



College Student Resilience During COVID-19: Examining the Roles of Mindfulness, Compassion, and Prosocial Behavior

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Abstract

The present study examined factors associated with resilience in college students during the COVID-19 pandemic. Participants were undergraduates at a large Midwestern university in the USA ($N = 848$). Hierarchical linear regression analyses examined self-reported pandemic-related adversity, community COVID-19 case rates, mindfulness, compassion, and prosocialness to determine the strongest associates of resilience. Findings demonstrated that mindfulness was the only psychological process of interest significantly associated with resilience, so specific facets were further explored in a regression analysis. Specifically, higher levels of the following mindfulness skills were associated with greater resilience: ability to describe internal experiences, to remain aware while engaging in action, and to take a nonreactive stance toward internal experiences. Mindfulness-based interventions may be appropriate for promoting resilience in college students during the COVID-19 pandemic.

Keywords COVID-19 · Resilience · Mindfulness · Prosocial · Compassion · College student

Introduction

In March 2020, the World Health Organization publicly characterized the coronavirus disease 2019 (COVID-19) outbreak as a global pandemic. To reduce spread in the United States (US), the Centers for Disease Control and Prevention recommended limiting mass gatherings to enforce social distancing measures (Centers for Disease Control & Prevention, 2019). This resulted in the closure of businesses, workplaces, and schools.

College campuses faced rapid changes, exacerbating student hardships. Courses transitioned online, and students moved out of dorms or on-campus apartments. In a snowball sample of 791 US college students, nearly one-third reported relocating from campus in the Spring of 2020 because of

the COVID-19 pandemic, of which 80% was given a week or less advanced notice (Conrad et al., 2021). Students may have also experienced a variety of other disruptions in their daily lives including changes in work or job loss and alterations to peer interactions. Indeed, approximately 55% of one US college student sample reported a great deal of disruption to their daily activities following the onset of the pandemic (Zimmermann et al., 2020), and nearly 90% of first-year undergraduate students in another sample reported that the pandemic was personally disruptive (Copeland et al., 2021).

Although the longstanding impact of COVID-19 on college students is undetermined, findings suggest serious psychological consequences. A study of home-quarantined Chinese university students found the prevalence of PTSD and depression to be ~3% and 9%, respectively (Tang et al., 2020), and another study in China similarly observed high levels of anxiety and depression in college students (C. H. Liu et al., 2020a, 2020b). Furthermore, a longitudinal assessment of college students in China found that from February 2020 to March/April 2020, rates of probable depression and anxiety increased significantly (Li et al., 2021). Notably, these rates are comparable to previous studies prior to the onset of the pandemic (Yu et al., 2015; Zhang et al., 2013), which found the prevalence of depression between 8.8 and 11.8%, respectively. However, these similar rates may be related to the Tang et al. study's close proximity from the

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start of the COVID-19 pandemic (i.e., 1 month). The pooled prevalence of depression among Chinese university students during the pandemic has since been reported as 26% in a meta-analysis with a sample of over 1.2 million (Luo et al., 2021). A previous study examining the prevalence of PTSD in Chinese university students during the 2009 H1N1 influenza pandemic observed comparable rates of PTSD prior to the COVID-19 pandemic (2%; Xu et al., 2011).

Correspondingly, one study conducted in the US showed that COVID-19 was tied to significant increases in anxiety and depressive symptoms, as well as sedentary behavior in college students (Huckins et al., 2020). In another US sample, students reported significantly greater depressive and anxiety symptoms in April 2020 compared to August 2019, December 2019, and February 2020 (Zimmermann et al., 2020). Furthermore, following the onset of the pandemic, 37–41% of the sample was above the clinical cutoffs for anxiety and depressive symptoms (Zimmermann et al., 2020). Relatedly, in a sample of over 2000 US undergraduate and graduate students, over one-third reported moderate to severe levels of anxiety, nearly half reported moderate to severe levels of depressive symptoms, and ~18% reported having suicidal thoughts in May 2020 (Wang et al., 2020). US students also showed externalizing and attentional problems across the spring 2020 semester (Copeland et al., 2021). Similarly, a study examining college students from Switzerland found that students are experiencing increased levels of stress, depression, anxiety, and loneliness (Elmer et al., 2020).

Interestingly, one study that examined how students were coping with the pandemic found that a majority reported that they were unsure how to, or felt unable to, cope with pandemic-related stress (Wang et al., 2020). Given the significant disruptions and impairment faced by college students at the onset of the pandemic, as well as their difficulties coping with pandemic-related stress, it is important to identify factors that may promote resilience for students during the pandemic.

