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Trajectories of financial distress during the COVID-19 pandemic and their associations with
mental health and substance use outcomes in a cohort of young adults

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Abstract

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The COVID-19 pandemic has led to unprecedented disruptions in the lives of young adults, with increases in job insecurity and financial strain documented for this population. Mental health problems and substance use have also increased during the pandemic, and young adults may be particularly vulnerable for experiencing these challenges. The present study examined trajectories of financial distress experienced by young adults during the COVID-19 pandemic and their associations with distal outcomes of depression, anxiety, and hazardous alcohol and cannabis use. Data from 473 young adults (ages 22-29, 62.1% women) collected from April 2020 to July/August 2021 were used to identify financial distress trajectories using a growth-mixture modeling approach. Three distinct trajectories were uncovered, with consistently Low, Moderate, and High levels of financial distress experienced by this sample. Individuals with ‘Moderate’ and ‘High’ trajectories showed significantly greater depression and anxiety symptom scores compared to those with ‘Low’ trajectories. Trajectory membership was not associated

with subsequent level of hazardous alcohol or cannabis use. These findings suggest a need for providers to be aware of the psychological challenges imposed by financial distress to prevent and treat worsening mental health symptoms among young adults, especially during periods of economic downturn.

Introduction

The period of young adulthood, often defined as ages 18 to 29, consists of multiple, significant social role transitions across domains of education, employment, interpersonal relationships, living situation, and financial well-being (Furstenberg, 2010; Duckworth, et al., 2021). Although such transitions are an expected part of young adulthood, the COVID-19 pandemic has led to unprecedented disruptions in the lives of young adults, with documented increases in the levels of job insecurity and financial strain among this age group (Gardner, et al., 2020; AIPCA, 2021). Of the 44.2 million Americans that filed for unemployment benefits by June of 2020 during the first national lockdown, one in four of these individuals were young adults (Smith, et al., 2021). The Census Bureau's Household Pulse survey conducted during March of 2020 also found that close to 70% of ages 18-25 reported an anticipated difficulty paying usual household expenses during the past 7 days. (Drake and Rudowitz, 2022). As several early studies during the COVID-19 pandemic have also shown, individuals living in already-precarious financial situations are more likely to experience financial hardships as a result of the COVID-19 pandemic (Smith, et al., 2021; Ettman, et al., 2021).

The impacts of the COVID-19 pandemic on young adults extend beyond the nation-wide economic recession. Several studies have reported an increase in the prevalence of mental health challenges, including depression and anxiety, among US adults, with young adults reporting these symptoms more frequently compared to other age groups (Zhou et al., 2020; Czeisler et al.,

2020; CDC 2021; McGinty et al., 2020). During previous periods of economic downturn, such as during the 2008 financial crisis, increased prevalence of depression and anxiety were also observed (McInerney, et al., 2013; Forbes and Krueger, 2019; Phillips and Nugent, 2014), suggesting a potential association between experiences of acute financial distress and worsening mental health outcomes. One longitudinal analysis of 1209 US employees conducted prior to the COVID-19 pandemic found associations between self-reported financial distress and poor mental health, and a similar association was observed when examining participant insurance claims data for depression and anxiety (Bialowolski et al., 2021). Early longitudinal analyses conducted to examine changes in depression and anxiety in the context of the COVID-19 pandemic's financial impacts have found that low income, a lack of savings, and unemployment were identified as individual risk factors for experiencing increased levels of depression and anxiety (Ettman, 2021; Hertz-Palmor et al., 2021).

