



Psychosocial correlates of posttraumatic growth among U.S. young adults during the COVID-19 pandemic

Sunah Hyun^{a,b}, Ga Tin Finneas Wong^a, Nomi C. Levy-Carrick^c, Linda Charmaraman^d, Yvette Cozier^e, Tiffany Yip^f, Hyeouk “Chris” Hahm^g, Cindy H. Liu^{a,b,c,*}

^a Department of Newborn Medicine, Brigham and Women's Hospital, Boston, MA, USA

^b Harvard Medical School, Boston, MA, USA

^c Department of Psychiatry, Brigham and Women's Hospital, Boston, MA, USA

^d Wellesley Centers for Women, Wellesley College, Wellesley, MA, USA

^e School of Public Health, Boston University, Boston, MA, USA

^f Psychology Department, Fordham University, Bronx, NY, USA

^g School of Social Work, Boston University, Boston, MA, USA

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ABSTRACT

Given the prolonged nature of the COVID-19 pandemic, the purpose of this study was to examine the association between posttraumatic growth (PTG) among young adults during the COVID-19 pandemic and their psychosocial characteristics, specifically: distress tolerance; resilience; family connectedness; depression, anxiety, and PTSD symptoms; and COVID-19-related worry. The study utilized data from 805 U.S. young adults (18–30 years) who completed online surveys during the COVID-19 pandemic across two waves (April–August 2020 and September 2020–March 2021). Overall, young adults reported low PTG scores. PTSD symptoms and COVID-19-related worry significantly predicted higher levels of PTG, while their depression symptoms predicted lower levels of PTG. Resilience and family connectedness significantly predicted higher levels of PTG, and distress tolerance significantly predicted lower levels of PTG after accounting for sociodemographic characteristics and negative influential factors. Compared to Whites, Asians were less likely to report PTG. In general, young adults have not perceived personal growth from the pandemic; however, young adults with certain psychosocial factors appear to be predisposed to such PTG. This study highlights the importance of exploring and elucidating the potential positive trajectories following the adversity of the COVID-19 pandemic.

1. Introduction

On March 11, 2020, the World Health Organization (WHO) declared the emergence of the COVID-19 pandemic. The lives of millions worldwide have faced unprecedented changes, with individuals confronted by the loss of life and of routines. For young adults, these changes have included the transition to remote school and work. For college students, the need to relocate from campus has been linked to mental health concerns (Conrad et al., 2021). The events and emotional experiences that have taken place during the COVID-19 pandemic have been associated with mental health problems across various populations (Ettman et al., 2020; Liu et al., 2020b; 2020a; National Center for Health Statistics, 2021; Tang et al., 2021). While such negative outcomes are to be expected following traumatic events, prior investigations have also

sought to examine whether any *positive* outcomes might arise from adversity. Findings from prior research suggest that some individuals who experience adverse events (e.g., vehicle accidents, personally life-threatening incidents) may show adaptive, positive psychological change (Helgeson et al., 2006; Tamiolaki and Kalaitzaki, 2020).

Posttraumatic growth (PTG) refers to a positive change that can occur after a traumatic event or a major life crisis (Tedeschi and Calhoun, 2004, 1996), during which individuals acquire complex coping skills, improve their interpersonal relationships, and develop a greater sense of appreciation for life (Frazier and Kaler, 2006; Tedeschi et al., 2007). Since the COVID-19 pandemic, only a few studies have examined the extent to which such an event might bring about personal growth for individuals (Chi et al., 2020; Kowalski et al., 2021; Vazquez et al., 2021; Zhou et al., 2020). Given the prolonged nature of the COVID-19

* Corresponding author at: Departments of Pediatric Newborn Medicine & Psychiatry, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA.
E-mail address: chliu@bwh.harvard.edu (C.H. Liu).

pandemic and the expected long-term psychological impacts, a question is for whom and under what conditions individuals might report PTG during the pandemic.

