Empirically Derived Psychological Profiles of College Students: Differential Associations With COVID-19 Impact and Social Adjustment

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Abstract
Using latent profile analysis, we derived psychological profiles of undergraduates during the pandemic and investigated profiles’ differential associations with COVID-19 impact and social adjustment. Participants (N = 517) completed measures of depression, loneliness, and anxiety, and two indices of social adjustment: friendship support and social connectedness. We identified Severe, Moderate, and Mild symptom profiles. Higher COVID-19 impact was associated with increased odds of belonging to the Severe versus Moderate and Mild profiles, and the Moderate versus Mild profile. On social adjustment, the Mild profile outscored the Moderate profile, which outscored the Severe profile. Overall, findings imply that individuals who perceive high levels of COVID-19 impact are especially likely to belong to a profile characterized by severe psychological symptoms and that membership in this profile is associated with social maladjustment.

Keywords
psychological adjustment, social adjustment, college, COVID-19, latent profile analysis

There is accruing evidence that the COVID-19 pandemic is associated with psychological difficulties across the lifespan (see e.g., Ettman et al., 2020; Firkey et al., 2020; Gassman-Pines et al., 2020). The impact of the pandemic on mental health may be especially severe when it prevents individuals from engaging in tasks that are critical for adaptive development. For example, identity exploration and self-focus are characteristic of emerging adulthood, a developmental period in the life course that follows adolescence and precedes adulthood and that characterizes most college students (Arnett, 2000). Unfortunately, health protocols, such as social distancing and remote learning, which many colleges implemented to reduce risk of virus transmission, presumably limited students’ ability to explore their identity through in-person social interactions, extracurricular activities, and other avenues normally available to students in a college setting. In addition, COVID-19 caused some students to assume responsibilities, such as working or caregiving, diminishing their freedom to focus on themselves in ways that are more typical for emerging adults in college (Arnett, 2000).

Many students at residential colleges were impacted by COVID; that is, they were faced with significant disruptions to their educational experience and to their expectations of what college would be like. Within a 1-week period in mid-March, 2020, almost 60% of 4-year colleges and universities shifted to online instruction (Marsicano et al., 2020), and additional schools followed soon after. By fall 2020, colleges announced a variety of models for opening. At the beginning of October, about 10% of nearly 3000 colleges and universities were fully online, 4% were fully in person, and the majority were partially in person and partially online (Chronicle of Higher Education, 2020). Private, 4-year institutions like the two institutions in the current study were often “primarily in person” (close to 30%) or “primarily online” (less than 20%; The College Crisis Initiative, 2022). Many students were not allowed on campus due to efforts to de-densify residential campuses. Even when students returned to campus, mitigation strategies were in place, and there were significant changes to campus life (e.g., dining halls and fitness centers were closed).

Thus, substantial disruptions to academic instruction and the overall student experience due to the pandemic continued in...
the fall of 2020 and beyond. Given these obstacles, college students may be at particular risk for experiencing psychological maladjustment during, and in the aftermath of, COVID-19.

**Psychological Adjustment During COVID-19**

Indeed, there is mounting support for the premise that college students have experienced elevated levels of mental health problems during COVID-19 (see e.g., Huckins et al., 2020; Kecojevic et al., 2020; Tasso et al., 2021; Wang et al., 2020). For example, studies based on U.S. and international samples of college students provide evidence for increases in anxiety and depression in Winter 2020 (i.e., the first semester affected by COVID-19) compared to previous terms (Huckins et al., 2020), positive links between depression and anxiety and time spent seeking COVID-related information (Kecojevic et al., 2020), and COVID-related depression, anxiety, and loneliness (Tasso et al., 2021). Despite evidence that COVID-19 has adversely impacted college students’ mental health, little is known about heterogeneity in their psychological adjustment during COVID-19 (but see Browning et al., 2021). Uncovering subpopulations with differing psychological profiles has the potential to provide us with a more nuanced understanding of college students’ psychological functioning during COVID-19. The first aim of our study was to employ latent profile analysis to empirically derive distinct profiles defined by students’ scores on measures of depression, loneliness, and anxiety. We chose these three indicators of psychological adjustment because they reflect some of the most common experiences of internalizing distress among college students and were known to be high among students even before the pandemic (e.g., Hunt & Eisenberg, 2010). In addition, as described above, data from early in the pandemic suggest that these particular psychological challenges were exacerbated with the impact of COVID-19.

Latent profile analysis (LPA) is a person-centered analytic strategy that permits the identification of subpopulations, or profiles, of individuals who are alike on a set of variables (Nylund-Gibson & Choi, 2018). Unlike variable-oriented analyses that describe associations between variables, LPA enables researchers to examine variability within a sample and the relative proportion of individuals who comprise the identified profiles. We expected that LPA would reveal heterogeneity in the psychological adjustment of college students, with at least one profile comprised of psychologically “at-risk” students and another comprised of psychologically well-adjusted students. We base this hypothesis on the assumption that individual variability in the severity of students’ symptoms may be especially likely during COVID-19 given differences in students’ experiences, intrapersonal factors, reactions to stressors associated with the pandemic, and the availability of potential protective factors.

Aim 2 was to evaluate factors that increase the likelihood of membership in the identified profiles. Given that stressful life events, and individuals’ cognitive appraisals of those events, play a role in the etiology of psychopathology (Grant et al., 2003), we expected that students who reported high levels of negative COVID-19 impact on their emotions, behaviors, and/or other situational factors (e.g., physical health, finances) would have increased odds of belonging to a profile characterized by severe psychological symptoms. In addition, there is reason to believe that females are at particular risk for psychological maladjustment during the pandemic. Investigators have found that female, compared to male, college students experienced greater increases in loneliness between January and April/May 2020 (Lee et al., 2020); females 18–29 years reported higher levels of loneliness, anxiety, and depression relative to their male counterparts (McQuaid et al., 2021); and female undergraduates were more likely to report that COVID-19 negatively impacted their stress levels and mental health (Prowse et al., 2021). We expected that BIPOC (i.e., Black, Indigenous, and people of color) students may likewise be at heightened risk for severe psychological symptoms, in view of research showing that COVID-19 has disproportionately affected the mental health of college students of color (Soria et al., 2020). Finally, on the basis of limited evidence suggesting that students in the early stages of their collegiate experience are especially susceptible to psychological maladjustment (Bewick et al., 2010; Wang et al., 2020), we hypothesized that lower-division students would be more likely than upper-division students to belong to a profile characterized by severe psychological symptoms.

Motivated by an extensive literature that attests to the intimate association between psychological and social adaptation during the college years (e.g., Friedlander et al., 2007; Hefner & Eisenberg, 2009; Mounts et al., 2006), the third aim of our study was to test for mean differences across identified psychological profiles in friendship support and social connectedness. Individuals who report high levels of social support perceive that specific people, such as friends, are available and willing to help in emotional and/or instrumental ways (Thoits, 1995). In comparison, social connectedness reflects a global and stable perception of one’s relationships with others and their place within the social world (Lee & Robbins, 1995). Individuals who report high levels of social connection acknowledge a sense of belongingness whereas low social connection reflects a sense of emotional distance from others (Lee & Robbins, 1995). Although these two indicators of social adjustment are conceptually distinct, both are critical for healthy psychological adjustment in college (Williams & Galliher, 2006) and have likely been disrupted during the pandemic.