In addition to worsening mental health outcomes, emerging evidence suggests an increase in the use of substances (such as alcohol and cannabis) as a means of coping with the various stressors imposed by the COVID-19 pandemic. According to a survey conducted in June 2020 by the Centers for Disease Control and Prevention, 13% of United States adults reported increased levels of substance use to cope with the stressors of the COVID-19 pandemic (Czeisler et al., 2020). Another survey, conducted by the Hazelden Betty Ford Foundation in May 2021, found that nearly one-third of adults who drink alcohol in the US reported increased levels of drinking during the COVID-19 pandemic (2021). These increases in consumption may be a response to a variety of pandemic impacts, including increases in loneliness, anxiety, boredom, depression, and other stressors. Some studies have also observed positive associations between reported levels of financial strain and hazardous alcohol use (Pierce et al., 1996; Gratz et al.,

2021; Davalos et al., 2012). Although much of this research has focused on alcohol use, there is also evidence that cannabis sales increased during the early months of the pandemic (Roig, 2020). One analysis of a cohort of young adults observed an increase in the reported use of cannabis during the pandemic, with participants citing this cannabis use as a means of coping with boredom. Although there were no statistically significant increases in alcohol use in this study, alcohol compared to cannabis use was more commonly reported as a strategy to cope with feelings of depression. (Graupensperger et al., 2021).

Although several studies have shown associations between financial distress and mental health and substance use outcomes, most have relied on cross-sectional data, thus limiting the ability to make temporal inferences about the resulting associations. Furthermore, to our knowledge, few studies to-date have utilized longitudinal data sources to examine the potential impact of financial distress over the course of the pandemic on mental health and substance use among young adults during the COVID-19 pandemic. To address these gaps, this proposed study had as its aims to 1) identify distinct trajectories of financial distress during the first year of the COVID-19 pandemic among a sample of young adults using a growth mixture modeling approach and 2) compare mental health and substance use outcomes across trajectory groups adjusting for pre-pandemic levels of each outcome. Using a growth-mixture modeling approach, this analysis can uncover trends in financial distress among sub-populations of young adults that may otherwise not be observed using traditional longitudinal analytic methods.

Methods

Study Design, Setting and Subjects:

These analyses utilized data collected from individuals participating in Project Transitions, a longitudinal cohort study originally conducted to examine associations between

social role transitions and alcohol use among a population of young adults beginning in 2015. During the COVID-19 pandemic, this project was extended, and 767 of the original 778 participants were invited to complete additional online assessments between January 2020 and August 2021. Recruitment of young adults to participate in the original Project Transitions occurred between 2015 and 2016. During this time, participants were recruited from the Greater Seattle Area *via* social media, newspapers, and community advertisements. Participants were eligible for inclusion in this study if they were between 18 and 23 years of age, reported consuming at least one alcoholic beverage in the past 12 months, and lived within 60 miles of study site offices in Seattle. As part of the original study, participants completed monthly surveys for 24 consecutive months.

In January 2020, participants from the original cohort were invited to complete an additional follow-up survey, with 594 (77.4%) of the original cohort responding. An additional follow-up survey was conducted in April 2020 and following the onset of the COVID-19 pandemic, and additional funding was received to further extend data collection. As part of this extension, participants completed bimonthly surveys for 12 months, with half of participants randomized to begin these surveys in September 2020 and the other half to respond in October 2020. For ease of analyses, the two randomized groups were collapsed into a single time-point for each two-month block (indicated by a '/' notation throughout this manuscript, e.g., "September/October 2020"). Participants provided informed consent at each survey completion timepoint, and the University of Washington institutional review board approved this study.

A total of 564 young adults opted in for the longitudinal portion of this study and thus were eligible for inclusion in the present analysis. The present analysis included the survey response data collected in April 2020 and bimonthly from September/October 2020 to

July/August 2021 to identify class trajectories of financial distress, using the January 2020 response data for models which adjusted for pre-pandemic levels of each outcome.

Study Measures:

Following an extensive literature review, we determined that a subjective measurement of financial distress would best serve this study population of young adults. During young adulthood, individuals may depend on multiple sources of income and may receive additional support from parental or peer sources not reflected in their income from employment, or other measures of personal assets. This creates challenges when attempting to use these more traditional measures of socio-economic status to study this population (Williams, et al., 2017).