Social and individual factors may both contribute to PTG. For instance, having a close connection with family can play an important role in individuals' positive growth during crises. As such, experiences with family may provide support to individuals experiencing challenges related to the COVID-19 pandemic. A longitudinal study conducted shortly after the start of the pandemic revealed that perceived social support was positively associated with PTG (Zhou et al., 2020). It might also be expected that those who report a greater ability to tolerate distress or who consider themselves as resilient might be more likely to overcome challenges, facilitating PTG. For example, in a recent study involving Iranian individuals with childhood abuse experience, researchers reported a positive association between distress tolerance and PTG (Basharpoor et al., 2021). Additionally, previous studies have shown significant associations between resilience and PTG (e.g., Levine et al., 2009; Ogińska-Bulik, 2015).

What is unclear is whether psychiatric symptoms such as depression, anxiety, and post-traumatic stress symptoms, as well as worries related to obtaining resources in the initial months of COVID-19 pandemic, might be associated with greater PTG. Several scholars have conceptualized PTG as an *outcome* of one's adaptation to a traumatic event (e.g. Schaefer and Moos, 1992; 1998; Tedeschi and Calhoun, 1995; 2004). Within the PTG as an *outcome* model, the conceptual model emphasizes three possible changes (i.e., outcomes) that could occur as individual makes meaning of their experiences with adversity: coping leading to (1) baseline (recovery); (2) lower level of functioning (survival); and (3) higher level of functioning (thriving; Aldwin et al., 1994; O'Leary and Ickovics, 1995). This process of PTG may include how individuals perceive their combination of experiences, which encompass any experiences of mental health symptoms, and how they regard their ability to handle adversity (perception of their resilience or their ability to tolerate distress).

Based on the aforementioned theory, within the present study, we examined how young adults' psychosocial characteristics can lead to different levels of PTG during the pandemic. For example, on one hand, we would expect to see lower levels of PTG among young adults with higher levels of mental health symptoms and lower levels of protective factors. On the other hand, given the nature of PTG, which refers to growth from adversity, we might also observe higher levels of PTG among young adults with higher levels of mental health symptoms. Currently, young adults are facing an unprecedented adversity that is completely unique, which may have different effects on their mental health (Kira et al., 2021). Assessing the extent to which these factors play a role in PTG during the COVID-19 pandemic may help to identify and prioritize individuals who are more in need (Tamiolaki and Kalaitzaki, 2020).

The current study examines PTG among young adults in the midst of the COVID-19 pandemic and its association with their psychosocial characteristics, specifically, those factors that promote positive outcomes (distress tolerance, resilience, family connectedness), as well as factors that are often perceived as risks to poorer outcomes (depression, anxiety, and PTSD symptoms, and COVID-19-related worry). Using the CARES 2020 Project (COVID-19 Adult Resilience Experiences Study) data, this analysis sought to identify potential psychosocial factors involved in young adults' posttraumatic growth during the COVID-19 pandemic across two waves of data collection.

2. Methods

2.1. Recruitment and procedure

Among the 1221 young adults who took part in the Wave 1 survey (T₁: April 13, 2020 to August 31, 2020), 805 of them completed the Wave 2 survey (T₂: September 21, 2020 to March 15, 2021). Participants

who agreed to be contacted again during the CARES Wave 1 were invited to participate in Wave 2. Among those who were contacted, 65.9% completed surveys for Wave 2. In terms of demographic characteristics between T₁ and T₂, no significant differences were observed except for participants' student status (there were fewer students in Wave 2, as many of them had graduated). The present study relied on 805 young adults' responses who completed both time points. During the study, participants were asked to complete a 30-minute online survey about their COVID-19-related experiences, risk and resilience, and physical and mental health outcomes. All participants provided an electronic informed consent. The first invitation to the second survey was sent roughly 5.5 months after the Wave 1 completion date. Participants were given \$10 gift cards when they completed the survey. In order to ensure data quality, we embedded three different attention checks within the survey. Study approval was obtained from the Institutional Review Board at Boston University.