Resilience

Though research surrounding adversity has traditionally focused on preventing pathology, a growing literature considers the makeup and pliability of resilience. Characterized as the dynamic process of maintaining functioning during and following adversity (Infurna & Luthar, 2018; Taylor et al., 2010; Thompson et al., 2011), resilience necessarily encompasses both a potentially stressful event and the response, particularly adaptive responses. The process of resilience is malleable and is influenced by individual and contextual factors (Bonanno et al., 2011; Masten, 2014). Resilience has been examined extensively in child development (Cicchetti, 2013; Infurna & Luthar, 2018; Masten,

2014), and adult resilience research continues to expand (Bonanno, 2004).

Though the operationalization of resilience differs across studies (e.g., self-assessment of one's ability to "bounce back," presence of absence of psychological symptoms) (Denckla et al., 2020), demographic and contextual variables relate to resilience (Bonanno et al., 2011). Some studies have indicated that young adults (18–24 years old) may have lower levels of resilience than other age groups (Bonanno et al., 2007; Campbell-Sills et al., 2009), which could be partially due to younger age groups having lower levels of education and income (Campbell-Sills et al., 2009) or to older individuals having greater emotion regulation and problem-solving resilience skills than young adults (Gooding et al., 2012). Studies have also suggested that physical health (Isaacs et al., 2017) and higher levels of education (Butler et al., 2009; Campbell-Sills et al., 2009) may promote resilience. Psychological characteristics that may promote resilience include task-oriented coping, extraversion (Campbell-Sills et al., 2006), lower levels of emotional suppression (Butler et al., 2009), hardiness, self-enhancement, and positive emotion and laughter (Bonanno, 2004). Recent professional recommendations surrounding research on resilience have highlighted the critical importance of situating this work within structural and societal level contexts that impact resilience rather than exploring the construct solely at the individual level and in relation to individual-level factors and abilities (Denckla et al., 2020). This in turn highlights the critical role of community and policy-level adjustments and interventions to promote population-level resilience (Denckla et al., 2020).

Identifying Resilience-Promoting Factors in the Context of COVID-19

Resilience may be particularly important in the context of the COVID-19 pandemic given the potential experiences of adversity faced at a population level during this time. Indeed, existing literature has indicated that resilience may be associated with psychological health (Conrad et al., 2021; Tan et al., 2021; Yalçın et al., 2021; Zhang et al., 2021) and quality of life (Keener et al., 2021) and with lower "lockdown fatigue" (Labrague & Ballard, 2021) during the pandemic. Of note, these studies operationalized resilience via self-report measures of resiliency. A study conducted in Europe found that having a positive appraisal style, or a tendency to evaluate potentially aversive situations in a non-negative way (Kalisch et al., 2015), was associated with mental resilience (operationalized by an equation created to measure good mental health in the presence of adversity exposure) during COVID-19 (Veer et al., 2021) in an adult sample, providing initial insight into resilience-promoting

factors specific to the pandemic. The continued exploration of malleable factors that may promote resilience is key in the development and implementation of both community-based and individual-level supports.

Mindfulness can be characterized as nonjudgmental, present-moment awareness (Kabat-Zinn, 2003). Mindfulness and acceptance-based coping, or relating to internal experiences in an open and nonjudgmental way, may be helpful in promoting resilience (Thompson et al., 2011). Previous research has indicated that mindfulness processes mediate the association between childhood trauma exposure and various psychological (Kroska et al., 2018a, 2018b) and behavioral (Roche et al., 2019) outcomes in college students. Researchers have also demonstrated significant correlations between measures of mindfulness and resilience, in samples of adult clinicians and trainees (Kemper et al., 2015) and samples of university students (Keye & Pidgeon, 2013; McGillivray & Pidgeon, 2015). Research conducted during the COVID-19 pandemic specifically has demonstrated that mindfulness may be important in promoting favorable coping (e.g., engagement coping such as problem solving; Götmann & Bechtoldt, 2021), and psychological health (Belen, 2021; Conversano et al., 2020; Yalçın et al., 2021) during this time. Initial work has also indicated the potential positive impact of mindfulness-based interventions for students during the pandemic. One feasibility study found that first year college students reported reductions in stress and anxiety and improvements in self-compassion after participation in an online mindfulness and self-compassion intervention (González-García et al., 2021) whereas another mindfulness-based program showed benefits for higher education music students in terms of implementation of strategies to increase well-being during the pandemic (Bartos et al., 2021).

Importantly, both mindfulness (Lim et al., 2015; Tirsch, 2010) and adversity (Lim & DeSteno, 2016; Staub & Vollhardt, 2008; Vollhardt, 2009; Vollhardt & Staub, 2011) may be associated with greater compassion, empathy, altruism, or prosocial behavior. As indicated by a recent meta-analysis including nearly 200,000 adults, prosociality in turn is associated with greater well-being (Hui et al., 2020). Additionally, a study examining military veterans found purpose in life and altruism to be predictors of resilience (Isaacs et al., 2017).