The Incharge Financial Distress/Financial Well-Being Scale (ICFD scale) offers an alternative approach to measure subjective financial stress instead of the traditional measures that may combine income, debt, or spending habits. The ICFD scale produces valid and reliable measurement estimates of financial distress levels when used in both general populations and among financially distressed populations (Prawitz et al., 2006). Within the Project Transitions study, three items from the ICFD scale with identical wording were included and were available for each of the survey timepoints. These scale items were: 1) ‘What do you feel is the level of your financial stress today?’ (1= overwhelming, 5= none), 2) ‘How satisfied are you with your financial status today?’ (0 = extremely unsatisfied, 5= very satisfied), and 3) ‘How often do you worry about being able to meet normal monthly living expenses?’ (0 = worry all the time, 10 = do not ever worry). Psychometric analyses of these three items suggested strong internal consistency (Cronbach’s alpha = 0.80) and uni-dimensionality. Using these three items, we created a composite financial distress index by standardizing each item and then computing the mean of the three standardized items for use as our indicator of financial distress at each survey

timepoint. For this study, financial distress measures from the April 2020, September/October 2020, November/December 2020, January/February 2021, March/April 2021, May/June 2021, and July/August 21 surveys were used to identify trajectory classes.

Outcomes:

Depressive Symptoms:

Depressive symptoms were assessed using eight of the nine items from the Patient Health Questionnaire (PHQ-9), which asks respondents to identify how often in the past month they have been bothered by eight problems, including “little interest or pleasure in doing things,” “feeling down, depressed, or hopeless,” and “feeling tired or having little energy.” Response options are as follows: “Not at all” (0), “Several Days” (1), “More than half the days” (2), and “Nearly every day” (3). The sum of the eight items was calculated to yield a total score with a possible range of 0 to 24. The PHQ-9 has been shown to be valid when compared against clinician-based diagnoses of major depressive disorder and has shown strong test-retest reliability (Kroenke et al., 2001). The ninth question in the PHQ-9 assesses risk of self-injury and suicide. Omission of this question is common in research and other settings in which staff cannot adequately intervene should a participant respond ‘yes’ to this measure, such as in this online-administered study. Previous research has shown that the exclusion of this ninth item does not impact scoring thresholds for depression severity in original validation studies completed with 6,000 patients (Kroenke et al., 2001; Kroenke et al, 2009). Psychometric analysis of the PHQ-8 measures during the July/August 2021 survey timepoint revealed a Cronbach’s alpha of 0.90, indicating high internal consistency of the PHQ items.

Anxiety Symptoms:

Anxiety symptoms were assessed using the Generalized Anxiety Disorder-7 (GAD-7) questionnaire. Symptoms of anxiety, including ‘feeling nervous, anxious, or on edge’, and ‘not being able to stop or control worrying,’ are assessed by participant response options ranging from 0 (Not at all) to 3 (Nearly every day). Like the PHQ, response values were summed across items to calculate a total patient score, ranging from 0 to 21. This measure has been shown to be valid when compared to independent diagnoses made by mental health professionals, and reliable when using a test-retest approach in a sample of over 965 adults (Spitzer et al., 2006). We observed a Cronbach’s alpha of 0.93 for the July/August 2021 GAD-7 responses, indicating high internal consistency.

Hazardous Alcohol Use:

The Alcohol Use Disorders Identification Test (AUDIT) was used to identify potential unhealthy alcohol use for each respondent. This 10-question screening tool covers three critical domains of drinking: alcohol intake, potential dependence on alcohol, and experiences of alcohol-related harm (Babor, 2001). AUDIT total scores range from 0 to 40, with increasing values reflecting increased severity of unhealthy alcohol use. The tool is shown to have high test-retest reliability and strong internal validity when delivered to patients in primary-care settings (Daepfen et al., 2000). A Cronbach’s alpha of 0.85 was observed for the July/August 2021 responses.

Hazardous Cannabis Use:

The Cannabis Use Disorder Identification Test (CUDIT) was used to measure cannabis misuse (Adamson, et al., 2010). The CUDIT consists of 9 questions which cover cannabis consumption, abuse, dependence, and psychological features. Response values are then totaled to arrive at respondents’ total scores. Among studies of cannabis-using populations, the measure

achieves higher positive predictive power, sensitivity and specificity for identifying cannabis dependency when compared to diagnoses of cannabis use disorder by a clinical provider (Adamson and Sellman, 2003). We again observed fairly strong internal consistency of the 10-item CUDIT scale with the July/August 2021 data (Cronbach's alpha = 0.82).

