relationship between COVID-19 stressors and PTG was not supported ($B = -0.01$, $SE = 0.14$, $p = 0.93$, 95% CI: [-0.29,

0.27]). Results indicated that the interaction of college student COVID-19 stressors and deliberate rumination on PTG was not significant.

H2B: Deliberate rumination would moderate the relationship between the COVID-19 stressors and depression.

The hypothesis that deliberate rumination would moderate the relationship between COVID-19 stressors and depression was not supported ($B = 0.13$, $SE = 0.08$, $p = 0.10$, 95% CI: [-0.02, 0.28]). Results indicated that the interaction of college student COVID-19 stressors and deliberate rumination on depression was not significant.

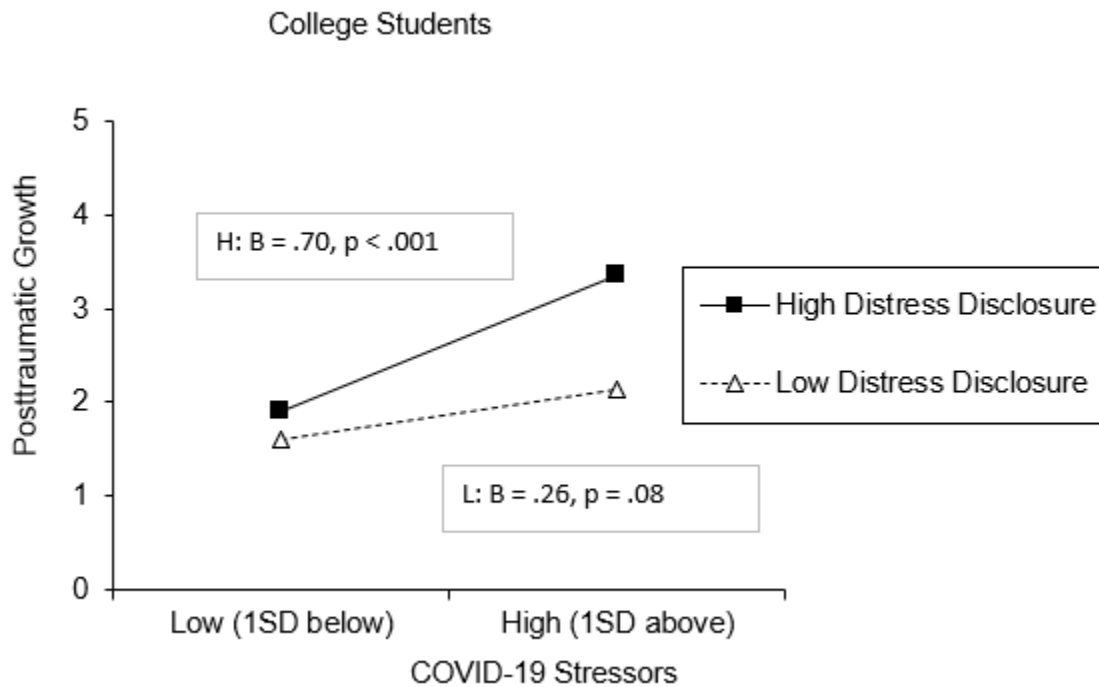
Hypothesis 3: Distress Disclosure as a Moderator

H3A: Distress disclosure would moderate the relationship between the COVID-19 stressors and PTG.

Results indicated that the moderation effect of distress disclosure on the association between COVID-19 stressors and PTG was significant ($B = 0.26$, $SE = 0.13$, $p = 0.04$, 95% CI: [0.01, 0.52], $\Delta R^2 = .03$), adding 3% of variance in predicting PTG (see Figure 10). The simple effects analysis showed that the association between COVID-19 stressors and PTG was significantly positive for those with high levels of distress disclosure ($B = 0.70$, $SE = 0.17$, $p < 0.01$, 95% CI: [0.37, 1.04]), but not for those with low levels of distress disclosure ($B = 0.26$, $SE = 0.14$, $p = 0.08$, 95% CI: [-0.03, 0.54]).

Figure 10

The relationship between COVID-19 stressors and PTG at high vs low levels of distress disclosure



H3B: Distress disclosure would moderate the relationship between the COVID-19 stressors and depression.

The hypothesis that distress disclosure would moderate the relationship between COVID-19 stressors and depression was not supported ($B = -0.04$, $SE = 0.07$, $p = 0.50$, 95% CI: [-0.17, 0.08]). Results indicated that the interaction of college student COVID-19 stressors and distress disclosure on depression was not significant.

CHAPTER FIVE

DISCUSSION

The purpose of this study was to explore whether intrusive rumination, deliberate rumination, or distress disclosure would moderate the relationship between COVID-19 stressors and outcome variables such as posttraumatic growth (PTG) or depression.

Intrusive Rumination as a Moderator

Results of the analyses confirmed Hypothesis 1A, which stated intrusive rumination would moderate the relationship between COVID-19 stressors and PTG. For students who reported low levels of intrusive rumination, the association between COVID-19 stressors and PTG was positively significant. Conversely, for college students who reported higher levels of intrusive rumination, the association between COVID-19 stressors and PTG was not significant. Consistent with previous research, lower rates of intrusive rumination were associated with higher PTG after individuals had experienced a traumatic event (Ramos et al., 2017).

Results of the analyses did not confirm Hypothesis 1B, which stated intrusive rumination would moderate the relationship between COVID-19 stressors and depression. These results may indicate a more complex relationship among trauma (e.g., COVID-19 stressors), intrusive rumination, and depression. Research indicates both depression and intrusive rumination are multifaceted constructs and the relationship between them may not be easily captured through the simple moderation analysis used in the present study (Smith & Alloy, 2009). Consequently, there may be a third variable that is unaccounted for by the current study's analyses, such as negative cognitive style that may serve as another moderator in addition to intrusive rumination in the relationship between COVID-19 stressors on depression (Robinson & Alloy, 2003). A study on moderators of the development of depression indicated individuals who ruminate and

have negative cognitive styles, that is, they ruminate on the negative attributions or implications of a stressful event (e.g., a pandemic), are at increased risk for developing depression (Robinson & Alloy, 2003). It is likely the addition of negative cognitive styles to the model added to the predictive power to the moderation effects of rumination on depression. This would indicate a potential three-way interaction or moderated moderation (e.g., COVID-19 stressors x intrusive rumination x negative cognitive style on depression).

Deliberate Rumination as a Moderator

Results of the analyses did not confirm Hypothesis 2A, which stated deliberate rumination would moderate the relationship between the COVID-19 stressors and PTG. Results indicated deliberate rumination did not moderate the relationship between COVID-19 stressors and PTG. While deliberate rumination has been shown to be a predictor of PTG (Calhoun et al., 2010; Tedeschi & Moore, 2021), little is known about the stability of the relationship between deliberate rumination and PTG over time. Theoretical models show deliberate rumination to be a later factor in the development of PTG (Calhoun et al., 2010; Tedeschi & Moore, 2021). This study was conducted soon after the height of the COVID-19 pandemic and may not have allowed for enough time to pass to see deliberate rumination positively impact the relationship between COVID-19 stressor and PTG. Longitudinal research conducted by Zhou and Wu (2015) indicated the effects of deliberate rumination on PTG development are not consistent across time. Their results showed deliberate rumination at 3.5 years after the traumatic event (i.e., earthquake) did not predict PTG 4.5 years after the event; however, deliberate rumination at 4.5 years after the event was found to predict PTG 5.5 years after the event. Thus, later studies may want to replicate and extend the current analysis to establish stability of factors over time.