Experts have suggested the critical importance of compassion, kindness, and social belonging as evidence-based strategies that can help to promote both individual and collective resilience, recovery, and growth in the context of the COVID-19 pandemic (Slavich et al., 2022), and initial work has supported this proposal. For example, research has indicated that a collectivist orientation (e.g., having common goals and interdependence with others) is associated with lower levels of psychological maladjustment in emerging

adults during the pandemic (Germani et al., 2020). Another study showed that UK adults' perceptions of increased community kindness and connectedness during the pandemic were associated with lower depressive symptoms and higher quality of life and well-being (White & Van Der Boor, 2020). Finally, Kornilaki (2021) demonstrated that altruism was associated with lower levels of stress, anxiety, and depressive symptoms in Greek undergraduate students during the pandemic.

Colleges and universities have experienced significant changes throughout the COVID-19 pandemic that have the potential to negatively impact students. The present study aimed to further explore constructs that may promote resilience in college students during this time period. The study examined whether pandemic-related adversity, community COVID-19 case rates, mindfulness, compassion, and prosocialness associated with resilience among undergraduate students. The authors hypothesized that greater levels of mindfulness, compassion, and prosocialness would be associated with higher levels of resilience. Understanding modifiable, resilience-promoting factors is vital to inform interventions that promote well-being.

Method

Participants and Procedures

Participants ($n = 848$) were recruited in three cohorts from undergraduates enrolled in psychology courses at a large university in the Midwestern US. The first cohort ($n = 100$) was recruited in April 2020. The second cohort ($n = 500$) was recruited in the Fall semester of 2020. The third cohort ($n = 248$) was recruited in the Spring semester of 2021. The majority of the sample identified as female (68.5%), with a mean age of 18.91 years ($SD = 1.07$). A small number of individuals ($n = 12$) identified as multiple genders or did not identify their gender as male or female, and as such, were not able to be compared statistically in between-group analyses. A majority were first year students (70.8%), white (81.5%), non-Hispanic or Latino/a (88.3%), and not in a relationship (56.6%). See Table 1 for sample demographics. Procedures were approved by the Institutional Review Board. Participants were recruited from a pool that provides course credit for participation in research studies. Eligible participants were able to read English and aged 18–25 years. Participants completed the study procedures online via Qualtrics after reviewing the informed consent document. Of note, the high level of missing data on the age variable was due in part to a systems error wherein Qualtrics auto-selected the lowest response value available (18 years old) until the researchers identified this error and corrected it after data collection

Table 1 Characteristics of the sample

Variable	Mean (SD)
Age, $n = 770$	18.91 (1.07)
Brief Resiliency Scale, $n = 845$	3.18 (.80)
Prosocial Scale, $n = 823$	62.60 (11.25)
Compassion Scale, $n = 821$	4.17 (.58)
Pandemic Adversity Measure, $n = 845$	12.86 (5.82)
14-day Rolling Total Positive Cases, $n = 848$	1752.17 (1782.47)
Five Facet Mindfulness Questionnaire, $n = 839$	120.07 (16.21)
Observe, $n = 840$	24.78 (6.01)
Describe, $n = 841$	25.49 (5.17)
Act with awareness, $n = 842$	24.52 (6.33)
Non-judgment, $n = 840$	24.91 (6.92)
Non-react, $n = 843$	20.40 (4.23)
	<i>n</i> (%)
Race	
African American/Black	26 (3.1%)
American Indian or Alaska Native	4 (0.5%)
Native Hawaiian or Other Pacific Islander	5 (0.6%)
Asian	79 (9.3%)
White	691 (81.5%)
Biracial or multiracial	34 (4%)
Missing	9 (1.1%)
Ethnicity	
Hispanic or Latino/a/x	86 (10.1%)
Non-Hispanic or Latino/a/x	749 (88.3%)
Missing	13 (1.5%)
Relationship status	
In a relationship	366 (43.2%)
Not in a relationship	480 (56.6%)
Missing	2 (.2%)
Sexual orientation	
Straight or heterosexual	742 (87.5%)
Lesbian, gay, or homosexual	20 (2.4%)
Bisexual	68 (8.0%)
Different identity	9 (1.1%)
Prefer not to disclose	8 (0.9%)
Missing	1(.1%)
Gender identity	
Female	581 (68.5%)
Male	255 (30.1%)
Transgender woman	0 (0%)
Transgender man	1 (0.1%)
Genderqueer/gender non-conforming	3 (0.4%)
Prefer to self-describe	1 (0.1%)
Identified multiple gender identities	2 (0.2%)
Prefer to not disclose or did not disclose	5 (0.6%)
Year in college	
First year	600 (70.8%)
Second year	174 (20.5%)
Third year	50 (5.9%)
Fourth year	19 (2.2%)