**Associations Between Psychological Symptoms and Social Adjustment**

According to the stress-buffering hypothesis, social support has the potential to reduce the impact of stress, foster effective coping, and, in turn, exert a positive effect on individuals’
well-being (Cohen & Wills, 1985). Several studies lend support for the hypothesis that social support from friends, family, and other special people are associated with fewer symptoms of depression and anxiety (e.g., Hefner & Eisenberg, 2009; Lee et al., 2020; Lee et al., 2014) and lower levels of loneliness (Nicpon et al., 2006).

Across the lifespan, but especially in adolescence through emerging adulthood, friendships are developmentally significant because friends, and the provisions they afford, including emotional and instrumental support, are theorized to satisfy important interpersonal needs (Barry et al., 2016; Demir, Orthel-Clark, Ozdemir, & Ozdemir, 2015; Sullivan, 1953). It is not surprising, therefore, that low levels of friend support are associated with depression (e.g., Sheets & Mohr, 2009) and loneliness (e.g., Lee & Goldstein, 2016). Examining friendship support separate from other sources of support (e.g., family, romantic partner) is needed in view of evidence that peer relationships play an important role in college students’ overall adjustment (Swenson et al., 2008) and because it is possible that psychological adjustment may be differentially associated with social support depending on the source of support and the developmental period under investigation (see Lee & Goldstein, 2016; Sheets & Mohr, 2009).

Social connectedness is likewise associated with college students’ psychological well-being. Individuals with lower levels of social connectedness have a greater propensity for experiencing discomfort within social interactions, exhibiting social skills deficits, and making negative attributions about others (Lee et al., 2001). These social difficulties have the potential to both contribute to and result from impairments in psychological functioning (see Rudolph, 2009 for a discussion of interpersonal theories of depression). Indeed, investigations aimed at explicating links between social connectedness and psychological well-being show that college students’ sense of connectedness is inversely related to negative emotions, such as feelings of depression, low self-esteem, and loneliness (Baumeister & Leary, 1995; Lee & Robbins, 1998; Williams & Galliher, 2006).

Investigating Friendship Support and Social Connectedness During COVID-19

One reason why it is important to examine college students’ social adjustment, and their psychological correlates, during COVID-19 is that the pandemic significantly altered college students’ patterns of social behavior. For example, remote learning and social distancing protocols contributed to considerably fewer in-person interactions with friends and classmates. In addition, health-related restrictions and COVID-19 mitigation strategies prohibited the coming together of students for academic events, extracurriculars, campus-wide social activities, and informal social gatherings or parties. Such a drastic departure from normative patterns of social behavior may impinge on both perceptions of friendship support and social connectedness, especially among students experiencing psychological difficulties.

Restricted social interactions may make it especially challenging for college students to access the support of friends in the ways they typically would. Even among students who maintain contact with a close friend during the pandemic via mobile technology or otherwise, interpersonal theories of depression (Rudolph, 2009) help explain how those who are psychologically at-risk may experience lower friendship support. Specifically, an individual may experience declines in friendship support if their internalizing distress, which may be elevated during the pandemic (Huckins et al., 2020; Kecojevic et al., 2020; Tasso et al., 2021), leads to behaviors (e.g., excessive reassurance seeking and self-focus) that can be off-putting to friends.

Decreases in social interactions may also affect students’ social connectedness. In fact, although social connectedness is typically conceptualized as stable or trait-like, it is malleable in some circumstances, such as in the presence of significant life events (Lee & Robbins, 1995; 1998). The pandemic has necessitated physical distancing but a likely byproduct is emotional distance – from friends, classmates, family, and other acquaintances on a college campus.

Study Overview

We first utilized LPA to derive psychological symptom profiles on the basis of college students’ scores on depression, loneliness, and anxiety. We examined COVID-19 impact, gender, BIPOC status, and year in school as predictors of profile membership. Finally, we tested for mean differences in friendship support and social connectedness among profiles. These objectives are important because they have the potential to inform interventions for college students who are especially at-risk for maladjustment amidst the ongoing health crisis.

Method

Participants

Participants were 517 college students (57.4% female, 42% male, 0.6% nonbinary or prefer to self-describe; Mage = 19.52, SD = 1.26) recruited from two, mid-sized, residential liberal arts institutions in the Southeastern United States. First year students comprised 25.3% of the sample, 39.5% of participants were 2nd year students, 13.5% of the sample was in their 3rd year, 19.5% of students were in their 4th year, and 2.2% in their 5th year. The majority of the sample was from the United States (86.8% domestic; 13.1% international). Half (49.5%) of the sample self-identified as White, 22.1% as Asian, 7.7% as Black or African American, 7.4% as Hispanic or Latino, and 2.1% reported another race or ethnicity. Multiracial participants (11.2%) were those who identified as belonging to more than one racial/ethnic category. First-generation students...
(i.e., students whose parents do not hold a Bachelor’s degree) comprised 21.7% of our sample, and 22.8% reported receiving a Pell Grant, or federal funding that supports undergraduates displaying exceptional financial need.

Participants reported the highest level of education for their primary caregiver: 12.3% of primary caregivers completed some or all of high school, 11.3% completed some college, 27.7% received a Bachelor’s degree, 27.7% received a Master’s degree, 19.5% received a Doctorate, Medical, or Law degree, and 1.6% reported completing some other form of graduate degree. Participants also reported family income: 8.5% reported a family income under $25,000, 13.6% reported $25,000-$49,999, 14.4% reported $50,000-$74,999, 12.9% reported $75,000-$99,999, 18.8% reported $100,000-$149,999, and 31.8% reported a family income of over $150,000. Participant demographics approximate those at the two institutions from which we recruited.

When the data were collected in November 2020, COVID mitigation efforts were in place, and students at the two institutions were in a variety of living situations. Most (70%) had returned to campus and were living in campus housing; 20.7% of students were living at home; and 8.7% were living off campus but not at home (e.g., in an apartment with friends). Note that the percentage of students residing on campus is substantially less than in a typical year for these two institutions when approximately 90% of students live on campus. In addition, both institutions were conducting classes in a variety of formats, including in-person classes (with masks and social distancing required), hybrid classes, and fully online classes. Only 18.2% of students had no online classes (27.3% had four or more online classes), and 27.5% of students had no in-person classes (only 17.8% had four or more in-person classes). Thus, even students who were living on campus often had at least some of their classes online. In addition to online classes, other typical campus activities were significantly restricted. For example, club and organization meetings were moved online; dining services were mostly take out; athletic teams either could not play or had very limited numbers of fans in attendance; campus social events were restricted to very small numbers of students or were prohibited entirely. Overall, then, typical campus life at these two institutions was significantly disrupted and looked substantially different than in pre-pandemic times.