Results of the analyses did not confirm Hypothesis 2B, which stated deliberate rumination would moderate the relationship between the COVID-19 stressors and depression. Deliberate rumination did not moderate the relationship between COVID-19 stressors and depression. Research indicates deliberate rumination may act on depression in different or more complicated ways than were measured in the current study (Smith & Alloy, 2009). Therefore, perhaps a third variable, which is unaccounted for in the current study, such as self-efficacy (Xu et al., 2023), may serve as a moderator of deliberate rumination, indicating a moderated moderation model. In a study on undergraduate students experiencing stress from the COVID-19 pandemic, self-efficacy played a regulatory role in the association between deliberate rumination and PTG (Xu et al., 2023). Results indicated while students are experiencing deliberate rumination, those with higher self-efficacy (i.e., self-confidence, optimism) could achieve greater PTG (Xu et al., 2023). These results may indicate a more complex relationship between trauma, deliberate rumination, and depression (e.g., COVID-19 stressors x deliberate rumination x self-efficacy on depression).

Distress Disclosure as a Moderator

Results of the analyses confirmed Hypothesis 3A, which stated distress disclosure would moderate the relationship between the COVID-19 stressors and PTG. The analyses showed distress disclosure moderated the relationship between COVID-19 stressors and PTG. For students reporting high amounts of distress disclosure, there was a significant positive relationship between COVID-19 stressors and PTG. In other words, students who talked more about pandemic-related distress experienced more PTG when they were experiencing higher pandemic-related stress. These patterns were not seen among those who reported low disclosure of pandemic-related stress. Consistent with previous research, the current study showed those

with higher rates of distress disclosure experienced more PTG when compared to those with lower rates of distress disclosure (Freedle & Oliveira, 2021).

Results of the analyses did not confirm Hypothesis 3B, which stated distress disclosure would moderate the relationship between the COVID-19 stressors and depression. Distress disclosure did not moderate the relationship between COVID-19 stressors and depression. This suggests there may be a third variable that is unaccounted for by the current study's analyses, such as shame or interpersonal shame that may serve as another moderator in addition to distress disclosure in the relationship between COVID-19 stressors on depression (Keum et al., 2021). It is likely individuals with lower levels of shame when engaging in distress disclosure related to COVID-19 stressors may experience lower rates of depression. This would indicate a three-way interaction or moderated moderation (e.g., COVID-19 stressors x distress disclosure x shame on depression).

Contributions and Implications

The current study contributes to the current PTG theoretical literature by adding empirical evidence to the model of PTG where intrusive rumination and distress disclosure are key factors in the development of PTG after individuals experience trauma (Calhoun et al., 2010; Tedeschi & Moore, 2021). Specifically, the current study produced evidence that both intrusive rumination and distress disclosure have a moderating effect on the association between COVID-19 stressors and PTG.

This study also expands the knowledge on the role of deliberate rumination in PTG. Deliberate rumination is theorized to happen after the trauma and data for the current study was recruited in spring of 2023. While this was after the height of the pandemic restrictions, many restrictions related to the pandemic have only recently been lifted and many restrictions are still

in place (i.e., mask mandates, mandatory vaccines, etc.). There may not have been sufficient time to allow for deliberate rumination to impact PTG, since PTG models suggest deliberate rumination happens later in the PTG process (Calhoun et al., 2010; Tedeschi & Moore, 2021).

Many studies related to effects of the pandemic focus on negative outcomes of the collective trauma experienced worldwide, such as increases in anxiety, loneliness, hopelessness, helplessness, chronic stress, substance use, and domestic violence (Bhattacharjee & Ghosh, 2021). The current study highlights positive effects of enduring negative or traumatic events. Positive and negative psychological outcomes can occur simultaneously, and are not mutually exclusive experiences (Taku et al., 2008; Taku et al., 2021). The results of the current study indicated that we should not over-emphasize either the positive or the negative outcomes of traumatic events (Linley & Joseph, 2004). In focusing on either the subsequent pathologies or growth, we may be biased in understanding the experience of traumatic events.

Clinical Implications

The results of the current study also provide practical implications for clinicians that may assist clinicians in facilitating growth after client experiences of trauma. Specifically, it provides evidence that when individuals increase the amount of distress disclosure they engage in, they are more likely to experience greater PTG in the face of COVID-19 stressors. This study also provides evidence that decreasing the amount of intrusive rumination an individual is engaging in is helpful for the development of PTG when one encounters COVID-19 stressors.

Overall, clinical interventions should be based on where each individual is in the process of PTG (Tedeschi & Moore, 2021). The results highlight the importance of interpersonal relationships in the process of growth after a traumatic experience. It was found that when experiencing COVID-19 stressors, college students who reported higher levels of distress

disclosure also experienced higher amounts of PTG when compared to those who had lower levels of distress disclosure. This practice of engaging with one's social supports (i.e., friends, family, community members, therapists, etc.) to elicit positive growth is an interpersonal process. Other research has reported similar findings, that is, the process of growth involves the disclosure of distress (Freedle & Oliveria, 2021; Levi-Belz, 2019). The tendency to disclose distressing events has been associated with greater levels of global PTG, and specifically higher ratings on the Relating to Others subscale (Freedle & Oliveria, 2021). This subscale focuses on an individual's experiences in their relationships with others. These results add empirical support to the theory of PTG, suggesting individuals may experience more intimate and meaningful relationships as part of their PTG (Tedeschi & Calhoun, 2004). Clinicians can help by providing psychoeducation designed to assist clients in acquiring social support and gain perspective on the situation they are experiencing (Levi-Belz, 2019). Clinical interventions should foster social interactions that allow an individual to discuss distress they are experiencing (Tedeschi & Moore, 2021). This might be orchestrated in the clinical setting through in-person or virtual group therapy interventions (Lai et al., 2021). Clinicians may also choose to work on distress disclosure in session through clinician-assisted emotional disclosure or journal writing exercises (Keefe et al., 2008). Other psychotherapy approaches, such as the expert companionship approach (Tedeschi & Moore, 2021) or written emotional disclosure protocols (Radcliffe et al., 2007), have been shown to be helpful alternatives or additions to traditional distress disclosure to social supports if those positive social supports are not available.

The present study provided evidence that decreasing intrusive rumination would help the individual develop higher levels of PTG in the face of COVID-19 stressors. Clinical interventions designed to promote positive outcomes for individuals who have experienced

trauma should focus on mitigating intrusive rumination. It is likely that cognitive behavioral therapies with interventions targeted at reducing intrusive rumination and mindfulness-based therapies may be helpful in teaching clients how to decrease frequency and severity of negative cognitions such as intrusive rumination (Wang et al., 2021).

Limitations and Future Research Directions

The results and conclusions of the current study should be interpreted while understanding several limitations. One significant limitation is the size of the sample. If the study had included more participants, small effect sizes would more likely be detected. Other limitations of this study include self-selection bias and the type of questionnaires that were used. College students interested in the topic of this study were more likely to participate, naturally creating a bias that should be considered when interpreting and generalizing conclusions. Similarly, self-report questionnaires are often used to collect data; however, the results may be influenced by participant bias, which can impact the study factors (Levi-Belz, 2019). Future studies may want to include qualitative elements that can answer more questions about the individual's lived experience in growing from the adversity of the pandemic. Data was collected from only one university, possibly limiting the generalizability of the results. Future research should include multiple universities in various areas of the country in order to collect a sample more representative of the college student population.