Statistical Analysis:

We first used a growth-mixture modeling approach to identify distinct latent trajectory classes of financial distress using the 7 specified time points between April 2020 and July/August 2021 using MPlus. To properly identify the appropriate number of latent class trajectories using the scaled measurements of financial distress, we first constructed a “one-class” latent curve model to observe the mean and variances of financial distress for the entire population at each of the 7 time points. We then constructed and reviewed model fit statistics for two through five-trajectory class models, reviewing the fit statistics to determine the model of best fit. Fit statistics examined included the Akaike's Information Criteria (AIC), Bayesian Information Criteria (BIC), Adjusted BIC, Entropy, Lo-Mendell-Rubin (LMR), Vuong-Lo-Mendell-Rubin Likelihood Ratio Test (VLMR), and Bootstrapped LMR statistical values. We prioritized choosing a class model with low AIC and BIC values according to guidance stating that models with the lowest AIC and BIC values typically represent the model of best fit (Ram and Grimm, 2009). The LMR, VLMR, and Bootstrapped LMR p-values compare fit of the model with k classes to the previous model ($k-1$ classes). Lastly, we considered entropy in these summary fit statistics, which ranges from values of 0 to 1 and is used as a summary indicator of the conditional probabilities of class membership for subjects. Consistent with Lanza and colleagues (2013), an entropy value of 0.60 or greater was considered sufficient. All fit statistics

for the two- through five-class models were considered in context with one another, and descriptive statistics, including size of class proportions, were also evaluated for meaningfulness.

Once the trajectory classes were identified from the above considerations, individuals were assigned to their most likely latent class based on the posterior probabilities obtained from the growth-mixture model EM algorithm (Ram and Grimm, 2009). We examined the demographic characteristics of participants in each trajectory class and conducted chi-squared tests of independence to identify notable differences. Next, the financial distress class designations were considered our exposure of interest, allowing us to regress each outcome variable on these values using a negative-binomial regression model. The negative-binomial model was selected due to the positive skew and over-dispersion observed for the PHQ-8, GAD-7, AUDIT, and CUDIT scores. We adjusted for several demographic covariates including sex, race/ethnicity, baseline participant age, and participant education. Due to the small sample sizes for certain racial identities indicated by respondents, we collapsed responses of ‘American Indian or Alaskan Native’, ‘Arab, Middle Eastern, or North African’, ‘Native Hawaiian or other Pacific Islander’, and ‘Other’ into a single ‘Other’ race category, which was used for the chi-square tests and regression models. In additional negative-binomial models, we further adjusted for the pre-pandemic version of the outcome (i.e., PHQ-8, GAD-7, AUDIT, or CUDIT score) measured at the January 2020 survey.

Results:

Of the 557 young adults completing any survey as part of the Project Transitions extension, 473 had available distal (July/August 2021) outcome measurements available. Baseline characteristics of this study population were similar to the original Project Transitions sample (reported elsewhere- Patrick et al., 2019), with 62.1% of participants assigned female at

birth, 27.1% having completed college, and 23.9% identifying as LGBTQ+ (Table 1).

Descriptive statistics for the depression, anxiety, hazardous alcohol use, and hazardous cannabis use outcomes assessed during the July/August 2021 survey wave can also be found in Table 1. Among this cohort, a greater percentage of individuals showed notable depressive symptoms (22.4%) than those showing notable levels of generalized anxiety disorder symptoms (16.9%) using score cutoff values of 10 for each scale. The mean score values for the AUDIT and CUDIT assessments were 4.50 and 3.86, respectively, with approximately one fifth of study participants reported scores indicating potential hazardous levels of use (Table 1).