The percent of the sample drawn from each institution (71.2% vs. 28.8%) is roughly proportional to the institutions’ reported student enrollments (3161 vs. 993). To evaluate differences on key variables (i.e., depression, loneliness, anxiety, COVID-impact, friend support, social connectedness) between participants at the two institutions, we conducted independent t-tests. There were differences across institutions on measures of depression, $t(512) = -2.42, p = .02 (M = 22.22, SD = 12.12 vs. M = 24.83, SD = 10.62)$, loneliness, $t(512) = -3.18, p = .00 (M = 2.69, SD = 0.87 vs. M = 2.96, SD = 0.86)$, COVID-impact, $t(512) = -3.59, p = .00 (M = 3.39, SD = .59 vs. M = 3.59, SD = 0.57)$, and social connectedness, $t(512) = 2.39, p = .02 (M = 3.93, SD = 1.18 vs. M = 3.66, SD = 1.14)$. There were no differences on measures of anxiety and friendship support.

**Procedure**

Data were collected in November 2020. Prior to data collection, the principal investigators obtained permission to conduct research from each university’s Institutional Review Board. Study personnel sent recruitment messages through the daily email forum that informs students about events, news, and research on campus. Study personnel also distributed via email and GroupMe an electronic flyer with study information. Recruitment materials included a link and a QR code to a web-based survey.

Undergraduates who were at least 18 years old and enrolled in either institution were eligible to participate. Participants provided informed consent, and they were told that their responses would be kept confidential, they could withdraw their consent at any point, and they could skip any questions they did not wish to answer. Participants were instructed to independently complete the 25-minute survey on psychosocial and academic adjustment during COVID-19 in a distraction-free location of their choice. After completing the survey, they were directed to a debriefing page that provided a brief description of the purpose of the study and listed resources students could access should they experience psychological distress. Upon submitting the survey, participants received an Amazon gift code as compensation. We omitted data for four participants because they completed their survey in fewer than 10 minutes, which was less time than was realistically possible, based on our piloting of the survey.

**Measures**

We first provide a description of the covariates of COVID-19 impact, gender, BIPOC status, and year in school. Second, we describe measures of the latent profile indicators, which include depressive symptoms, loneliness, and anxiety. Third, we discuss friendship support and social connectedness measures, the distal outcomes under investigation.

**Covariates**

**COVID Impact.** We used 12 items from a 16-item scale that was designed to measure perceptions of COVID-19 impact in multiple domains of life (Skinner & Lansford, 2020). We omitted four items because they were not relevant to our sample (Item 4: Impact on parenting) or not permitted by the IRBs (Items 16–18: Smoking, Alcohol use, & Illicit drug use). Participants were instructed to think about their life now, and in the last 3 months, and rate how the pandemic affected their emotions (e.g., anger), behavioral tendencies/habits/activities (e.g., exercise), and other situational factors (e.g., income, working conditions, interactions with family members). Participants responded on a 5-point Likert Scale (1 = made it a
lot better to 5 = made it a lot worse). We computed each participant’s score by averaging their scores on all items ($\alpha = .79$). Scores close to 5 on this measure reflect a strong, negative COVID impact; scores close to 1 reflect a strong, positive effect; and scores close to 3 represent little or no effect in either direction.

**Gender.** Participants were asked to indicate their gender by selecting one of the following options: female, male, transgender, gender neutral, non-binary, other, or prefer to self-describe. Because only 0.06% of the sample ($n = 3$) reported a gender other than female or male, LPA analyses excluded these three cases following Step 1 (i.e., enumeration) of the 3-step BCH approach (see Data Analytic Strategy below).

**BIPOC Status.** Participants were asked to select one or more categories that best describe their race/ethnicity. To avoid unreliable statistical estimates due to small cell sizes for some racial and ethnic groups, we created a dichotomous race variable, such that BIPOC ($n = 261$) refers to participants who identified as belonging to at least one non-White racial/ethnic category. We note important limitations associated with this strategy in the Discussion section.

**Year in School.** Given our interest in examining potential differences in psychological adjustment for lower-division (1st/2nd year; $n = 335$) versus upper-division (3rd/4th/5th year; $n = 178$) students, we created a dichotomous year-in-school variable.

**Latent Profile Indicators**

**Depressive Symptoms.** We used the 20-item Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977) as an index of depressive symptoms. Participants were given a list of feelings or experiences and asked how often they had experienced them over the past few weeks. The scale included items such as “I was bothered by things that usually don’t bother me” and “I felt everything I did was an effort.” Participants responded on a 4-point Likert scale ($0 = rarely or none of the time to 3 = most or all of the time$). We computed each participant’s depression score by summing across all items. Higher scores indicated higher levels of depression, and scores of 16 or greater may reflect risk for clinical depression ($\alpha = .92$).

**Loneliness.** Participants completed the 10-item Loneliness in Context scale to assess feelings of loneliness in college (Asher & Weeks, 2014). One challenge with many measures of loneliness is that they include items about both the emotional experience of loneliness and the potential causes of loneliness (e.g., the availability of friends and others, whether one receives expected provisions from relationships). Including this mix of items is potentially problematic when the research question is about associations between loneliness and social adjustment. Importantly, the items on the Loneliness in Context measure index the emotional experience of loneliness only, and the measure is thus considered a “pure” measure of loneliness (Asher & Weeks, 2014). Participants were asked to what extent they agree with a list of statements, such as “Class is a lonely place for me” and “My free time is a lonely time for me.” Participants responded on a 5-point Likert Scale ($1 = strongly disagree to 5 = strongly agree$). We computed loneliness scores by averaging across the ten items for each participant ($\alpha = .90$).

**Anxiety.** Participants completed the General Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006) to assess anxiety. Participants indicated how often in the past 2 weeks they experienced each symptom. Examples include “feeling nervous, anxious, or on edge” and “trouble relaxing.” Participants responded on a 4-point Likert scale ($0 = Not at all to 3 = Nearly every day$). Scores were computed by taking the sum of all items; scores of 5, 10, and 15 may be interpreted as representing mild, moderate, and severe anxiety, respectively ($\alpha = .91$).

**Distal Outcomes**

**Friendship Support.** To measure perceptions of social support from friends, we administered a 4-item subscale of the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988). Participants indicated to what extent they agreed with statements such as “I can talk about my problems with my friends” and “My friends really try to help me.” Participants responded on a 7-point Likert Scale ($1 = very strongly disagree to 7 = very strongly agree$). We averaged scores on the four items to compute a mean support score per participant ($\alpha = .92$).

**Social Connectedness.** We measured social connectedness using the 8-item Social Connectedness Scale (Lee & Robbins, 1995). Participants indicated how much they agreed with a list of negatively valanced statements regarding their connectedness to people around them. Items included “I feel disconnected from the world around me” and “I have no sense of togetherness with my peers.” Participants responded using a 6-point Likert Scale ($1 = strongly disagree to 6 = strongly agree$). To compute each participant’s social connectedness score, we reverse scored items and averaged across the items with higher scores reflecting higher levels of connectedness ($\alpha = .90$).