PTG and depression are separate factors that can exist in a person simultaneously, meaning growth and distress are not mutually exclusive (Linley & Joseph, 2004; Taku et al., 2008; Taku et al., 2021); therefore, the moderation factors are not likely to interact with both factors in the same way. The moderators were chosen from the PTG literature (Tedeschi & Moore, 2021), not the depression literature or theories about mechanism of action in depression.

While the moderators were shown to be related to depression, how the factors interact with depression is likely through a different mechanism of action (Smith & Alloy, 2009). Future studies should make sure to choose factors explaining depression from the depression literature and theories. Lastly, data for this study was collected in spring of 2023. The process of PTG takes time to take place, and some changes in lifestyles and government policies are still in effect (e.g., travel restrictions, mask wearing, vaccine mandates, etc.). Therefore, more time might need to pass before more significant effects of deliberate rumination on PTG to be detected (Zhou & Wu, 2015). Future studies would benefit from looking at longitudinal data (Levi-Belz, 2019) in order to further investigate the timeline of growth after individuals or groups of people experience a collective trauma (i.e., natural disaster, pandemic).

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traumatic growth of college students during the COVID-19 pandemic and the moderating role of self-efficacy. *Frontiers in Public Health*, 11.

<https://doi.org/10.3389/fpubh.2023.1043402>

Yang, C., Chen, A., & Chen, Y. (2021). College students' stress and health in the COVID-19

pandemic: The role of academic workload, separation from school, and fears of contagion. *PLOS ONE*, 16(2), e0246676. <https://doi.org/10.1371/journal.pone.0246676>

Yang, Z., Ji, L. J., Yang, Y., Wang, Y., Zhu, L., & Cai, H. (2021). Meaning making helps cope

with COVID-19: A longitudinal study. *Personality and Individual Differences*, 174, 110670. <https://doi.org/10.1016/j.paid.2021.110670>

- Zeng, W., Zeng, Y., Xu, Y., Huang, D., Shao, J., Wu, J., & Wu, X. (2021). The influence of post-traumatic growth on college students' creativity during the COVID-19 pandemic: The mediating role of general self-efficacy and the moderating role of deliberate rumination. *Frontiers in Psychology, 12*. <https://doi.org/10.3389/fpsyg.2021.665973>
- Zhou, X., & Wu, X. (2015). Longitudinal relationships between gratitude, deliberate rumination, and posttraumatic growth in adolescents following the Wenchuan earthquake in China. *Scandinavian Journal of Psychology, 56*(5), 567–572. <https://doi.org/10.1111/sjop.12237>

Appendix A: Measures**Demographic Information**

- 1) Age: ___ years
- 2) Sex
 - a. Male
 - b. Female
 - c. Non-binary
 - d. Other _____
- 3) Ethnicity
 - a. Asian or Asian American
 - b. Latino/a or Hispanic
 - c. Alaska Native or American Indian
 - d. Middle Eastern or North African
 - e. Black or African American
 - f. White/Caucasian or European American
 - g. Native Hawaiian or Pacific Islander
 - h. Bi-racial or multi-racial
 - i. Other _____
- 4) Sexual orientation
 - a. Heterosexual/Straight
 - b. Gay/Lesbian/Same-Gender
 - c. Bisexual
 - d. Other _____
- 5) Year in college
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. 5th year senior
 - f. Other _____
- 6) Relationship status
 - a. Single (never married)
 - b. In a domestic partnership
 - c. Married
 - d. Widowed
 - e. Separated
 - f. Divorced
- 7) Are you a first-generation college student (the first member of your family to ever attend college)?
 - a. Yes
 - b. No
- 8) Where were you living during the beginning of the pandemic?
 - a. In campus housing
 - b. Off campus alone
 - c. Off campus with peers or roommates
 - d. Off campus with significant other
 - e. Off campus with parents

COVID-19 Stressors Scale

During the ongoing COVID-19 pandemic, people may encounter many different kinds of stressors. Please indicate the degree to which you have experienced each of the events below in the past YEAR. You will also be asked to rate how stressful you found each event.

0	1	2	3	4	5
I have <i>not</i> experienced this in the past year	Yes, I have experienced this, and it was <i>not at all stressful</i>	Yes, I have experienced this, and it was <i>slightly stressful</i>	Yes, I have experienced this, and it was <i>moderately stressful</i>	Yes, I have experienced this, and it was <i>very stressful</i>	Yes, I have experienced this and <i>extremely stressful</i>

- 1) Risk of becoming infected
- 2) Self-monitoring of symptoms
- 3) Risk of loved ones becoming infected
- 4) Risk of unintentionally infecting other people
- 5) Reading about or hearing others talk about severity and contagiousness of COVID-19
- 6) Stigma, shame, discrimination, or social exile related to quarantine or working in a high-risk area (e.g., others shunning you because you work in healthcare)
- 7) Stigma, shame, or discrimination related to being in a certain age group (e.g., negative statements about Millennials or Generation Z).
- 8) Uncertainty about how long quarantine and/or social distancing requirements will last
- 9) Changes to daily personal care routine (e.g., cooking, cleaning, exercise/relaxation, hobbies)
- 10) Changes to daily work routine (e.g., unable to earn money attend full- or part-time work schedule)
- 11) Changes to daily education routine (e.g., online instruction)
- 12) Changes to social routine (e.g., spending free time with friends/loved ones)
- 13) Changed responsibilities to care for dependents (e.g., childcare, eldercare)
- 14) Cancellation of planned or scheduled celebrations, entertainment, vacations or trips (e.g., graduations, birthdays, concerts)
- 15) Cancellation of meaningful personal or religious rituals (e.g., funerals, religious services)
- 16) Inability to travel (e.g., cancellation of vacations, weekend trips)
- 17) Increased contact with close others or loved ones
- 18) Pressure to “make the most of” COVID-19 or “find a silver lining” while quarantining (e.g., social media fitness challenges; encouragement to increase productivity)
- 19) Loss of current job security or income (e.g., inability to earn money)
- 20) Loss of current job training opportunities or education benchmarks (e.g., certification, apprenticeship, internship or degree completion)
- 21) Potential changes to the national or global economy (e.g., future job prospects, loss of investments)
- 22) Difficulty accessing important resources for daily life (e.g., healthcare, food, clothes, water, housing, medical supplies or prescriptions)
- 23) Inadequate access to reliable information about COVID-19 (including your personal risk of illness)

References:

- Park, C. L., Russell, B. S., Fendrich, M., Finkelstein-Fox, L., Hutchison, M., & Becker, J. (2020). Americans' COVID-19 stress, coping, and adherence to CDC guidelines. *Journal of General Internal Medicine*, 35(8), 2296–2303. <https://doi.org/10.1007/s11606-020-05898-9>
- Tambling, R. R., Russell, B. S., Park, C. L., Fendrich, M., Hutchinson, M., Horton, A. L., & Tomkunas, A. J. (2020). Measuring Cumulative Stressfulness: Psychometric Properties of the COVID-19 Stressors Scale. *Health Education & Behavior*, 48(1), 20–28. <https://doi.org/10.1177/1090198120979912>

Event Related Rumination Inventory (ERRI)

As a result of COVID-19 pandemic, people sometimes, but not always, find themselves having thoughts about their experience even though they don't try to think about it. Indicate for the following items how often, if at all, you had the experiences described during the weeks immediately after the event.