Table 1 (continued)

Variable	Mean (SD)
Fifth year or greater	5 (0.6%)
Semester cohort	
Spring 2020	100 (11.8%)
Fall 2020	500 (59.0%)
Spring 2021	248 (29.2%)

begin. Notably, the majority of participants missing the age variable reported that they were first-year college students.

Measures

Demographics Age, gender, race, ethnicity, relationship status, and year in school were assessed.

Pandemic adversity was measured using the Pandemic Adversity Measure (PAM), which measures pandemic-related hardship across financial (e.g., loss of income or investments), home (e.g., living apart from family), work/business (e.g., place of work altered or closed), health (e.g., access to health care, physical illness), and social (e.g., suffering loss during the pandemic) domains. Questions are categorical endorsements of adverse experiences (yes, no), and the Total Adversity score ranges from 0 to 52. The measure has been used to quantify COVID-19 adversity (Kroska et al., 2020), and measure validation is in progress. Items are generally scored categorically and are not anticipated to correlate; thus, internal consistencies are not reported. The items were conceptualized using previous measures of objective adversity due to flood or other natural disasters that may result in adversity that affects multiple life domains, such as financial, social, home, and work life (Brock et al., 2014; Kroska et al., 2018a, 2018b; Laplante et al., 2007). Due to the substantial disaster adversity literature, the authors reviewed the early literature regarding the impacts of COVID-19, in conjunction with the disaster adversity literature, to create items that were applicable to COVID-19 adversity.

Community COVID-19 case rates were utilized for Johnson County, Iowa, from the state's department of public health reporting data. These data are publicly available. The 14-day rolling total was utilized to estimate community risk for infection with COVID-19.

Mindfulness was measured using the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), a 39-item measure of five facets of mindfulness: (1) to *observe*

present-moment experience, (2) to *describe* internal experiences, (3) to *act with awareness*, (4) to take a *nonjudgmental* stance toward internal experiences, and (5) to take a *nonreactive* stance toward internal experiences. Items are rated on a 5-point Likert scale for total and facet scores, with higher scores indicating higher mindfulness. The total score and the facets demonstrated adequate internal consistency (total $\alpha=0.88$; observe $\alpha=0.83$; describe $\alpha=0.78$; act with awareness $\alpha=0.89$; non-judgment $\alpha=0.91$; non-reactivity $\alpha=0.78$).

Compassion was measured using the Compassion Scale (CS; Pommier et al., 2020), a 16-item measure that examines the tendency to experience compassion toward others. Items are rated on a 5-point Likert scale, and the mean compassion score is the composite, with higher scores indicating greater compassion. The CS demonstrated adequate internal consistency ($\alpha=0.88$).

Prosocialness was measured using the Prosocial Scale for Adults (PSA; Caprara et al., 2005), a 16-item measure of the tendency to engage in prosocial behaviors. Items are rated on a 5-point scale and summed for a total score, with higher scores indicating a greater tendency toward prosocialness. The PSA demonstrated adequate internal consistency ($\alpha=0.94$).

Resilience was measured using the Brief Resilience Scale (BRS; Smith et al., 2008) which examines the ability to maintain functioning during and after adversity. Six items are rated on a 5-point Likert scale, and the mean of items is the composite, with higher scores indicating greater resilience. The BRS demonstrated adequate internal consistency ($\alpha=0.87$).

Statistical Analyses

Item-level data were imputed by scale with person mean imputation when $\leq 20\%$ of items were missing. When $> 20\%$ of items were missing, the score was identified as missing and excluded from analyses (Brock et al., 2014; Downey & King, 1998). For the PAM, item-level mean imputation was not used, and scores were calculated if $> 80\%$ of the scale was completed. Imputations were computed by subscale for the FFMQ and by total score for other measures. Demographic variables were examined for inclusion as covariates. Hierarchical linear regression analyses were utilized to examine how pandemic-related adversity, community case rates, mindfulness, compassion, and prosocialness associated with resilience after accounting for relevant demographic characteristics. The model included three steps. Step 1 included year in school (first year vs. advanced), gender (male vs. female), and sexual orientation (straight/

heterosexual vs. other), Step 2 included pandemic-related adversity and community case rates, and Step 3 included mindfulness, compassion, and prosocialness, with primary interest in the modifiable processes included in Step 3. A second regression model examined pandemic-related adversity and community case rates (Step 2) and compassion, prosociality, and specific mindfulness facets (Step 3) as associated with resilience after accounting for the same relevant demographics (Step 1). Variance inflation factors (VIFs) were used to examine multicollinearity. Statistical rules of thumb indicate that VIFs > 10 are of significant concern (Kleinbaum et al., 2013).