**Data Analytic Strategy**

We first inspected data for non-normality and missingness. We then employed a manual 3-step BCH approach (Asparouhov & Muthén, 2014) to conduct LPA in Mplus 8.6 (Muthén & Muthén, 1998–2021). The goal of LPA is to identify subpopulations (i.e., latent profiles) using a set of observed indicators (Nylund-Gibson & Choi, 2018). A person-centered approach, LPA has the potential to uncover important
individual differences – ones that may be missed with variable-centered analyses that do not differentiate between profiles within the population (Ferguson et al., 2020). In addition, LPA permits an examination of auxiliary variables, or variables that predict and are predicted by profile membership (Ferguson et al., 2020). We used the 3-step BCH approach because, unlike other methods for including auxiliary variables in mixture models, it maintains the integrity of identified profiles upon the inclusion of covariates and distal outcomes (see McLarnon & O’Neill, 2018; Nylund-Gibson et al., 2019). In the LPA framework, the term “distal” outcomes is used even though LPA is usually conducted with cross-sectional data (Nylund-Gibson & Choi, 2018), which is true of the present study.

Step 1 was enumeration, or estimating models with one to five profiles, using depression, loneliness, and anxiety indicators, and identifying the best-fitting unconditional LPA model (Ferguson et al., 2020; Nylund-Gibson et al., 2019). We made model retention decisions on the basis of substantive interpretability (i.e., do these profiles make conceptual sense?) and multiple fit indices, including Akaike’s Information Criterion (AIC), Bayesian Information Criterion (BIC), and Sample-Adjusted BIC (SABIC), with lower values indicating better fit (Nylund-Gibson & Choi, 2018). We also evaluated the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR) and the bootstrapped likelihood ratio test (BLRT) with significant p-values indicating that the more complex model was a superior fit to the data (Ferguson et al., 2020; Nylund-Gibson & Choi, 2018).

Following class enumeration, and to evaluate covariates and distal outcomes, we estimated the Step 2 model, which generated an external data file that contained individual membership probabilities with weights applied to account for profile membership uncertainty. In Step 3, we used this data file to conduct covariate and distal outcome analyses. We included gender, BIPOC status, year in school, and COVID-19 impact as covariates in a multinomial logistic regression analysis, resulting in logits and odds ratios that permitted the evaluation of differences in the likelihood of profile membership based on each covariate. In addition, we estimated the profile-specific distal outcome means of perceived friendship support and social connectedness and conducted pairwise Wald tests to evaluate the equality of means across profiles. Each distal outcome was also regressed on gender, race, and year in school to control for mean differences between male versus female students, BIPOC versus White students, and upper- versus lower-division students on friendship support and social connectedness.

Results

Descriptive Statistics

Means, standard deviations, and correlations appear in Table 1. All variables were correlated in the expected directions. Specifically, depression, loneliness, and anxiety were positively correlated, and each was negatively associated with friendship support and social connectedness. Additionally, participants reporting a greater negative impact of COVID-19 on their lives also reported higher depression, loneliness, and anxiety, and lower friendship support and social connectedness. Mean levels of depression in our sample were high with considerable variability, and mean levels of anxiety were in the mild to moderate range, according to reports of norms and/or cutoff scores on the depression and anxiety measures.

We screened all LPA indicator (i.e., depression, loneliness, anxiety) and distal outcome (i.e., friendship support, social connectedness) variables, and the covariate of COVID-19 impact, for non-normality. In simulation studies, absolute values of skewness and kurtosis between 1 and 2.3 are routinely characterized as moderate non-normality, and values exceeding 2.3 as severe non-normality (Blanca et al., 2013). Using these criteria, skewness/kurtosis for the indicators included in the LPA were within acceptable range: 0.32/−0.49 for depression, 0.10/−0.57 for loneliness, and 0.48/−0.73 for anxiety. The covariate of perceived COVID-19 impact likewise demonstrated normality, with skewness/kurtosis values of −0.47/0.62. One distal outcome, perceived friendship support, demonstrated slight to moderate skewness (−1.22) and kurtosis (1.98), but for the other distal outcome of social connectedness, skewness (−0.23) and kurtosis (−0.55) values were acceptable. Overall, skewness and kurtosis values provide evidence of normal data. To address the slight to moderate departure from normality for the perceived friendship support variable, we used a maximum likelihood robust estimator (MLR), which provides standard errors and chi square.

| Variable               | M   | SD  | 1    | 2    | 3    | 4    | 5    |
|------------------------|-----|-----|------|------|------|------|------|
| 1. COVID Impact        | 3.45| 0.59| —    | —    | —    | —    | —    |
| 2. Depression          | 22.98| 11.73| 0.55 | —    | —    | —    | —    |
| 3. Anxiety             | 8.75| 5.81| 0.43 | 0.73 | —    | —    | —    |
| 4. Loneliness          | 2.77| 0.87| 0.46 | 0.72 | 0.52 | —    | —    |
| 5. Social Connectedness| 3.85| 1.17| −0.47| −0.74| −0.52| −0.78| —    |
| 6. Perceived friend Support| 5.40| 1.19| −0.26| −0.37| −0.25| −0.41| 0.48 |

Note. All correlations are significant at $p < .01$. 

Table 1. Means, Standard Deviations, & Correlations for Study Variables.
statistics for non-normal data (Muthen & Muthen, 1998–2021). There were no missing data on LPA indicators or distal outcomes. As noted in the Measures section, three cases were excluded from analyses that involved gender as a covariate.

Model Selection
To address Aim 1, which was to derive distinct psychological profiles defined by scores on measures of depression, loneliness, and anxiety, we estimated models with one to five profiles. Results from the LPA indicated that a three-profile model (Figure 1) was the optimal solution (refer to Table 2 for model fit indices). For three main reasons, we did not select the four- and five-profile solutions. First, after three profiles, we observed minimal decreases in AIC/BIC/SABIC, which may suggest a point of “diminishing returns in model fit” (Nylund-Gibson & Choi, 2018, p. 9). Second, the LMR test comparing the three- and four-profile solutions yielded a p-value of .05, which suggests that the four-profile model may not represent an improvement in fit over the three-profile model. Third, the three-profile solution was conceptually meaningful whereas the four-profile model resulted in a fourth profile that was not theoretically distinct from each of those identified in the three-profile solution.

Latent Profiles
The mean values for the indicators (i.e., depression, loneliness, anxiety) used in the LPA appear in Table 3. Three distinct profiles emerged. The first, characterized by “Mild Psychological Symptoms” (Profile 1: Mild), includes participants who reported low levels of depression, loneliness, and anxiety relative to participants in the other two profiles. A second profile, “Moderate Psychological Symptoms” (Profile 2: Moderate), included participants whose scores on depression, loneliness, and anxiety were higher than those reported by participants in the Mild Psychological Symptoms profile but lower than those reported by participants in a third profile, the “Severe Psychological Symptoms” profile (Profile 3: Severe).