0	1	2	3
Not at all	Rarely	Sometimes	Often

- 1) I thought about the event when I did not mean to.
- 2) Thoughts about the event came to mind and I could not stop thinking about them.
- 3) Thoughts about the event distracted me or kept me from being able to concentrate.
- 4) I could not keep images or thoughts about the event from entering my mind.
- 5) Thoughts, memories, or images of the event came to mind even when I did not want them.
- 6) Thoughts about the event caused me to relive my experience.
- 7) Reminders of the event brought back thoughts about my experience.
- 8) I found myself automatically thinking about what had happened.
- 9) Other things kept leading me to think about my experience.
- 10) I tried not to think about the event, but could not keep the thoughts from my mind.

As a result of COVID-19 pandemic, people sometimes, but not always, deliberately and intentionally spend time thinking about their experience. Indicate for the following items how often, if at all, you deliberately spent time thinking about the issues indicated during the weeks immediately after the event.

0	1	2	3
Not at all	Rarely	Sometimes	Often

- 1) I thought about whether I could find meaning from my experience.
- 2) I thought about whether changes in my life have come from dealing with my experience.
- 3) I forced myself to think about my feelings about my experience.
- 4) I thought about whether I have learned anything as a result of my experience.
- 5) I thought about whether the experience has changed my beliefs about the world.
- 6) I thought about what the experience might mean for my future.
- 7) I thought about whether my relationships with others have changed following my experience.
- 8) I forced myself to deal with my feelings about the event.
- 9) I deliberately thought about how the event had affected me.
- 10) I thought about the event and tried to understand what happened.
- 11) This is a test item, please mark 3 for the answer.

References:

Cann, A., Calhoun, L. G., Tedeschi, R. G., Triplett, K. N., Vishnevsky, T., & Lindstrom, C. M. (2011). Assessing posttraumatic cognitive processes: the Event Related Rumination Inventory. *Anxiety, Stress & Coping, 24*(2), 137–156. <https://doi.org/10.1080/10615806.2010.529901>

Distress Disclosure Index (DDI)

Please read each statement carefully. For each statement indicate the appropriate number.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

1. When I feel upset I usually confide in my friends.
2. I prefer not to talk about my problems.
3. When something unpleasant happens to me, I often look for someone to talk to.
4. I typically don't discuss things that upset me.
5. When I feel depressed or sad, I tend to keep those feelings to myself.
6. I try to find people to talk with about my problems.
7. When I am in a bad mood, I talk about it to my friends.
8. If I have a bad day, the last thing I want to do is talk about it.
9. I rarely look for people to talk to when I am having problems.
10. When I am distressed I don't tell anyone.
11. I usually seek out someone to talk to when I am in a bad mood.
12. I am willing to tell others my distressing thoughts.

References:

Kahn, J. H., & Hessling, R. M. (2001). Measuring the Tendency to Conceal Versus Disclose Psychological Distress. *Journal of Social and Clinical Psychology, 20*(1), 41–65.

Post Traumatic Growth Inventory

Indicate for each of the statements below the degree to which this change occurred in your life as a result of the COVID-19 pandemic, using the following scale.

0	1	2	3	4	5
I did not experience this change as a result of my crisis.	I experienced this change to a very small degree as a result of my crisis.	I experienced this change to a small degree as a result of my crisis.	I experienced this change to a moderate degree as a result of my crisis.	I experienced this change to a great degree as a result of my crisis.	I experienced this change to a very great degree as a result of my crisis.

1. I changed my priorities about what is important in life.
2. I have a greater appreciation for the value of my own life.
3. I developed new interests.
4. I have a greater feeling of self-reliance.
5. I have a better understanding of spiritual matters.
6. I more clearly see that I can count on people in times of trouble.
7. I established a new path for my life.
8. I have a greater sense of closeness with others.
9. I am more willing to express my emotions.
10. I know better that I can handle difficulties.
11. I am able to do better things with my life.
12. I am better able to accept the way things work out.
13. I can better appreciate each day.
14. New opportunities are available which wouldn't have been otherwise.
15. I have more compassion for others.
16. I put more effort into my relationships.
17. I am more likely to try to change things which need changing.
18. I have a stronger religious faith.
19. I discovered that I'm stronger than I thought I was.
20. I learned a great deal about how wonderful people are.
21. I better accept needing others.

References:

Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*(3), 455–471.
<https://doi.org/10.1002/jts.2490090305>

Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10)

Below is a list of the ways you might have felt or behaved. Please indicate how often you have felt this way during the past week.

0	1	2	3
Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)

1. I was bothered by things that usually don't bother me.
2. I had trouble keeping my mind on what I was doing.
3. I felt depressed.
4. I felt that everything I did was an effort.
5. I felt hopeful about the future.
6. I felt fearful.
7. My sleep was restless.
8. I was happy.
9. I felt lonely.
10. I could not "get going."

References:

- Björgvinsson, T., Kertz, S.J., Bigda-Peyton, J.S., McCoy, K.L., Aderka, I.M. (2013). Psychometric properties of the CES-D-10 in a psychiatric sample. *Assessment, 20*, 429-436.
- Miller, W.C., Anton, H.A., Townson, A. F. (2008). Measurement properties of the CESD scale among individuals with spinal cord injury. *Spinal Cord, 46*, 287-292.
- Radloff, L. S. (1977). CES-D scale: A self report depression scale for research in the general populations. *Applied Psychological Measurement, 1*, 385-401.

Appendix B: SONA Consent – Cover Letter

You are invited to participate in a research survey, entitled “COVID-19 Stressors, Posttraumatic Growth, and Depression: The Roles of Rumination and Distress Disclosure.” The study is being conducted by Emily Siebach, M.S., esiebach@radford.edu and Dr. Pei-Chun Tsai, ptsai3@radford.edu in the Psychology Department of Radford University, 801 E. Main St Radford, VA, 24142.

The purpose of this study is to examine the hypotheses that persistent, negative thoughts (i.e., intrusive rumination), purposeful thinking (i.e., deliberate rumination), and talking to others about hardships (i.e., distress disclosure) moderate the relationship between COVID-19 stressors and psychological outcomes for college students.

Eligible participants need to be 18 years old or older college students. We estimate that it will take about 15-25 minutes of your time to complete the questionnaire.

Your participation in this survey is completely voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time without penalty. Risks to participants are considered minimal. A limited number of research team members will have access to the data during data collection. You will not be monetarily compensated for participating in the study. However, you will receive one research credit toward your psychology class for participating in this study. IP addresses will not be recorded.

You may contact the principal student researcher, Emily Siebach, M.S. via email (esiebach@radford.edu) to discuss any questions you may have regarding the questionnaire. You can request a copy of the consent form from Emily Siebach.

This study was approved by the Radford University Committee for the Review of Human Subjects Research. If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Jeanne Mekolichick, Institutional Official and Associate Provost for Research, Faculty Success, and Strategic Initiatives, Radford University, jmekolic@radford.edu, 540-831-6504.

If you agree to participate, please press the arrow button at the bottom right of the screen. Otherwise, use the X at the upper right corner to close this window and disconnect.

Thank you.