2.2. Measures

2.2.1. Predictors

Participants' psychological resilience, or ability to cope with adverse experiences, was assessed by using the Connor-Davidson Resilience Scale (CD-RISC-10; Connor and Davidson, 2003). On a five-point Likert-type scale (0 = *not true at all* to 4 = *true nearly all the time*), young adults were asked to rate how they felt about themselves in the past month. Items were summed to calculate the total score, with higher scores indicating higher levels of resilience. For the present study, Cronbach's alpha for this measure was 0.88.

Participants' distress tolerance was assessed by using the 15-item Distress Tolerance Scale (DTS; Simons and Gaher, 2005), which captures one's ability to withstand and cope with emotional distress. On a scale of 1 (*strongly agree*) to 5 (*strongly disagree*), participants rated their ability to tolerate distress. The sum score was used, with higher scores indicating greater levels of distress tolerance. Cronbach's alpha for this measure was 0.89, which indicated good reliability.

Using the Family Connectedness Scale (FCS; Eisenberg and Resnick, 2006), we examined the degree to which participants felt connected to their family members. Possible responses ranged from 1 (*not at all*) to 10 (*very much*). The sum score was calculated. Higher scores indicated greater connectedness levels among family members. Cronbach's alpha for this measure was 0.89, which indicated good reliability.

Depression symptoms were assessed using the Patient Health Questionnaire (PHQ-8; Kroenke et al., 2009). Participants self-rated their depression symptoms over the past two weeks using a scale of 0 to 3 (0 = *not at all* to 3 = *nearly every day*). The total score ranged from 0 to 24, and a higher score represented greater depressive symptomatology. Cronbach's alpha for this measure was 0.87.

Participants' anxiety symptoms were assessed with the Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006). On a scale of 0 (*not at all*) to 3 (*nearly every day*), participants rated their current symptoms over the past two weeks. The total score ranged from 0 to 21, with a higher score indicating elevated anxiety. Cronbach's alpha for this measure was 0.90.

Post-traumatic stress symptoms were assessed using the PTSD Checklist—Civilian Version (PLC-C; Weathers et al., 1993). Participants self-reported how much they had been bothered by problems and experiences in response to stressful life events over the past month. The total symptom severity score from the sum of items scores ranged from 17 to 85, and higher sum scores indicated higher PTSD symptoms. Cronbach's alpha for this measure was 0.92.

Using a newly developed 6-item measure (Liu et al., 2020b), participants' severity of COVID-19 pandemic-related worry was assessed. Participants responded to each item on a scale from 1 to 5, with 1 being *not worried at all* and 5 being *very worried*. The possible sum scores ranged from 6 to 30, with higher scores indicating higher levels of worry. Cronbach's alpha for this measure was 0.77, indicating good

reliability.

2.2.2. Outcome

PTG was assessed using the Posttraumatic Growth Inventory (PTGI) short form (Cann et al., 2010). The survey was modified to specifically ask respondents to indicate the changes that have occurred as a result of the COVID-19 pandemic. The measure included two items from each of the five domains of the PTGI. Using a 6-point Likert scale, response options were from 0 = *I did not experience this change at all* to 5 = *I experienced this change to a very great degree*. Items were summed to calculate a total score, with higher scores indicating greater growth.

2.3. Data analytic plan

A multiple regression analysis was performed to identify influential psychosocial factors for PTG using SPSS 27.0. Covariates (age, race, gender, family income, and student status) were entered in Step 1. These covariates were included given prior research showing associations between these factors and PTG (Pollari et al., 2021). In addition to these covariates, potential negative influential factors (e.g., depression, anxiety, and PTSD symptoms and COVID-19-related worry scores at T₁) were entered in Step 2, and potential positive influential factors (e.g., resilience distress tolerance, family connectedness scores at T₁) were entered in Step 3 to predict young adults' posttraumatic growth at T₂.