Estimating Covariates and Distal Outcomes
This study’s Aim 2 was to evaluate whether negative COVID impact, and being a male versus female student (coded 1 and 0, respectively), BIPOC versus White student (coded 1 and 0, respectively), or upper- versus lower-division student (coded 1 and 0, respectively) increased odds for belonging to the three psychological profiles. To address Aim 2, we conducted multinomial logistic regressions with COVID-19 impact, gender, BIPOC status, and year in school as covariates. As predicted, odds ratios (see Table 4) showed that higher negative COVID-impact was associated with increased odds of being in the Severe versus Moderate and Mild profiles, and in the Moderate versus the Mild profile. In addition, being female was associated with a greater likelihood of belonging to the Moderate and Severe profiles compared to the Mild profile, and the Severe, relative to the Moderate, profile. We also found that BIPOC participants were nearly twice as likely as White participants to belong to the Severe compared to the Mild profile. The proportion of upper- versus lower-division students did not differ across profiles.

Table 2. Latent Profile Analysis Model Fit Summary.

| Model | Log Likelihood | AIC     | BIC     | SABIC   | Entropy | Smallest Class % | LMR p-value | BLRT p-value |
|-------|----------------|---------|---------|---------|---------|-----------------|-------------|--------------|
| 1     | -4312.51       | 8637.02 | 8662.50 | 8643.46 | —       | —               | —           | —            |
| 2     | -4035.97       | 8091.93 | 8134.41 | 8102.67 | 0.80    | 40              | .00         | .00          |
| 3     | -3943.22       | 7914.44 | 7973.91 | 7929.47 | 0.79    | 22              | .00         | .00          |
| 4     | -3916.45       | 7868.90 | 7945.36 | 7888.23 | 0.79    | 13              | .05         | .00          |
| 5     | -3892.06       | 7828.12 | 7921.58 | 7851.74 | 0.77    | 11              | .05         | .00          |

Note. AIC = Akaike’s Information Criterion; BIC = Bayesian Information Criterion; SABIC = Sample-Adjusted BIC; LMR = Lo-Mendell-Rubin adjusted likelihood ratio test; BLRT = Bootstrapped likelihood ratio test.
Our third aim was to test for mean differences across identified psychological profiles in friendship support and social connectedness. We did so by estimating the profile-specific distal outcome means of friendship support and social connectedness and conducted pairwise Wald tests to evaluate the equality of means across profiles. Means and Wald test results appear in Table 5. Findings showed that participants in the Mild profile outscored those in the Moderate and Severe profiles on measures of friendship support and social connectedness. Additionally, friendship support and social connectedness scores were higher for those in the Moderate compared to the Severe profile.

Our model included direct paths from gender, race, and year in school to each distal outcome. Regression results indicated that gender was a predictor of distal outcomes in the Mild profile only, such that being female was associated with higher levels of friendship support ($B = -.50, p = .001$) and social connectedness ($B = -.24, p = .04$). Results further revealed that race was associated with social connectedness in the Severe profile only, with White students outscoring BIPOC students ($B = -.42, p = .03$). We found no additional support for predictive associations between demographic variables (i.e., gender, race, and year in school) and indices of social adjustment (i.e., friendship support and social connectedness).

### Summary of Findings

Results from the LPA provide support for three psychological symptoms profiles: Mild, Moderate, and Severe. Notably, individuals belonging to the Severe profile reported, on average, the highest levels of loneliness, as well as levels of depression and anxiety that meet or exceed clinical cut-offs routinely used for these measures. Interestingly, the average depression score for the Moderate profile also exceeded the clinical cut-off. Overall, being female and BIPOC, and reporting high levels of negative COVID-impact, were associated with increased odds of belonging to the Severe profile. In addition, participants in the Severe profile fared the worst on

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**Table 3. Mean Scores for Indicator Variables for the Three-Profile Solution.**

| Variable     | Profile 1 Mild symptoms | Profile 2 Moderate symptoms | Profile 3 Severe symptoms |
|--------------|-------------------------|-----------------------------|---------------------------|
|              | ($n = 178$)             | ($n = 226$)                 | ($n = 113$)               |
| Depression   | 11.16 (0.86)            | 24.20 (1.10)                | 38.61 (1.21)              |
| Loneliness   | 2.01 (0.08)             | 2.89 (0.08)                 | 3.70 (0.10)               |
| Anxiety      | 3.67 (0.30)             | 8.95 (0.63)                 | 16.10 (0.65)              |

**Table 4. Covariate Logits and Odds Ratios for the 3-Profile Model.**

| Covariate                | Reference Profile | Profile 1: Mild | Profile 2: Moderate | Profile 3: Severe |
|--------------------------|-------------------|-----------------|--------------------|-------------------|
| Gender (Male)            |                   |                 |                    |                   |
| Mild                     | —                 | —               | .89***             | 2.43              |
| Moderate                 | —                 | .41             | —                  | 0.67*             |
| Severe                   | —                 | —               | 0.67*              | 0.67*             |
| Race (BIPOC)             |                   |                 |                    |                   |
| Mild                     | —                 | —               | —                  | 0.29              |
| Moderate                 | —                 | 1.34            | —                  | 0.39              |
| Severe                   | —                 | 1.98            | —                  | 1.48              |
| Year in school (Upper division) |                   |                 |                    |                   |
| Mild                     | —                 | —               | 0.08               | 1.09              |
| Moderate                 | —                 | 0.92            | —                  | 0.29              |
| Severe                   | —                 | 1.24            | —                  | 1.34              |
| Perceived negative COVID-19 impact |                   |                 |                    |                   |
| Mild                     | —                 | —               | –1.81***           | 0.16              |
| Moderate                 | —                 | 6.09            | —                  | –2.16***          |
| Severe                   | —                 | 52.77           | —                  | 8.66              |

Note. The sample was 42.0% male ($n = 217$), 50.5% BIPOC ($n = 261$), and 35.2% upper division students (third year or higher; $n = 182$). * $p \leq .05$. ** $p < .01$. *** $p < .001$. 


both indicators of social adjustment. In sum, college students who experienced high levels of negative COVID-19 impact were at particular risk for belonging to a profile characterized by elevated psychological symptoms and that membership in this profile was associated with lower levels of friendship support and connectedness.

Discussion

Results extend what is known about college students’ psychosocial adjustment during COVID-19 in three key ways. First, we obtained evidence of substantial heterogeneity in students’ psychological functioning during the pandemic. LPA provided support for a three-profile solution, which included Mild, Moderate, and Severe psychological profiles. Not quite half the sample was classified as belonging to the Moderate profile for whom depression, loneliness, and anxiety scores were higher than those reported by participants in the Mild Profile but lower than those reported by individuals in the Severe Profile. Importantly, even though scores on depression, loneliness, and anxiety variables indicated that psychological maladjustment was most pronounced among individuals in the Severe profile, participants belonging to the Moderate profile likewise evidenced concerning levels of psychological distress, with depression scores in the clinical range and moderate levels of generalized anxiety. Nearly two-thirds of the sample (i.e., students belonging to the Moderate and Severe profiles), therefore, reported symptoms consistent with clinical depression as well as scores indicative of moderate to severe generalized anxiety.