Appendix C: Non-SONA Consent – Cover Letter

You are invited to participate in a research survey, entitled “COVID-19 Stressors, Posttraumatic Growth, and Depression: The Roles of Rumination and Distress Disclosure.” The study is being conducted by Emily Siebach, M.S., esiebach@radford.edu and Dr. Pei-Chun Tsai, ptsai3@radford.edu in the Psychology Department of Radford University, 801 E. Main St Radford, VA, 24142.

The purpose of this study is to examine the hypotheses that persistent, negative thoughts (i.e., intrusive rumination), purposeful thinking (i.e., deliberate rumination), and talking to others about hardships (i.e., distress disclosure) moderate the relationship between COVID-19 stressors and psychological outcomes for college students.

Eligible participants need to be 18 years old or older college students. We estimate that it will take about 15-25 minutes of your time to complete the questionnaire.

Your participation in this survey is completely voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time without penalty. Risks to participants are considered minimal. A limited number of research team members will have access to the data during data collection. At the end of the survey, you will choose whether you would like to be entered into a drawing to win one of five, \$20 Amazon gift cards. An online generator will be used by the researcher to randomly select a winner. If 200 participants use the Qualtrics link, the odds of winning the drawing are 5%. If you would like to be entered into the drawing, there will be a separate Qualtrics link provided so your name and email address are not connected to your responses on the survey. Whether or not you choose to be in the drawing, your IP addresses will not be recorded.

You may contact the principal student researcher, Emily Siebach, M.S. via email (esiebach@radford.edu) to discuss any questions you may have regarding the questionnaire. You can request a copy of the consent form from Emily Siebach.

This study was approved by the Radford University Committee for the Review of Human Subjects Research. If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Jeanne Mekolichick, Institutional Official and Associate Provost for Research, Faculty Success, and Strategic Initiatives, Radford University, jmekolic@radford.edu, 540-831-6504.

If you agree to participate, please press the arrow button at the bottom right of the screen. Otherwise, use the X at the upper right corner to close this window and disconnect.

Thank you.

Appendix D: SONA Debriefing Form

Thank you for your participation. The study you just participated in was designed to better understand the roles of thinking deeply or repeatedly (i.e., rumination) and talking to others about their hardships (i.e., distress disclosure) in the relationships between COVID-19 stressors and personal growth after going through hard things (i.e., posttraumatic growth) and depression among college students.

If you have questions, you may contact the student researcher, Emily Siebach, via email at esiebach@radford.edu. If participation in this research study raised personal issues for you that you would like to talk about, please contact the Radford University Student Counseling Services, Tyler Hall, Lower Level, 540-831-5226 or call the National Suicide Prevention Lifeline at 1-800-273-8255. If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Jeanne Mekolichick, Institutional Official and Associate Provost for Research, Faculty Success, and Strategic Initiatives, Radford University, jmekolic@radford.edu, 540-831-6504.

Appendix E: Non-SONA Debriefing Form

Thank you for your participation. The study you just participated in was designed to better understand the roles of thinking deeply or repeatedly (i.e., rumination) and talking to others about their hardships (i.e., distress disclosure) in the relationships between COVID-19 stressors and personal growth after going through hard things (i.e., posttraumatic growth) and depression among college students.

If you have questions, you may contact the student researcher, Emily Siebach, via email at esiebach@radford.edu. If participation in this research study raised personal issues for you that you would like to talk about, please contact the Radford University Student Counseling Services, Tyler Hall, Lower Level, 540-831-5226 or call the National Suicide Prevention Lifeline at 1-800-273-8255. If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Jeanne Mekolichick, Institutional Official and Associate Provost for Research, Faculty Success, and Strategic Initiatives, Radford University, jmekolic@radford.edu, 540-831-6504.

If you would like to exit the survey without entering the drawing, you may close this browser at any time.

If you would like to be entered into a drawing to win one of five, \$20 Amazon gift cards, please click the link below:

[*Drawing link*](#)

After clicking the link, participants who wish to be in the drawing will be prompted:

Please enter your name and an email address where a \$20 Amazon gift card can be sent to you if you are a winner.

Name: _____

Email address: _____

Appendix F: SONA Recruitment Script

Greetings!

My name is Emily Siebach., a PsyD counseling psychology student at Radford University. I am conducting my dissertation research related to your experience with COVID-19, supervised by Dr. Pei-Chun Tsai. Please consider taking 15-25 minutes to filling out my dissertation research survey. Your participation in this survey is completely voluntary. You will not be monetarily compensated for participating in the study. However, you will receive one research credit toward your psychology class for participating in this study. IP addresses will not be recorded.

I invite you to participate in my research if you are (a) at least 18 years old, and (b) currently as a college student at Radford University.

If you are interested in this study, please access it through the SONA system.

This study has been approved by the Radford University Committee for the Review of Human Subjects Research (IRB# xxxxxx) and they can be reached at irb-iacuc@radford.edu. If you have questions about this research, feel free to contact me (esiebach@radford.edu) or Dr. Pei-Chun Tsai (ptsai3@radford.edu).

Your help is greatly appreciated.

Appendix G: Non-SONA Recruitment Script

Greetings!

My name is Emily Siebach., a PsyD counseling psychology student at Radford University. I am conducting my dissertation research related to your experience with COVID-19, supervised by Dr. Pei-Chun Tsai. Please consider taking 15-25 minutes to filling out my dissertation research survey. Your participation in this survey is completely voluntary. After completing the survey, you can voluntarily enter into a raffle for a chance to win one of five \$20 Amazon gift cards. Whether or not you choose to be in the drawing, your IP addresses will not be recorded.

I invite you to participate in my research if you are (a) at least 18 years old, and (b) currently as a college student at Radford University.

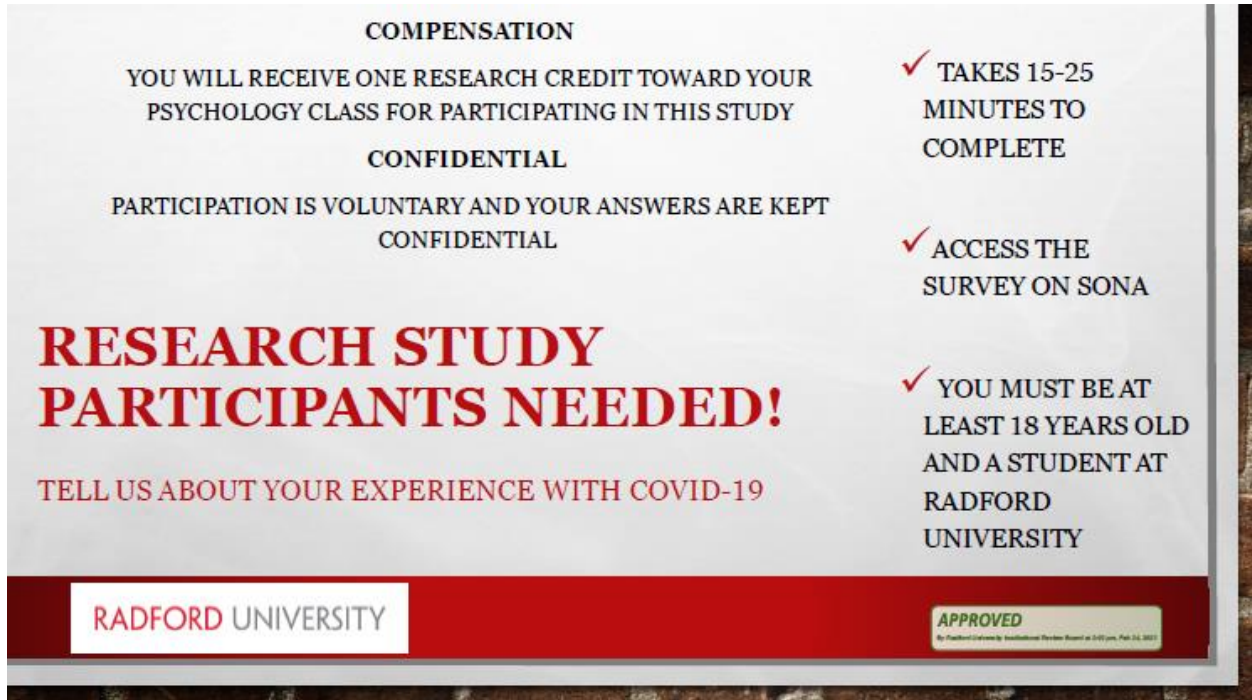
If you are interested in this study, please click the link below:

xxxxxx
QR code

This study has been approved by the Radford University Committee for the Review of Human Subjects Research (IRB# 2013-017) and they can be reached at irb-iacuc@radford.edu. If you have questions about this research, feel free to contact me (esiebach@radford.edu) or Dr. Pei-Chun Tsai (ptsai3@radford.edu).

Your help is greatly appreciated.

Appendix H: SONA Recruitment Flyer



The flyer is a rectangular graphic with a light gray background and a dark red footer. It contains text about a research study, including compensation, confidentiality, and eligibility requirements. A large red headline reads 'RESEARCH STUDY PARTICIPANTS NEEDED!'. A red banner at the bottom contains the Radford University logo and an 'APPROVED' stamp.

COMPENSATION
YOU WILL RECEIVE ONE RESEARCH CREDIT TOWARD YOUR PSYCHOLOGY CLASS FOR PARTICIPATING IN THIS STUDY

CONFIDENTIAL
PARTICIPATION IS VOLUNTARY AND YOUR ANSWERS ARE KEPT CONFIDENTIAL

RESEARCH STUDY PARTICIPANTS NEEDED!

TELL US ABOUT YOUR EXPERIENCE WITH COVID-19

- ✓ TAKES 15-25 MINUTES TO COMPLETE
- ✓ ACCESS THE SURVEY ON SONA
- ✓ YOU MUST BE AT LEAST 18 YEARS OLD AND A STUDENT AT RADFORD UNIVERSITY

RADFORD UNIVERSITY

APPROVED
By Radford University Institutional Review Board on 1/17/2020, Page 2/4, 2020

Appendix I: Non-SONA Recruitment Flyer

QR CODE

Compensation
You can choose to be entered into a drawing to win one of five \$20 Amazon gift cards

Confidential
Participation is voluntary and your answers are kept confidential

RADFORD UNIVERSITY

RESEARCH STUDY PARTICIPANTS NEEDED!

Tell us about your experience with COVID-19

- ✓ Takes 15-25 minutes to complete
- ✓ You must be at least 18 years old and a student at Radford University

URL for Qualtrics survey

APPROVED
By Radford University Institutional Review Board on 1/10/2020, Page 26, 2020

Figures

Figure 1

The Conceptual Model for the Moderation Hypothesis: The Association Between the COVID-19 Stressors and Posttraumatic Growth at High Versus Low Levels of Intrusive Rumination

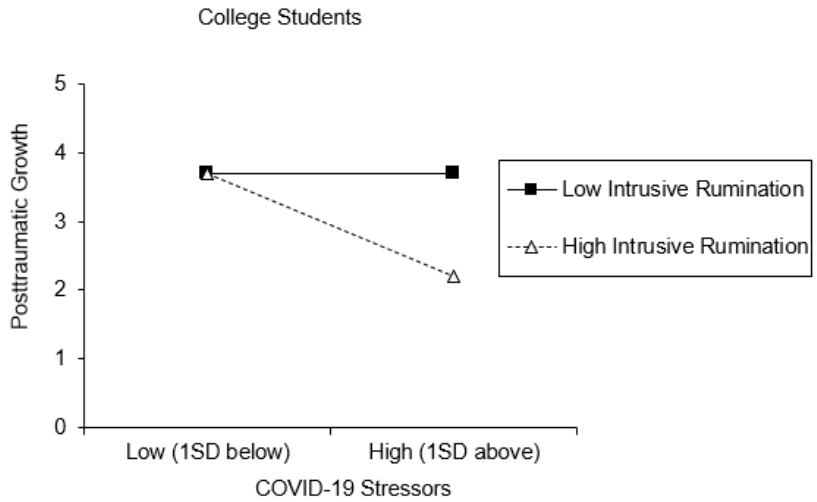


Figure 2

The Conceptual Model for the Moderation Hypothesis: The Association Between the COVID-19 Stressors and Depression at High Versus Low Levels of Intrusive Rumination

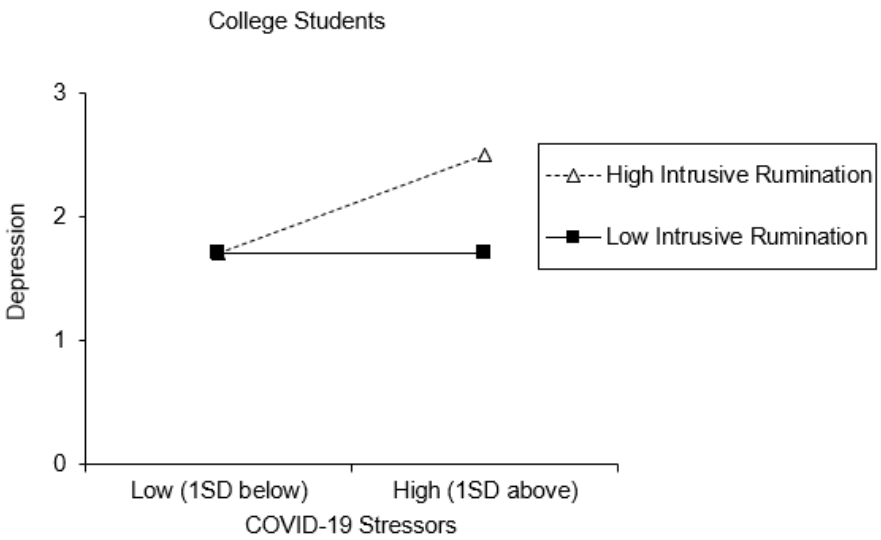


Figure 3

The Conceptual Model for the Moderation Hypothesis: The Association Between the COVID-19 Stressors and Posttraumatic Growth at High Versus Low Levels of Deliberate Rumination