3. Results

Tables 1 and 2 present the distributions of demographic characteristics of our study variables at T₂, and descriptive data on all predictors and participants' PTG outcome. More detailed information about the overall sample at T₁ has been addressed in the previously published paper (Liu et al., 2020b). Our sample included 61.4% White, 21.6% Asian, and 17% other (Black, Hispanic/Latino, AI/NA, mixed race, and another race). About 85% of participants were women, and a little over half of the participants have a family income of less than \$125,000. For these participants, more than 60% reported no change to minimal (a very small degree) change had occurred in their life as a result of the pandemic.

Table 3 provides results from the multiple regression analysis that determines the potential effects of psychosocial predictors on posttraumatic growth. Among the covariates, Asians were less likely to report posttraumatic growth ($\beta = -0.15, p = .001$). After controlling for the covariate variables, PTSD symptoms and COVID-19-related worry predicted higher levels of posttraumatic growth, while depressive symptoms predicted lower levels of posttraumatic growth. Finally, after controlling for the covariates and negative influential factors, resilience

Table 2

Key variable characteristics from T₁ to T₂ of CARES 2020.

Variables	Wave 1 (n = 1221)	Wave 2 (n = 805)
	Means $\pm$ SD	
<i>Negative Influential Factors</i>		
Depression symptoms	9.00 $\pm$ 5.68	8.62 $\pm$ 5.94
Anxiety symptoms	9.30 $\pm$ 5.58	9.66 $\pm$ 5.77
PTSD symptoms	38.54 $\pm$ 14.15	37.83 $\pm$ 15.03
COVID-19-related worry	15.48 $\pm$ 5.29	13.39 $\pm$ 4.85
<i>Positive Influential Factors</i> ^a		
Resilience	25.88 $\pm$ 6.18	–
Distress tolerance	3.31 $\pm$ 0.85	–
Family connectedness	37.41 $\pm$ 9.81	–
<i>Outcome: Posttraumatic growth</i> ^b	–	1.66 $\pm$ 1.03

Note: ^aonly measured at T₁.

^bonly measured at T₂.

and family connectedness significantly predicted higher levels of posttraumatic growth, and distress tolerance significantly predicted lower levels of posttraumatic growth.

4. Discussion

The findings demonstrate the extent to which psychosocial characteristics influence PTG among US young adults during the COVID-19 pandemic. On average, respondents (1.66; SD = 1.03) reported PTGI levels between “*I did not experience this change at all*” and “*I did experience this change to a very small degree*” - which overall represented low PTG. Previous studies, for example, yielded a PTG score of 2.53 among college students following a mass murder (Jaramillo and Felix, 2020) and a PTG score of 2.52 after students survived a serious crime (average age of 26.96; Brooks et al., 2016). The sample's PTG score suggests that at baseline, young adults do not see themselves as having experienced personal growth from the pandemic between the two waves of data collection over the survey period (<1 year). The young adults from our group may have shifted relatively little towards personal growth from these circumstances, perhaps attributable to the continued uncertainties (e.g., financial and social consequences) faced by young adults (Killgore et al., 2020; Price et al., 2020).

The results of the hierarchical regression analysis showed a positive association between PTG and participants' resilience and family connectedness, consistent with past research (Anderson, 2018; Bensimon, 2012) and COVID-19 related research (Chi et al., 2020). Those who consider themselves resilient may be more likely to respond to the event more optimistically, which in turn leads to further development of PTG following adversity (i.e., COVID-19; Büyükaşık-Çolak et al., 2012). Furthermore, warm and interpersonal partnerships, in particular, may be critical in fostering PTG (Tedeschi and Calhoun, 2004). Within the context of the COVID-19 pandemic, young adults with greater feelings of connectedness with their family may enhance the level of positive coping and thus promote PTG in young adults. Understanding how family connectedness is experienced may provide a significant opportunity for designing supports and warrants further research.