The other third of the sample belonged to the Mild symptoms profile. Individuals in this profile reported less depression, loneliness, and anxiety compared to the other two profiles; however, scores on psychological symptom measures, and especially the depression measure, imply that even in the Mild profile, the average student experienced some degree of symptomatology. Overall, the severity of psychological maladjustment reported by the majority of this study’s sample is alarming but perhaps not surprising. Even before the pandemic, the prevalence and severity of mental health problems among college students were on the rise (e.g., Hunt & Eisenberg, 2010), and other research teams have likewise reported elevated levels of mental health difficulties among college students during the pandemic (see e.g., Huckins et al., 2020; Kecojevic et al., 2020; Tasso et al., 2021; Wang et al., 2020).

A second key finding is that individuals who perceived the greatest negative impact of COVID-19 were most likely to belong to a profile characterized by high levels of psychological difficulties. College students in the Severe profile were 6 times more likely than those in the Moderate profile and nearly 53 times more likely than those in the Mild profile to report high levels of negative COVID-19 impact. Some college students, more so than others, may have been affected by an abrupt pivot to remote learning, significant changes to campus life, added responsibilities related to elder or child care, and/or restricted social interactions, and students most affected by pandemic-related stressors may have fared the worst psychologically. Because our cross-sectional design does not permit causal inferences, we cannot conclude that the psychological symptoms reported by our participants are resulting from these or other COVID stressors. Findings from other studies, however, do show markedly higher rates of mental health problems during than before COVID-19 (Ettman et al., 2020) and, thus, lend credence to the proposition that COVID-19 has undermined college students’ psychological well-being.

Still, alternate explanations for our findings should be considered. For example, on the basis of evidence that cognitive processing plays an important role in the etiology of psychopathology (Grant et al., 2003), perhaps students who experience elevated levels of psychological symptoms are prone to negative thoughts that artificially inflate their perceptions of COVID’s impact. Longitudinal studies that began before, and have continued during, the pandemic have the potential to clarify the extent of COVID’s impact on students’ psychological adjustment and provide support for or against the perspective that psychologically at-risk students overestimate COVID’s negative effects. In addition to longitudinal investigations, studies are needed that help delineate which pandemic-related stressors are most responsible for eliciting psychological difficulties. We assessed perceptions of COVID-19’s overall impact by asking participants to evaluate how the pandemic impacted multiple domains of their life, including their emotions (e.g., anger), behaviors (e.g., doing fun things with friends), and other circumstances (e.g., income). We did not examine whether different domains of COVID-related stressors independently confer varying degrees of psychological risk (e.g., moderate vs. severe symptoms) or predict distinct forms of psychopathology (e.g., depression.

Table 5. Profile-Specific Distal Outcome Means and Results from Pairwise Wald Tests.

| Outcome                  | Mild (SD)         | Moderate (SD)      | Severe (SD)     |
|--------------------------|-------------------|--------------------|-----------------|
| Perceived friendship support | 6.23 (0.14)a      | 5.45 (0.14)b      | 4.76 (0.31)c   |
| Social connectedness     | 5.24 (0.13)a      | 3.58 (0.10)b      | 2.83 (0.19)c   |

Note. Our model included direct paths from gender, race, and year in school to each distal outcome and, thus, latent profile differences in the distal outcome means are adjusted for these demographic variables. Differing superscripts within a row reflect significant mean differences (p < .05) between profiles on the given distal outcome.
vs. anxiety). These possibilities represent avenues for future research.

Also noteworthy are the gender differences that emerged when examining participants’ likelihood of belonging to distinct psychological profiles. Specifically, students who identified as male were almost five times more likely to belong to the Mild profile compared to the Severe profile, whereas females were 0.21 times more likely to be in the Severe than the Mild profile. These findings reinforce earlier work suggesting that females are prone to mental health problems during the pandemic (e.g., Lee et al., 2020; McQuaid et al., 2021; Prowse et al., 2021).

In addition to female students, our findings suggest that BIPOC students may be at heightened risk for severe psychological symptoms. Consistent with this perspective and previous research that shows that COVID-19 has disproportionately affected the mental health of college students of color (Soria et al., 2020), we found that BIPOC students were nearly twice as likely as White students to belong to the Severe compared to the Mild profile. These findings add to a growing literature suggesting that females and BIPOC students may be at particular risk for experiencing psychological difficulties during the pandemic; however, it is important to note that our use of a dichotomous race variable combined members of disparate racial and ethnic groups into one category (Hamby, 2015). Doing so does not take into account the considerable variability within racial and ethnic groups and may even function to reinforce the European American culture as dominant or the default. To address such limitations, researchers should consider sampling frames that yield more individuals from historically underrepresented racial and ethnic groups and, in turn, permit statistically valid racial and ethnic group analyses.

A third key finding is that participants in the Mild symptoms profile scored the highest, and those in the Severe profile scored the lowest, on indices of social adjustment. Friendship support and social connectedness are distinct components of social adjustment that reflect different aspects of success and competence in the social world. Our findings suggest that both are associated with college students’ psychological adjustment. Importantly, friendship support and social connection survey items were designed to solicit students’ current perceptions of support and connection (i.e., measure students’ interpersonal adjustment during the pandemic). Because, however, the instructions contained no explicit timeframe, it is possible that some students might have responded about their relationships before the pandemic.

There are several possible explanations for the pattern of findings we observed. For instance, for those in the Mild profile, friendship support may have functioned as an important coping resource (Bagwell & Schmidt, 2011), fostering students’ sense of security and decreasing their risk for psychological problems. Similarly, feeling socially connected, or a sense of belonging and emotional closeness (Lee & Robbins, 1995), may have buffered psychological risk for those in the Mild profile. Indeed, there is considerable evidence for the “protective function” of friendship in childhood and adolescence (see e.g., Bagwell & Schmidt, 2011; Kochel et al., 2017). Another explanation is that students in the Severe profile, compared to the other profiles, may have encountered more obstacles that prevented them from nurturing relationships with important others. Because our results show that students in the Severe profile perceived the greatest negative COVID-19 impact, it could be that these individuals were ill, had ill family members or friends, or were otherwise affected by COVID in ways that significantly and negatively altered their interpersonal relationships and feelings of friendship support and connectedness with others. One more explanation, which is predicated on interpersonal theories of depression (Rudolph, 2009), is that individuals experiencing especially severe psychological symptoms may be more likely to exhibit social withdrawal, excessive self-focus, poor emotion regulation, and other aversive behaviors. In turn, such behaviors may undermine friendship support and interfere with interpersonal relationships that typically contribute to feelings of social connectedness. We did not provide an empirical test of these explanations; thus, future research is needed to support or refute the ideas we articulate here.