Descriptive statistics of the financial distress scale values for each time point of survey are included in Table 2, with more positive values representing greater financial distress while more negative values indicate lower financial distress. Across the entire young adult population included in this analysis, experiences of financial distress were greatest at the beginning of the COVID-19 pandemic during the April 2020 survey wave (mean = 0.47). The mean financial distress scaled value indicated a decrease in financial distress, falling to a value of -0.35 in May/June of 2021 before increasing slightly to -0.11 in July/August 2021.

Class proportions and fit statistics for the two through five-class financial distress growth mixture models are displayed in Table 3. Based on fit indices and evaluation of the size and interpretability of the latent trajectory groups, we selected the 3-class model. A plot of the three trajectory groups is displayed in Figure 1, with the trajectory with the most negative values representing a consistently low level of financial distress experienced between April 2020 and July/August 2021. The majority of participants (59%, $n = 288$) were assigned to this “Low” class trajectory, followed by a class characterized by “Moderate” levels of financial distress (37%, $n = 166$), and finally a class characterized as having “High” levels of

financial distress that also worsened slightly as the pandemic continued (4%, $n = 19$).

Demographic characteristics of participants based on their assigned trajectory class are displayed in Table 4. Statistically significant differences in financial distress trajectory class membership were observed by race ($p = 0.03$), where white participants were more likely to be assigned to the Low financial distress compared to the other trajectory classes, in contrast to those identifying as other races. Although not significant at the $p < 0.05$ level, 42.1% of participants in the “High” financial distress group identified as LGBTQ+, compared to only 21.2% in the “Low” financial distress class.

Table 5 presents the results of the negative binomial regression models examining whether latent financial distress trajectory class was associated with depression, anxiety, hazardous alcohol use, and hazardous cannabis use in July and August of 2021. Without controlling for the pre-pandemic measurements for each outcome, participants assigned to the Moderate and High latent financial distress trajectories tended to have higher depression (PHQ-8) and anxiety (GAD-7) severity scores compared to the Low trajectory. Participants in the Moderate and High trajectories tended to have higher cannabis use (CUDIT) severity scores compared to the Low financial distress group; however, these associations were not statistically significant at $p < 0.05$. There were no statistically significant differences in AUDIT scores among financial distress trajectory classes.

When controlling for the pre-pandemic (i.e. January 2020) levels of the distal outcome variable in each model, differences in depressive and anxiety symptoms according to financial distress trajectory classes remained. Participants in the Moderate financial distress class reported 22% greater depression severity scores (Count Ratio [CR] = 1.22, 95% CI = 1.03, 1.46) and those in the High financial distress class reported 73% greater depressive symptom scores (CR =

1.73, 95% CI = 1.18, 2.62) relative to the Low distress class. A similar association between trajectory classes and anxiety symptoms was observed, with those in the Moderate distress class reporting 36% greater anxiety severity scores (CR = 1.36, 95% CI = 1.13, 1.63) and those in the High distress class reporting 46% greater scores (CR = 1.46, 95% CI = 0.97, 2.26) compared to the Low distress class, though this difference was not significant for the High distress group. Neither the Moderate nor the High financial distress trajectories showed statistically significant differences in hazardous alcohol use or hazardous cannabis use when compared to the Low distress trajectory.

Discussion:

The COVID-19 pandemic has presented unprecedented economic challenges for young adults across the US. Among the cohort of young adults included in this study, we observed a similarly elevated experience of financial distress reported during the April 2020 wave of the survey that eventually lessened as the pandemic progressed into 2021. Consistent with expectations, we identified three distinct financial distress trajectories, including a consistently Low, consistently Moderate, and a High financial distress group that experienced a slight increase in financial distress between April 2020 and July/August 2021. Upon examination of the association between assigned trajectory of financial distress and distal outcomes of depression and anxiety, those assigned to “Moderate” and “High” classes showed significantly greater mental health impairment (i.e., greater depression and anxiety symptom scores) compared to those assigned to the “Low” trajectory group. Trajectory membership was not associated with subsequent levels of hazardous alcohol or cannabis use.