Consistent with prior literature, young adults' PTSD symptoms were positively associated with PTG. Studies have highlighted that traumatic exposures and resultant traumatic stress symptoms may be central to PTG. As such, these symptoms should be perceived as distinct from adaptive coping (Bensimon, 2012; Taylor, 1983). There is a value in recognizing the potential co-existence of PTSD symptoms and post-traumatic growth: the experience of an event as traumatic (rather than simply unfortunate, for example) may be an intrinsic component of the growth that follows this experience. The COVID-19 pandemic experience may have presented these young adults (as with the general population) a situation where normal coping strategies were compromised; if so, the cumulative impact of these losses may contribute to toxic stress.

Our measure assessing COVID-19-related worry was also found to be

Table 1

Demographic characteristics from T₂ of CARES 2020.

Factors	Means $\pm$ SD or % (n)
Age (mean years)	24.8 $\pm$ 3.30
Gender	
Men	11.3 (91)
Women	84.8 (683)
Other	3.9 (31)
Race	
White	61.4 (494)
Asian	21.6 (174)
Other	17.0 (137)
Family income (USD/year)	
< \$50,000 – \$74,999	28.2 (223)
\$75,000 – \$124,999	27.7 (219)
\$125,000 – $\geq$ \$225,000	44.1 (349)
Student status	
No	43.6 (351)
Yes	56.4 (454)

N = 805.

Table 3

Hierarchical regression predicting **posttraumatic growth** based on psychosocial influences (e.g., depression, anxiety, and PTSD symptoms, COVID-19-related worry, resilience, distress tolerance, and family connectedness).

Blocks of variables entered in three steps	Change in posttraumatic growth associated with each variable			Percent variance explained by each block ΔR^2
	Unstandardized coefficients B	SE	Standardized coefficients β	
1. Sociodemographic Characteristics				0.02**
Age	−0.18	0.12	−0.06	
Race (ref=White)				
Asian	−3.24	0.90	−0.15***	
Other	−0.70	1.15	−0.03	
Gender (ref=man)				
Women	0.77	1.14	0.03	
Other	−2.25	2.10	−0.04	
Family income (ref=<\$75 K)				
\$75,000 – \$124,999	0.43	0.95	0.02	
\$125,000 – ≥\$225,000	−0.09	0.89	−0.004	
Student status (ref=no)				
Yes	−0.91	0.75	−0.04	
2. Negative Influential Factors				0.07***
Anxiety symptoms	−0.14	0.11	−0.08	
Depression symptoms	−0.26	0.11	−0.14*	
PTSD symptoms	0.15	0.05	0.21***	
COVID-19-related worry	0.35	0.08	0.18***	
3. Positive Influential Factors				0.11***
Resilience	0.39	0.07	0.23***	
Distress tolerance	−1.96	0.57	−0.16***	
Family connectedness	0.07	0.04	0.07*	

N = 805.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

positively associated with PTG. Items in this measure represent a specific source of stress during the pandemic (e.g., *I worry that I will not be able to obtain a COVID-19 test if I become sick, or I will not have enough groceries during city lockdowns/social distancing protocols*). Those that have been confronted with these challenges of obtaining resources may have had experiences that demonstrate their ability to overcome adversity, and thus may contribute to a sense of PTG.

As expected, depressive symptoms inhibited PTG in this study. However, it should be noted that pre-COVID-19 pandemic studies focused on other traumatic incidents such as assaults, accidents, or catastrophic natural events have been inconclusive on this matter (Bianchini et al., 2017; Kleim and Ehlers, 2009; Su and Chow, 2020), and a correlation between depression and PTG was not observed in an early COVID-19 pandemic study (Zhou et al., 2020). Kleim and Ehlers (2009) suggests that the relationship between depressive symptoms and PTG may be curvilinear, in which lower and higher PTG are associated with lower depressive symptoms and moderate PTG associated with severe depressive symptoms. As the pandemic is ongoing, individuals with depressive symptoms might find it difficult to recognize any PTG or any “silver linings” related to their experience of the pandemic. Longitudinal analyses of the association between depressive symptoms and PTG are needed as the pandemic progresses.