**Implications and Conclusions**

This study advances our understanding of college students’ adjustment during COVID. Using LPA, we empirically derived three distinct psychological symptom profiles (i.e., Mild, Moderate, Severe), providing evidence for individual variability in psychological functioning. We also found that students who perceived high levels of negative COVID-19 impact, and female and BIPOC students, were at particular risk for belonging to the Severe symptoms profile—the profile characterized by the highest levels of depression, loneliness, and anxiety. Importantly, this profile also reported the lowest levels of friendship support and social connectedness.

These findings, on the one hand, imply that targeted interventions, designed for subpopulations of students who evidence the most severe psychological difficulties, may be warranted. A reasonable assumption is that the more severe the symptomatology, the more likely it will interfere with successful functioning in other domains of life, including academics and social experiences. Indeed, our results suggest that, as the severity of psychological symptoms increases, so do problems with social relationships.

On the other hand, perhaps the fact that students belonging to the Moderate profile also reported elevated psychological symptom scores (albeit less extreme than those in the Severe profile) indicates that college administrators should prioritize universal interventions aimed at increasing access to and the utilization of mental health services for all students. In reality, neither “adequate treatment” (i.e., the prioritization of students with the greatest needs) nor “rapid access” (i.e., an emphasis on breadth of care) is a perfect solution, but research findings,
including those reported here, underscore the need for a continued investment in mental health resources and services on college campuses.

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**Open Practice**

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**References**

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*(5), 469–480. doi.org/10.1037/0003-066X.55.5.469

Asher, S. R., & Weeks, M. S. (2014). Loneliness and belongingness in the college years. In R. J. Coplan, & J. C. Bowker (Eds.), *The handbook of solitude: Psychological perspectives on social isolation, social withdrawal, and being alone* (1st ed., pp. 283–301). Wiley.

Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Using the BCH method in Mplus to estimate a distal outcome model and an arbitrary secondary model. *Mplus Web Notes: No. 21* www.statmodel.com/examples/webnotes/webnote21.pdf

Bagwell, C. L., & Schmidt, M. E. (2011). *Friendships in childhood and adolescence*. Guilford Press.

Barry, C. M., Madsen, S. D., & DeGrace, A. (2016). Growing up with a little help from their friends in emerging adulthood. In J. J. Arnett (Ed.), *The Oxford handbook of emerging adulthood* (pp. 215–229). Oxford University Press.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. doi.org/10.1037/0033-2909.117.3.497

Bewick, B., Koutsopoulou, G., Miles, J., Slaa, E., & Barkham, M. (2010). Changes in undergraduate students’ psychological well-being as they progress through university. *Studies in Higher Education, 35*(6), 633–645. doi.org/10.1080/03075070903216643

Blanca, M. J., Arnav, J., López-Montiel, D., Bono, R., & Bendayan, R. (2013). Skewness and kurtosis in real data samples. *Methodology, 9*(2), 78–84. doi.org/10.1016/j metod.2014.02.001

Browning, M. H., Larson, L. R., Sharaievskya, I., Rigolon, A., McAnirin, O., Mullenchab, L., Cloutier, S., Vu, T. M., Thomsen, J., Reigner, N., Metcalf, E. C., D’Antonio, A., Helbich, M., Bratman, G. N., & Alvarez, H. O. (2021). Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PLoS One, 16*(1), Article e0245327. doi.org/10.1371/journal.pone.0245327

Chronicle of Higher Education (2020). Here’s our list of colleges’ reopening models. https://www.chronicle.com/article/heres-a-list-of-colleges-plans-for-reopening-in-the-fall/

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*(2), 310–357. doi.org/10.1037/0033-2909.98.2.310

College Crisis Initiative (2022). COVID-19 data dashboard. https://collegecrisis.org/

Demir, M., Orthel-Clark, H., Özdemir, M., & Bayram Özdemir, S. (2015). Friendship and happiness among young adults. In M. Demir (Ed.), *Friendship and happiness* (pp. 117–135). Springer. doi.org/10.1007/978-94-017-9603-3_7

Ettman, C. K., Abdalla, S. M., Cohen, G. H., Sampson, L., Vivier, P. M., & Galea, S. (2020). Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. *JAMA Network, 3*(9), Article e2019686. doi.org/10.1001/jamanetworkopen.2020.1.9686

Ferguson, S. L., Moore, E. W., & Hull, D. M. (2020). Finding latent groups in observed data: A primer on latent profile analysis in Mplus for applied researchers. *International Journal of Behavioral Development, 44*(5), 458–468. doi.org/10.1177/0165025419881721

Firkey, M. K., Sheinfil, A. Z., & Woolf-King, S. E. (2020). Substance use, sexual behavior, and general well-being of US college students during the COVID-19 pandemic: A brief report. *Journal of American College Health, 12*, 1–7. doi.org/10.1080/07448481.2020.1869750

Friedlander, L. J., Reid, G. J., Shupak, N., & Cribbie, R. (2007). Social support, self-esteem, and stress as predictors of adjustment to university among first-year undergraduates. *Journal of College Student Development, 48*(3), 259–274. doi.org/10.1353/csd.2007.0024

Gassman-Pines, A., Ananat, E. O., & Fitz-Henley, J. (2020). COVID-19 and parent-child psychological well-being. *Pediatrics, 146*(4), 1–9. doi.org/10.1542/peds.2020-007294

Grant, K. E., Compas, B. E., Stuhlmacher, A. F., Thurm, A. E., McMahon, S. D., & Halpert, J. A. (2003). Stressors and child and adolescent psychopathology: Moving from markers to mechanisms of risk. *Psychological Bulletin, 129*(3), 447–466. doi.org/10.1037/0033-2909.129.3.447

Hamby, S. (2015). On the use of race and ethnicity as variables in violence research. *Psychology of Violence, 5*(1), 1–7. http://dx.doi.org/10.1037/a0038470

Hefner, J., & Eisenberg, D. (2009). Social support and mental health among college students. *American Journal of Orthopsychiatry, 79*(4), 491–499. doi.org/10.1037/a0016918

Huckins, J. F., DaSilva, A. W., Wang, W., Hedlund, E., Rogers, C., Nepal, S. K., Wu, J., Obuchi, M., Murphy, E. I., Meyer, M. L.,
Wagner, D. D., Holtzheimer, P. E., & Campbell, A. T. (2020). Mental health and behavior of college students during the early phases of the COVID-19 pandemic: Longitudinal smartphone and ecological momentary assessment study. *Journal of Medical Internet Research, 22*(6), Article e20185. https://doi.org/10.2196/20185

Hunt, J., & Eisenberg, D. (2010). Mental health problems and help-seeking behavior among college students. *Journal of Adolescent Health, 46*(1), 3–10. https://doi.org/10.1016/j.jadohealth.2009.08.008