Results

Preliminary Analyses

Age and resilience were not significantly correlated ($r(765)=0.00$, $p=0.99$). Due to the small number of individuals who reported a gender identity other than male or female, only males and females were examined in between-group comparisons. Males reported significantly greater resilience than females ($t(831)=-6.43$, $p<0.001$) (male $M(SD)=3.44$ (0.76); female $M(SD)=3.07$ (0.78)). Due to the small sample of racial groups, racial groups were compared dichotomously by comparing those that identified as White and those that did not, as well as those that identified as Asian and those that did not. There were insufficient numbers in other racial categories upon which similar comparisons could be conducted. There were no significant differences between individuals who identified as White and individuals who identified as a racial category other than White in resilience ($t(834)=0.12$, $p=0.90$). There were no significant differences between individuals who identified as Asian and individuals who identified as a racial category other than Asian in resilience ($t(103.36)=-0.27$, $p=0.78$). There were no differences between individuals who identified as ethnically Hispanic/Latino/a/x and those identifying as non-Hispanic/Latino/a/x ($t(830)=-0.51$, $p=0.61$). First year students ($M(SD)=3.23$ (0.80)) reported significantly higher resilience than advanced level students ($M(SD)=3.06$ (0.79), $t(843)=2.78$, $p=0.006$). There were no significant differences in resilience between individuals in a romantic relationship vs. not ($t(841)=-1.56$, $p=0.12$). Due to a small sample size within individuals who identified their sexual orientation as something other than straight/heterosexual, these individuals were combined into one group for between-group comparisons. Individuals who reported their sexual orientation as straight or heterosexual ($M(SD)=3.23$ (0.77)) reported greater resilience than those who identified as something other than straight/heterosexual ($M(SD)=2.85$ (0.91), $t(114.74)=3.92$, $p<0.001$).

Finally, there were no significant differences in resilience between individuals who completed the study in the Spring 2020 semester, the Fall 2020 semester, and the Spring 2021 semester ($F(2, 842) = 1.38, p = 0.25$). Thus, gender, year in school, and sexual orientation were included as covariates in primary analyses. Bivariate correlations indicated that compassion was significantly correlated with prosocialness, ($r(804) = 0.70, p < 0.001$) and mindfulness ($r(812) = 0.09, p = 0.008$). Mindfulness was significantly correlated with prosocialness ($r(814) = 0.08, p = 0.019$). Greater self-reported pandemic adversity was related to lower resilience ($r(843) = -0.17, p < 0.001$), but county-level COVID-19 case rate was not significantly related to resilience ($r(844) = 0.03, p = 0.33$).

Primary Analyses

Results indicated that gender ($\beta = 0.14, t(771) = 4.31, p < 0.001$), year in school ($\beta = -0.08, t(771) = -2.59, p = 0.01$), and sexual orientation ($\beta = -0.08, t(771) = -2.48, p = 0.01$) were significantly associated with resilience. Demographic variables (Step 1) accounted for 8.2% of the variance in resilience ($R^2 = 0.082$). Pandemic-related adversity was significantly associated with resilience ($\beta = -0.07, t(771) = -2.23, p = 0.03$). Community case rates were not significantly associated with resilience ($p > 0.05$). Pandemic-related adversity and 14-day rolling total positive cases

(Step 2) significantly added to the model ($\Delta R^2 = 0.01, \Delta F(2, 775) = 4.78, p = 0.009$). Mindfulness was associated with greater resilience ($\beta = 0.44, t(771) = 13.70, p < 0.001$). Neither compassion nor prosocialness was significantly associated with resilience ($ps > 0.05$). Mindfulness, compassion, and prosocialness (Step 3) added significantly to the model ($\Delta R^2 = 0.18, \Delta F(3, 772) = 63.55, p < 0.001$). All VIFs were below 2.05 and were deemed acceptable. See Table 2 for model.