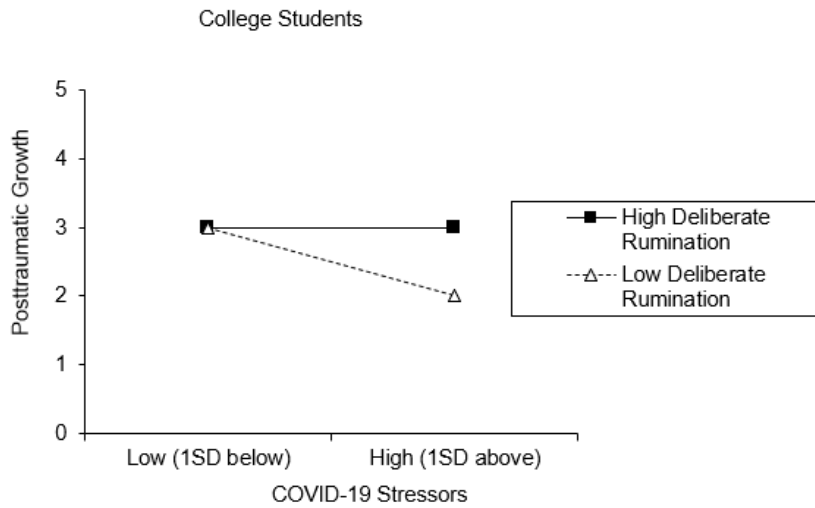


Figure 4

The Conceptual Model for the Moderation Hypothesis: The Association Between the COVID-19 Stressors and Depression at High Versus Low Levels of Deliberate Rumination

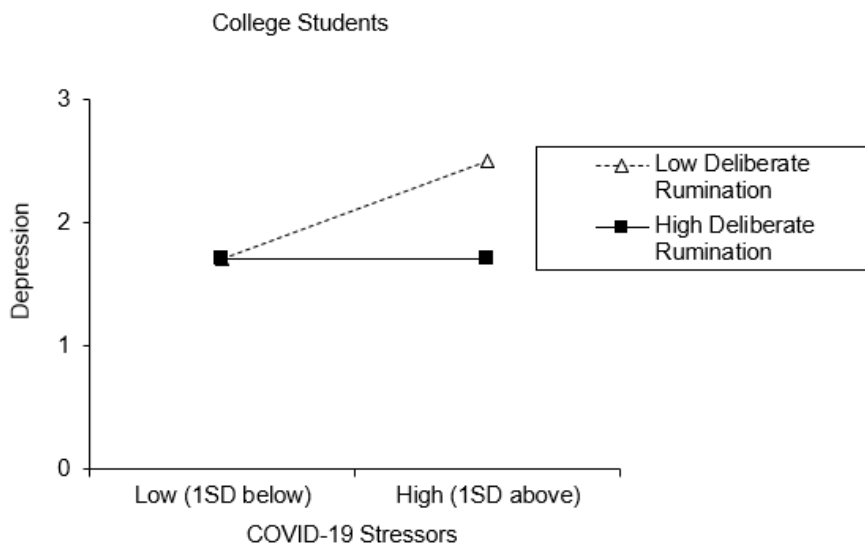


Figure 5

The Conceptual Model for the Moderation Hypothesis: The Association Between the COVID-19 Stressors and Posttraumatic Growth at High Versus Low Levels of Distress Disclosure

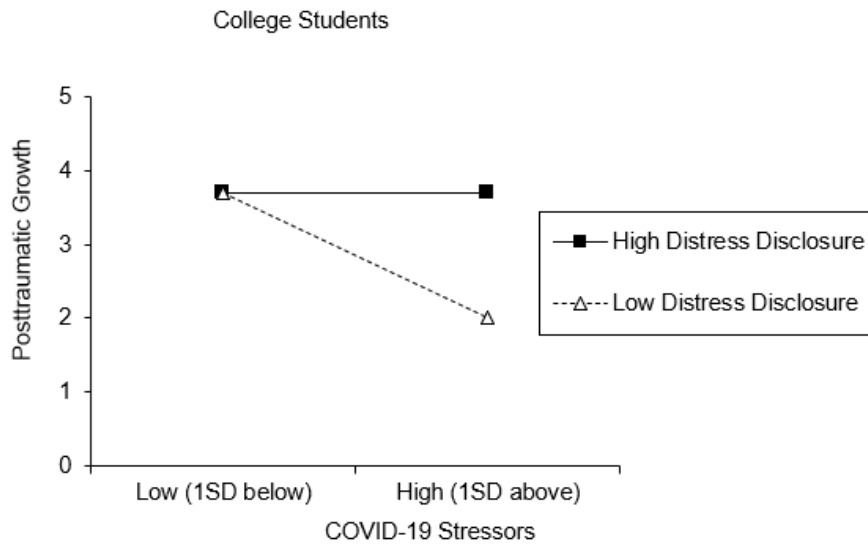


Figure 6

The Conceptual Model for the Moderation Hypothesis: The Association Between the COVID-19 Stressors and Depression at High Versus Low Levels of Distress Disclosure

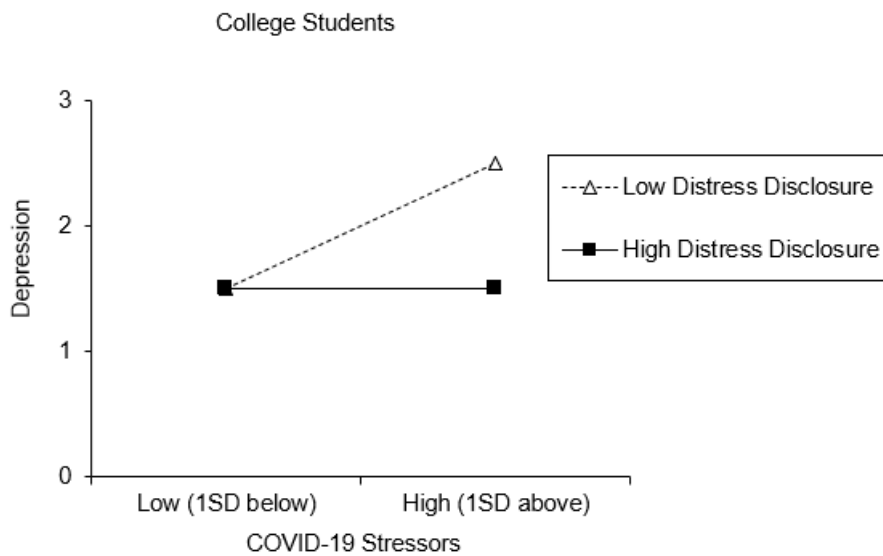


Figure 7

The Conceptual Model for Hypotheses H1a, H2a, and H3a in which PTG is the Outcome

Variable

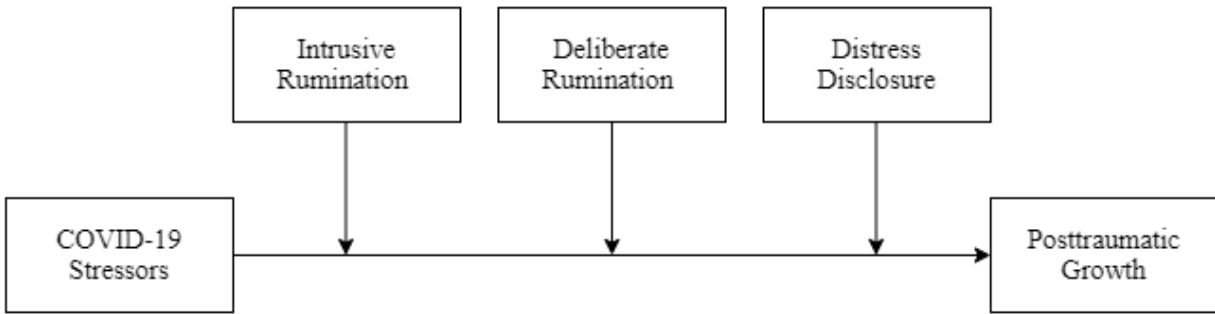


Figure 8

The Conceptual Model for Hypotheses H1a, H2a, and H3a in which Depression is the Outcome