Interestingly, and contrary to our hypothesis, distress tolerance was negatively related to PTG in this study. Distress tolerance includes the acceptance of aversive experiences and may reflect an emotional regulation strategy during periods of stress (Leyro et al., 2010). Our findings suggest that those with high levels of distress tolerance show lower levels of PTG. When considered as a regulation strategy, distress tolerance may limit one's perception of having an adverse experience to overcome. Notably, the features that characterize distress tolerance do not encompass psychological adaptation via cognitive mechanisms (e.g., reframing one's ability to handle a challenge). For example, mindfulness-based practices are often used to increase distress tolerance; while these strategies may be helpful as a means for coping, based

on our results, it may be less central to the development of PTG.

Our study yielded racial differences in PTG, with a higher proportion of Asian Americans (both U.S. born and foreign-born) reporting lower PTG compared to Whites. Several studies have indicated that Asian Americans have been uniquely exposed to racial trauma experiences during the COVID-19 pandemic (e.g., race-related threats, insults, microaggressions, marginalization), stressors that have a negative impact on their well-being (Chen et al., 2020; Ruiz et al., 2020). Thus, our result indicating that Asian Americans may not perceive their experience of the pandemic as potentially beneficial or may not see beneficial possibilities would be consistent with these findings. This may be particularly true given the rising tide of hate and violence against Asian Americans within the US (Chen et al., 2020; Pan et al., 2020).

Despite the contributions of the field, this study has several limitations. First, our data only include self-report measures. Second, although this was a longitudinal survey, the current analyses included two time points of the survey, which were about 6 months apart. Future studies that incorporate multiple waves of data collection will enable us to examine trajectories of young adults' psychosocial characteristics and its relation to PTG. Furthermore, we need to note that measures included in the study referenced varying time periods (e.g., past two weeks, past month). Lastly, as the results from the present study were based on a sample recruited using convenience sampling, the estimates derived from our study can be biased. Thus, the generalizability of our findings beyond the current sample remains a question for future study.

Even with the persistence of the COVID-19 pandemic and the documentation of negative mental health consequences on young adults, the potential for a more positive trajectory following the adversity of this global experience is important to explore and elucidate. For example, further research to understand the nature of family connectivity, which strongly correlated with PTG, will be valuable to inform programs that may support these dynamics. The interplay between depression and PTSD symptoms, and its differential or synergistic impact on functioning and outlook similarly warrant closer study in this

age group, particularly where there may not have been a single identified traumatic event, but rather an accumulation of adversities that overwhelmed coping strategies. Additionally, incorporation of distress tolerance skills into high school and college orientation programming may provide opportunities to mitigate stressors that arise as uncertainty persists in this next phase of the pandemic.

Post-traumatic growth may differentially arise in individuals based on psychosocial circumstances, race and cultural experiences, the nature and intensity of traumatic exposure, resilience-associated traits, and the presence of anxiety and depression. Understanding predisposing and contributing factors involved in PTG can inform and tailor screening, assessment and treatment planning to optimize wellbeing across this population for many years ahead (Tamiolaki and Kalaitzaki, 2020).

CRediT authorship contribution statement

Sunah Hyun: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Ga Tin Finneas Wong:** Data curation, Writing – original draft, Writing – review & editing, Project administration. **Nomi C. Levy-Carrick:** Writing – original draft, Writing – review & editing. **Linda Charmaraman:** Writing – review & editing. **Yvette Cozier:** Writing – review & editing. **Tiffany Yip:** Writing – review & editing. **Hyeouk “Chris” Hahm:** Writing – review & editing, Funding acquisition. **Cindy H. Liu:** Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Supervision, Project administration, Funding acquisition.

Declaration of Competing Interest

There are no potential conflicts of interest for any author.

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