Given that mindfulness significantly associated with resilience, over and above relevant demographic variables, pandemic-related adversity, community case rates, compassion, and prosocialness, a second model examined how demographic variables (Step 1); pandemic-related adversity and community case rates (Step 2); and compassion, prosocialness, and *the facets of mindfulness* (Step 3) associated with resilience. The final model indicated that gender ($\beta = 0.12, t(767) = 3.81, p < 0.001$) and year in school ($\beta = -0.09, t(767) = -2.94, p = 0.003$) each significantly associated with resilience. Sexual orientation did not ($p > 0.05$). Together, Step 1 variables accounted for 8.2% of the variance ($R^2 = 0.082$). Pandemic-related adversity ($\beta = -0.03, t(767) = -0.88, p = 0.38$) and community case rates ($\beta = 0.01, t(767) = 0.41, p = 0.68$) were not significantly associated with resilience and accounted for additional variance ($\Delta R^2 = 0.01, \Delta F(2, 775) = 4.78, p = 0.009$). Neither compassion nor prosocialness was

Table 2 Role of demographic characteristics, pandemic-related characteristics, compassion, prosocialness, and mindfulness in resilience

Variable	B	SE	β	t	p	R ²
Step 1						.08
Gender	.37	.06	.22	6.27	<.001	
First-year status	-.23	.06	-.13	-3.76	<.001	
Sexual orientation	-.35	.09	-.14	-4.02	<.001	
Step 2						.09
Gender	.35	.06	.20	5.81	<.001	
First-Year Status	-.20	.06	-.11	-3.27	.001	
Sexual Orientation	-.31	.09	-.13	-3.61	<.001	
Pandemic Adversity	-.01	.01	-.10	-2.92	.004	
Community Case Rates	.00	.00	.03	1.00	.32	
Step 3						.27
Gender	.24	.06	.14	4.31	<.001	
First-Year Status	-.14	.06	-.08	-2.59	.01	
Sexual Orientation	-.19	.08	-.08	-2.48	.01	
Pandemic Adversity	-.01	.004	-.07	-2.23	.03	
Community Case Rates	.00	.00	.02	.56	.58	
Prosocialness	-.002	.003	-.03	-.72	.47	
Compassion	.01	.06	.01	.19	.85	
Mindfulness	.02	.002	.44	13.70	<.001	

$n = 780$ for model. Bolded rows in the final model denote statistically significant values. *Pandemic Adversity* Pandemic Adversity Measure, *Community Case Rates* county 14-day rolling COVID-19 positive test total, *Prosocialness* Prosocial Scale for Adults, *Compassion* Compassion Scale, *Mindfulness* Five Facet Mindfulness Questionnaire (total score)

significantly associated with resilience ($ps > 0.05$). The observe facet ($\beta = -0.08$, $t(767) = -2.20$, $p = 0.03$) was associated with lower resilience. In contrast, the describe ($\beta = 0.11$, $t(767) = 3.35$, $p < 0.001$), act with awareness ($\beta = 0.28$, $t(767) = 8.38$, $p < 0.001$), and non-reactivity ($\beta = 0.42$, $t(767) = 12.61$, $p < 0.001$) facets were all significantly associated with greater resilience. The non-judgment ($\beta = 0.03$, $t(767) = 1.12$, $p = 0.26$) facet was not significantly related to resilience when controlling for other mindfulness facets, compassion, prosocialness, pandemic adversity and community case rates, and demographic variables. Mindfulness facets, compassion, and prosocialness (Step 3) added significantly to the model ($\Delta R^2 = 0.29$, $\Delta F(7, 768) = 52.14$, $p < 0.001$). All VIFs were below 2.10 and deemed acceptable. See Table 3 for model.

Discussion

Studies have indicated that college students experienced psychological difficulties during the pandemic (Li et al., 2021; X. Liu et al., 2020a, 2020b; Tang et al., 2020; Wang et al.,

2020; Zimmermann et al., 2020), and resilience has been shown to be a protective factor against distress during this period (Conrad et al., 2021; Kavčič et al., 2020; Riehm et al., 2021; Vos et al., 2021). As such, it is important to identify modifiable factors that promote resilience in college students as they face the many potential hardships presented by the global pandemic. The current study examined compassion, prosocialness, and mindfulness as potential resilience-promoting factors.

Mindfulness can be defined as noticing and taking a non-judgmental stance toward present-moment experiences (e.g., thoughts, emotions; Kabat-Zinn, 2003). The current study demonstrated that mindfulness associated with resilience among college students when also accounting for relevant demographic variables, pandemic-related adversity, and community positive case rates. Specifically, the ability to label or *describe* internal experiences, *act with awareness* (rather than on “auto-pilot”), and take a *non-reactive* stance toward internal experiences were associated with greater resilience. This may indicate that stepping back and labeling thoughts and emotions, rather than immediately reacting, and choosing one’s response with awareness can promote resilience. Indeed, this type of awareness and intentional

Table 3 Role of demographic characteristics, pandemic-related characteristics, compassion, prosocialness, and mindfulness facets in resilience