Variable

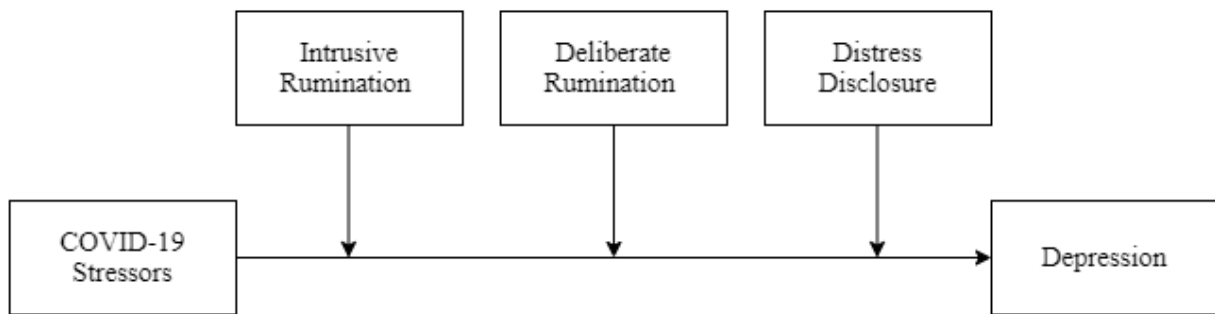


Figure 9

The Relationship Between COVID-19 Stressors and PTG at High Versus Low Levels of Intrusive Rumination

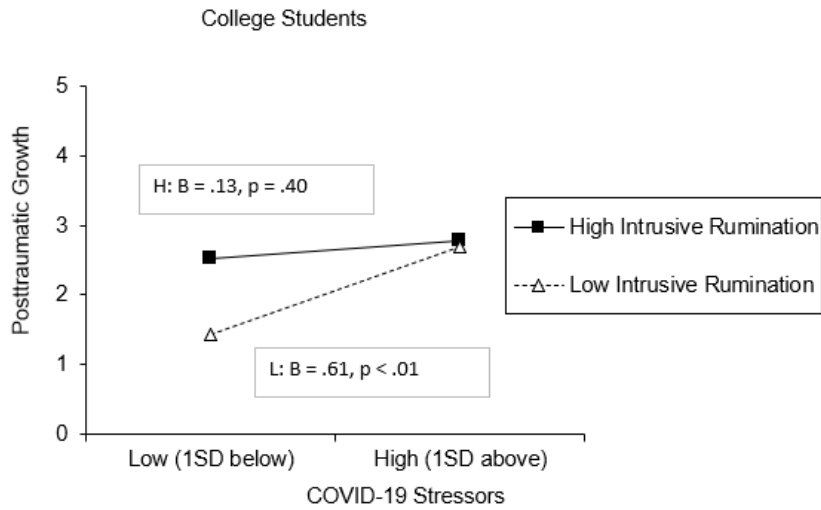
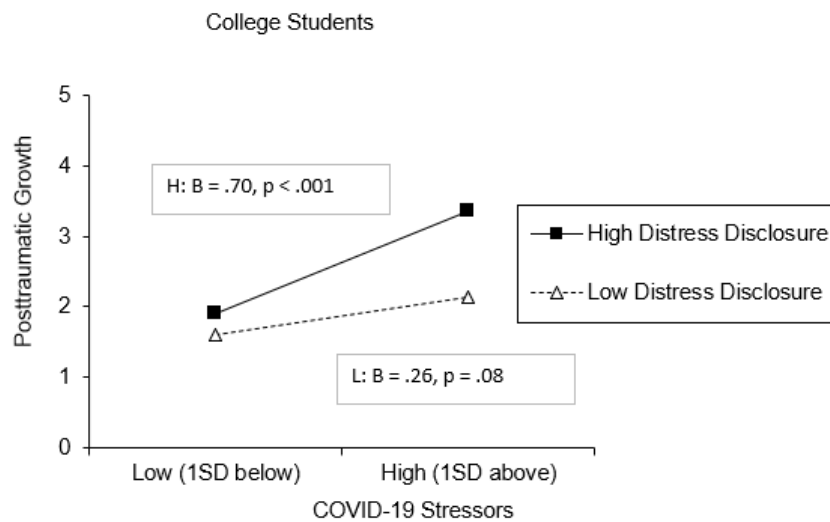


Figure 10

The Relationship Between COVID-19 Stressors and PTG at High Versus Low Levels of Distress Disclosure



Tables

Table 1

Participant Demographic Information

Variable	<i>n</i>	%
Gender Identity		
Female	86	77.5%
Male	18	16.2%
Non-binary	6	5.4%
Other ^a	1	0.9%
Sexual Orientation		
Heterosexual	72	64.9%
Bisexual	25	22.5%
Gay/Lesbian	9	8.1%
Other ^b	5	4.5%
Race/Ethnicity		
Caucasian/White	82	73.9%
Black/African American	11	9.9%
Latino/a or Hispanic	6	5.4%
Bi- or Multi-racial	4	3.6%
Asian/Asian American	3	2.7%
Alaska Native/Native American	2	1.8%
Native Hawaiian/Pacific Islander	1	0.9%
Other ^c	2	1.8%
Year in Program		
Freshmen	51	45.9%
Sophomore	21	18.9%
Junior	20	18%
Senior	17	15.3%
5th year senior	1	0.9%
Other ^d	1	0.9%
Relationship Status		
Single	85	76.6%
In a domestic partnership	24	21.6%
Married	2	1.8%
Housing Situation		
Off campus with parents	87	78.4%
Campus housing	17	15.3%
Off campus with peers or roommates	4	3.6%
Off campus with significant other	2	1.8%
Off campus alone	1	0.9%
1st Generation College Student Status		
1 st Generation	41	36.9%
Not 1 st Generation	70	63.1%
SONA vs. Non-SONA		
SONA	90	81.1%
Non-SONA	21	18.9%

^aParticipants responding “Other” to gender identity did not indicate their gender identity.

^bParticipants responding “Other” to sexual orientation indicated “curious”, pansexual, or asexual

^cParticipants responding “Other” to race/ethnicity indicated mixed race heritage.

^dParticipants responding “Other” to year in program indicated transfer student status.

Table 2*Means, Standard Deviations, and Correlations of the Main Variables*

	1	2	3	4	5	6
1. COVID	-----					
2. ERRI-I	.45***	-----				
3. ERRI-D	.39***	.63***	-----			
4. PTGI	.35***	.32**	.55***	-----		
5. DDI	.03	.04	.07	.27**	-----	
6. CESD-10	.23*	.39***	.30**	-.01	-.27**	-----
<i>Mean</i>	1.91	1.23	1.63	2.25	2.87	1.45
<i>SD</i>	1.04	.80	.77	1.35	.85	.65
<i>α</i>	.94	.95	.93	.91	.97	.84

Note. $N = 111$. COVID = COVID -19 Stressors Scale; ERRI-I= Event Related Rumination Inventory- intrusive rumination subscale; ERRI-D= Event Related Rumination Inventory- deliberate rumination subscale; DDI= Distress Disclosure Index; PTGI= Posttraumatic Growth Inventory; CESD-10= Center for Epidemiologic Studies Depression Scale Revised.

* $p < .05$, ** $p < .01$, *** $p < .001$