When examining the trajectory classes, results suggest that individuals experiencing greater financial distress during the beginning of the COVID-19 pandemic (i.e. April 2020)

continued to show similar levels of distress as the pandemic continued. Trajectory class membership varied by race, with a greater proportion of white individuals identified as members of the Low financial distress group. This may be attributable to economic impacts of structural racism, including factors such as generational wealth that create differing levels of personal economic resources across racial groups, offering white individuals greater economic protections when faced with financial uncertainty (Hamilton and Darity, 2017; Gale and Scholz, 1994). Although not statistically significant at $p < 0.05$, the proportion of LGBTQ individuals increased as the level of class mean reported financial distress increased. Discrimination and non-inclusive workplace climates, possible exclusion from familial inheritance money, and discriminatory wages may be factors impacting this high observed level of financial distress among LGBTQ+ young adults (Badgett et al., 2021). While a small sample size for those identified as part of the 'High' distress trajectory prevented additional exploration of potential effect modification, future work should examine the potential differences in these relationships according to LGBTQ+ and minoritized racial/ethnic identity.

The relative consistency in reported financial distress among each identified trajectory supports previous literature from the COVID-19 pandemic indicating that those pre-disposed to precarious financial situations are more likely to continue to experience financial distress while those with low distress pre-pandemic are less likely to experience such impacts (Smith et al., 2021; Drake and Rudowitz, 2021; Ettman et al., 2021). Additionally, our findings support other studies conducted during the COVID-19 pandemic which reported greater mental health impairment among those experiencing higher levels of financial distress. While many studies have focused on the corrosive impacts of job insecurity and income loss on mental health during the COVID-19 pandemic, some research suggests that financial distress acts as a mediator on the

pathway between job loss and poor mental health outcomes (Wilson et al., 2020; de Miquel et al., 2022). These findings highlight the importance of our study's examination of subjective levels of financial distress as a potential risk factor for experiencing a deterioration in mental well-being rather than examining job or income loss alone.

Current literature presents varying conclusions about the impacts of financial distress during periods of economic decline and changes in alcohol and cannabis use among young adults. Our study did not find significant associations between financial distress trajectory class and changes in alcohol or cannabis use, consistent with findings from another study examining multi-faceted COVID-19-related stressors that reported no association between financial stressors and change in alcohol or cannabis use for a population of young adults (Graupensberger et al., 2021). However, another longitudinal analysis conducted during the COVID-19 pandemic using a sample of midwestern young adults reported statistically significant associations between financial-related distress and increases in risky patterns of alcohol consumption (Lechner et al., 2021). A systematic review of literature from the 2008 Great Recession suggests that economic challenges may affect behavioral patterns related to substance use via opposing mechanisms (de Goeji et al., 2015). For example, while financial challenges may impede individuals from purchasing alcohol or cannabis (Johansson et al., 2006, de Goeji et al., 2015), experiences of financial distress during the 2008 Recession show associations between the psychological impacts financial distress and the use of alcohol as a means of coping with this stress (Bor et al., 2013). These opposing implications of financial distress on individual behavioral patterns related to alcohol use may explain the varying conclusions of studies examining this association within young adult populations.

Our use of a growth-mixture modeling approach to examine the associations of interests presents advantages, but also important considerations which must be considered when interpreting model results. While several fit statistics are taken into consideration to identify a class-model of best fit, there remains some subjectivity in model choice according to which fit statistics are prioritized. Model fit statistics are also limited by the specific bounds imposed by an analyst during model specification, due to the exploratory nature of this analytic technique. Despite these limitations, careful consideration of model fit statistics was undertaken following recommended guidelines (Ram and Grimm, 2009). Importantly, growth mixture modeling allows for examination of associations between trajectory experiences of financial distress and distal mental health and substance use outcomes that may not otherwise be identified using traditional longitudinal models. Another possible limitation of this study is the reliance on a subjective measure of financial distress, which may suffer from systematic biases related to one how perceives their own financial status in relation to their peers or environment. However, others (Adams et al., 2016; Weissman et al., 2020) have argued that objective measurements of financial status are not useful for identifying how a person's financial status impacts their ability to meet their personal needs, since these needs will likely vary between people with the same objective financial status (for example, two people with the same income may have different economic responsibilities or dependents). While reported subjective financial distress may also vary depending on personal psychological factors, we explicitly adjusted for these factors at baseline in each examined outcome model to minimize these impacts. Other limitations include the use of social media, email, and recruitment flyers as a mode of participant recruitment, leading to a final sample from which findings may not be generalizable to the broader population of young adults.