Variable	B	SE	β	t	p	R ²
Step 1						0.08
Gender	.37	.06	.22	6.27	<.001	
First-year status	-.23	.06	-.13	-3.76	<.001	
Sexual orientation	-.35	.09	-.14	-4.02	<.001	
Step 2						0.09
Gender	.35	.06	.20	5.81	<.001	
First-year status	-.20	.06	-.11	-3.27	.001	
Sexual orientation	-.31	.09	-.13	-3.61	<.001	
Pandemic adversity	-.01	.01	-.10	-2.92	.004	
Community case rates	.00	.00	.03	1.00	.32	
Step 3						0.39
Gender	.20	.05	.12	3.81	<.001	
First-year status	-.15	.05	-.09	-2.94	.003	
Sexual orientation	-.10	.07	-.04	-1.43	.15	
Pandemic adversity	-.004	.004	-.03	-.88	.38	
Community case rates	.00	.00	.01	.41	.68	
Prosocialness	.002	.003	.03	.78	.43	
Compassion	-.01	.06	-.01	-.21	.83	
Observe	-.01	.01	-.08	-2.20	.03	
Describe	.02	.01	.11	3.35	<.001	
Act with awareness	.04	.004	.28	8.38	<.001	
Non-judgments	.004	.004	.03	1.12	.26	
Non-reactivity	.08	.01	.42	12.61	<.001	

n=780. Bolded rows in the final model denote statistically significant values. *Pandemic Adversity* Pandemic Adversity Measure, *Community Case Rates* county 14-day rolling COVID-19 positive test total, *Prosocialness* Prosocial Scale for Adults, *Compassion* Compassion Scale, *Observe*, *Describe*, *Act with Awareness*, *Non-judgment*, *Non-reactivity* subscale totals of Five Facet of Mindfulness Questionnaire

responding may well allow for greater effectiveness in the face of adversity.

Interestingly, the ability to simply *observe* internal experiences was negatively associated with resilience. Though not hypothesized, this finding is consistent with previous work showing the observe facet to be associated with negative outcomes (Baer et al., 2006; Kroska et al., 2018a, 2018b). It is possible that simply noticing internal experiences (especially if unpleasant), without relating to them in an adaptive way, may be unhelpful in terms of resilient responding. Additionally, the non-judgment facet of mindfulness was not significantly associated with resilience. The current findings do not necessarily indicate that the observe and non-judgment mindfulness facets are unimportant in terms of resilience but may point to the importance of the interrelated and interdependent nature of the mindfulness processes.

Additionally, results indicated that compassion and prosocialness were not significantly associated with resilience. This was not anticipated given previous work suggesting that altruism may be “born out of suffering” (Vollhardt, 2009) and that behavioral compassion may promote health and well-being (Post, 2005). Altruism has also been shown to be associated with resilience in military veterans (Isaacs et al., 2017). It is possible that engagement in compassionate or prosocial acts may be more challenging in the context of the pandemic given quarantine and social distancing measures, making it less likely that these tendencies would promote resiliency in this period. Additionally, it could be that prioritizing compassion and prosocialness during the pandemic may even diminish emotional resources that could promote individual-level resilience. Moreover, given that some degree of prosocial behavior was requested by organizations (e.g., World Health Organization), such as wearing a mask or staying home when symptomatic, it may be that individuals had fewer resources for engagement in other prosocial behaviors. It is important to note that the lack of association between compassion and prosocialness and resilience in the current sample did not appear to be due to problems with multicollinearity. Though the constructs of compassion and prosocialness are related to mindfulness, they are also theoretically distinct. This was apparent in the current data, which showed only small correlations between both mindfulness and prosocialness and mindfulness and compassion. Though mindfulness was the most important associate of individual resilience in the current sample, compassion and prosocialness may still be important for promoting longer-term societal resilience, which was not examined here but will be important for future work to explore.

Interestingly, analyses also demonstrated that multiple demographic variables were associated with resilience. Males reported higher levels of resilience than females, which is consistent with other work during this time period (Riehm et al., 2021). This is also consistent with some