Kecojevic, A., Basch, C. H., Sullivan, M., & Davi, N. K. (2020). The impact of the COVID-19 epidemic on mental health of undergraduate students in New Jersey, cross-sectional study. *PLoS One, 15*(9), Article e0239696. https://doi.org/10.1371/journal.pone.0239696

Kochel, K. P., Bagwell, C. L., Ladd, G. W., & Rudolph, K. D. (2017). Do positive peer relations mitigate transactions between depressive symptoms and peer victimization in adolescence? *Journal of Applied Developmental Psychology, 51*, 44–54. https://doi.org/10.1016/j.appdev.2017.04.003

Lee, C., Dickson, D. A., Conley, C. S., & Holmbeck, G. N. (2014). A closer look at self-esteem, perceived social support, and coping strategy: A prospective study of depressive symptomatology across the transition to college. *Journal of Social and Clinical Psychology, 33*(6), 560–585. https://doi.org/10.1521/jscp.2014.33.6.560

Lee, C. M., Cadigan, J. M., & Rhew, I. C. (2020). Increases in loneliness among young adults during the COVID-19 pandemic and association with increases in mental health problems. *Journal of Adolescent Health, 67*(5), 714–717. doi:10.1016/j.jadohealth.2020.08.009

Lee, C. Y. S., & Goldstein, S. E. (2016). Loneliness, stress, and social support in young adulthood: Does the source of support matter? *Journal of Youth and Adolescence, 45*(3), 568–580. https://doi.org/10.1007/s10964-015-0395-9

Lee, R. M., Draper, M., & Lee, S. (2001). Social connectedness, dysfunctional interpersonal behaviors, and psychological distress: Testing a mediator model. *Journal of Counseling Psychology, 48*(3), 310–318. doi:10.1037/0022-0167.48.3.310

Lee, R. M., & Robbins, S. B. (1995). Measuring belongingness: The social connectedness and the social assurance scales. *Journal of Counseling Psychology, 42*(2), 232–241. doi:10.1037/0022-0167.42.2.232

Lee, R. M., & Robbins, S. B. (1998). The relationship between social connectedness and anxiety, self-esteem, and social identity [Editorial]. *Journal of Counseling Psychology, 45*(3), 338–345. doi:10.1037/0022-0167.45.3.338

Marsicano, C., Felten, K., Toledo, L., & Buitendorp, M. (2020). Tracking campus responses to the COVID-19 pandemic. APSA Preprints. https://doi.org/10.33774/apsa-2020-3wvr

McLaron, M. J., & O’Neill, T. A. (2018). Extensions of auxiliary variable approaches for the investigation of mediation, moderation, and conditional effects in mixture models. *Organizational Research Methods, 21*(4), 955–982. https://doi.org/10.1177/1094428118770731

McQuaid, R. J., Cox, S. M., Ogunlana, A., & Jaworska, N. (2021). The burden of loneliness: Implications of the social determinants of health during COVID-19. *Psychiatry Research, 296*(3), Article 113648. https://doi.org/10.1016/j.psychres.2020.113648

Mounts, N. S., Valentiner, D. P., Anderson, K. L., & Boswell, M. K. (2006). Shyness, sociability, and parental support for the college transition: Relation to adolescents’ adjustment. *Journal of Youth and Adolescence, 35*(1), 68–77. https://doi.org/10.1007/s10964-005-9002-9

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user’s guide* (8th ed.). Muthén & Muthén.

Nicpon, M. F., Huser, L., Blanks, E. H., Sollenberger, S., Befort, C., & Kurpius, S. E. R. (2006). The relationship of loneliness and social support with college freshmen’s academic performance and persistence. *Journal of College Student Retention: Theory & Practice, 8*(3), 345–358. https://doi.org/10.2190/A465-356M-7652-783R

Nylund-Gibson, K., & Choi, A. Y. (2018). Ten frequently asked questions about latent class analysis. *Translational Issues in Psychological Science, 4*(4), 440–461. doi:10.1037/tps0000176

Nylund-Gibson, K., Grimm, R. P., & Masyn, K. E. (2019). Prediction from latent classes: A demonstration of different approaches to include distal outcomes in mixture models. *Structural Equation Modeling: A Multidisciplinary Journal, 26*(6), 967–985. https://doi.org/10.1080/10705511.2019.1590146

Prowse, R., Sherratt, F., Abizaid, A., Gabrys, R. L., Hellemans, K. G., Patterson, Z. R., & McQuaid, R. J. (2021). Coping with the COVID-19 pandemic: Examining gender differences in stress and mental health among university students. *Frontiers in Psychiatry, 12*, 1–11. https://doi.org/10.3389/fpsyt.2021.650759

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385–401. https://doi.org/10.1177/014621677700100306

Rudolph, K. D. (2009). The interpersonal context of adolescent depression. In S. Nolen-Hoeksema, & L. Hilt (Eds.), *Handbook of adolescent depression*. Lawrence Erlbaum.

Sheets, R. L., & Mohr, J. J. (2009). Perceived social support from friends and family and psychosocial functioning in bisexual young adult college students. *Journal of Counseling Psychology, 56*(1), 152–163. doi:10.1037/0022-0167.56.1.152

Skinner, A. T., & Lansford, J. E. (2020). *Experiences related to COVID-19*. [Unpublished measure]. Sanford School of Public Policy, Duke, University.

Soria, K. M., Roberts, B. J., Horgos, B., & Hallahan, K. (2020). Undergraduates’ experiences during the COVID-19 pandemic: *Disparities by race and ethnicity* [Report]. SERU Consortium, University of California – Berkeley and University of Minnesota. https://conservancy.umn.edu/handle/11299/218339

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine, 166*(10), 1092–1097. doi:10.1001/archinte.166.10.1092
Sullivan, H. S. (1953). *The interpersonal theory of psychiatry.* Norton.

Swenson, L. M., Nordstrom, A., & Hiester, M. (2008). The role of peer relationships in adjustment to college. *Journal of College Student Development, 49*(6), 551–567. https://doi.org/10.1353/csd.0.0038

Tasso, A. F., Hisli Sahin, N., & San Roman, G. J. (2021). COVID-19 disruption on college students: Academic and socioemotional implications. *Psychological Trauma: Theory, Research, Practice, and Policy, 13*(1), 9–15. doi.org/10.1037/tra0000996

Thoits, P. A. (1995). Stress, coping, and social support processes: Where are we? What next? *Journal of Health and Social Behavior, (Extra Issue),* 53–79. https://doi.org/10.2307/2626957

Wang, X., Hegde, S., Son, C., Keller, B., Smith, A., & Sasangohar, F. (2020). Investigating mental health of US college students during the COVID-19 pandemic: Cross-sectional survey study. *Journal of Medical Internet Research, 22*(9), Article e22817. https://doi.org/10.2196/22817

Williams, K. L., & Galliher, R. V. (2006). Predicting depression and self-esteem from social connectedness, support, and competence. *Journal of Social and Clinical Psychology, 25*(8), 855–874. https://doi.org/10.1521/jscp.2006.25.8.855

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment, 52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2