previous literature, where males showed greater levels of resilience compared to females (Bonanno et al., 2007; Campbell-Sills et al., 2009; Chmitorz et al., 2018; Rodriguez-Rey et al., 2016; Smith et al., 2008; Stein et al., 2009). However, examinations of gender differences in resilience have been mixed, and some research has found females to have greater resilience than males (McGloin & Widom, 2001; Davidson et al., 2005). A 2013 meta-analysis found that gender did have a significant, albeit small, effect on resilience; though, given concerns of sampling bias, the authors warned to interpret these results with caution (Lee et al., 2013). It has been suggested that gender differences in resilience may be reflective of the different types of social-ecological stressors faced by different genders (Portnoy et al., 2018). Perhaps female college students, compared to their male counterparts, face unique stressors that are related to their reduced resilience. Previous authors have also posited that gender differences on self-report resilience measures may be related to reporting bias, such that men may have a stronger desire to appear strong than women (Campbell-Sills et al., 2009). Given the mixed findings among gender differences in resilience, future research would benefit from continued investigations into whether there are gender differences in resilience, and if so, potential contributing factors of this difference. Further investigations into gender differences in resilience should consider the impact of *context* on resilience, as the COVID-19 pandemic is just one example of adversity that individuals may experience. Of additional importance, many previous studies have not clearly differentiated sex assigned at birth from gender identity or have used terms such as “female/male” and “women/men” interchangeably, perhaps conflating these constructs. Future work in this area should be attentive to the importance of differentiating sex assigned at birth from gender identity and to assessing gender identities other than simply man and woman (e.g., non-binary, gender fluid) as related to resilience.

Regarding other demographic variables associated with resilience, first-year students reported greater resilience than advanced students. This may be reflective of the significant change in the college experience that advanced students underwent during the pandemic. Advanced students may have been more solidly grounded in roles, relationships, and routines than first-year students. Thus, adjustments and adaptations may have been more challenging for advanced students. Finally, participants who self-identified their sexual orientation as something other than straight/heterosexual (e.g., lesbian, gay, bisexual, or other identities) reported lower levels of resilience than those who identified their sexual orientation as straight/heterosexual. In line with the minority stress model, this may be because of the unique stressors (e.g., discrimination) experienced by marginalized individuals (Brooks, 1981; Meyer, 2015). Meyer (2015) suggests that community resilience is particularly important, a

concept that highlights the importance of the broader community in creating an environment that provides resources and support to minoritized individuals in coping with stress and promoting well-being.

In the current sample, pandemic-related adversity was negatively correlated with resilience. This is intuitive given that as adversity mounts over time, coping strategies may diminish or be less readily available. This points to the importance of societal level intervention to reduce the impact of pandemic-related adversity on individuals and communities. Even still, it is possible that college students will continue to face multiple hardships during the pandemic, highlighting the importance of identifying targetable processes that may mitigate risk and promote resilience in the current context. Adversities faced by college students are likely accompanied by difficult internal experiences. Taking a mindful stance toward difficult thoughts and emotions amidst adversity may foster resilience. For example, stepping back, being aware of, and labeling present-moment experiences (e.g., “I’m noticing anxiety about my classes”), rather than reacting automatically, may promote understanding of the information offered by emotions (e.g., “My anxiety indicates that I care about education”). This may in turn allow individuals to respond intentionally and with awareness as they choose and engage in actions that promote adaptation in the context of adversity. Indeed, mindfulness has been shown to be associated with better mental health outcomes during the COVID-19 pandemic (Conversano et al., 2020). A next step in this area may be to examine longitudinally the mediating role of mindfulness in the relation between adversity and resilience. Additionally, mindfulness-based prevention and intervention efforts based in evidence-based approaches such as Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1982, 1990) or Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) may be appropriate for promoting resilience among college students during this time. Importantly, mindfulness components have been included in previous prevention and resilience programs targeting university students (Akeman et al., 2020; Galante et al., 2018; Rith-Najarian et al., 2019), potentially indicating promise for this type of approach more broadly.

Several limitations should be acknowledged. The sample was a relatively homogenous sample of college students, so results may not generalize. Data were cross-sectional, so causal inferences cannot be made, and all results are presumed to be associative in nature. Nearly all measures were self-report, which introduces potential social desirability biases and retrospective recall. Attention checks were not included in the surveys to filter out automatic responding. Additionally, as noted, an initial Qualtrics systems error led to a high level of missingness on the age variable. The COVID-19 case rates were utilized from the county where

the university is located; however, students may not have been located in that county when completing the survey (i.e., traveling for a weekend or taking classes online). Nevertheless, the case rates in this county were most likely to impact coursework and student life. Additionally, resilience can be defined and characterized in a variety of ways, with self-report measures being one of many possible approaches. Future work may benefit from objective methods for operationalizing individual and community resilience in the context of the pandemic.

In conclusion, the current study identified mindfulness, specifically the describe, act with awareness, and non-reactivity facets, as significantly associated with resilience over and above demographic variables, pandemic-related adversity, prosocialness, compassion, and community case rates in a sample of college students during the COVID-19 pandemic. The results have important implications for prevention and intervention efforts.

Author Contribution Anne I. Roche — study conceptualization, data collection, manuscript preparation.

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Declarations

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