However, online strategies for recruitment have been found to help facilitate enrollment of harder to reach populations. Finally, the final sample size of 473 participants is somewhat small for use under a growth-mixture modeling approach. Although our resultant model fit statistics indicated strong support for the 3-class model, it would be beneficial for similar analyses to be conducted with larger cohorts of young adult participants available to further support these class trajectory findings.

Our study found trajectories of financial distress over the COVID-19 pandemic that varied from consistently Low to High among young adults, and that young adults of both Moderate and High trajectory classes showed greater depressive and anxiety symptoms compared to those of the Low trajectory class. Although other studies have examined similar associations, this study is the first, to our knowledge, to examine these associations using a growth-mixture modeling approach and to use over one year of longitudinal data collected during the COVID-19 pandemic. Our findings provide important insight into the impact of financial distress during the COVID-19 pandemic on mental health and substance use outcomes among young adults, who are at a particularly vulnerable life stage for experiencing these challenges. These findings suggest a need for health care providers to be aware of the psychological challenges imposed by financial distress to potentially prevent or treat worsening mental health symptoms, especially during periods of economic downturn.

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Tables and Figures:

Table 1: Descriptive Statistics for Cohort Demographic Covariates and Distal Outcomes (N = 473)
Demographic Covariates at Baseline (January 2020) **Mean (SD) or %**

Female	62.1%
Age	25.68 (1.75)
Race	
- Asian	19.5%
- Black/African American	4.9%
- White	57.5%
- Other*	5.8%
- More than one race	12.3%
Ethnicity: Hispanic/Latinx	8.1%
Percent Graduated College	27.1%
LGBTQ+	23.9%
Distal Outcomes (July/August 2021)	
- Depression Severity (PHQ-8 Score)	6.05 (5.46)
- % with Depressive Symptoms	22.4
- Anxiety Severity (GAD-7)	5.18 (5.14)
- % with Anxiety Symptoms	16.9
- Alcohol Use Severity (AUDIT)	4.50 (4.69)
- % with Hazardous Alcohol Use	17.9
- Cannabis Use Severity (CUDIT)	3.86 (5.04)
- % with Hazardous Cannabis Use	20.4

Note. PHQ-8 = Patient Health Questionnaire-8; GAD-7 = Generalized Anxiety Disorder-7; % with depressive/anxiety symptoms = PHQ-8 \geq 10; GAD-7 \geq 10; % with hazardous alcohol/cannabis use = AUDIT \geq 8; CUDIT \geq 8

*Numbers are as follows: American Indian or Alaskan Native (<5), Arab, Middle Eastern, or North African (6), Native Hawaiian or Pacific Islander (<5), Other (16)

Table 2: Mean Financial Distress Scaled Values for each Survey Time Point

Month(s) of Survey	Scaled Value
April 2020	0.47 (2.68)
September/October 2020	0.23 (2.61)
November/December 2020	0.03 (2.47)
January/February 2021	-0.11 (2.53)
March/April 2021	-0.30 (2.43)
May/June 2021	-0.35 (2.43)
July/August 2021	-0.11 (2.49)

Table 3

Fit Statistics and Class Proportions for a “One-Class” Latent Curve Model and Two- through Five-Class Growth Mixture Models

Fit Statistic	Latent Curve Model		Growth Mixture Models		
	One-Class	Two-Classes	Three-Classes	Four-Classes	Five-Classes*
AIC	13593	13561	13539	13537	13532
BIC	13646	13627	13561	13563	13562
Adjusted BIC	13608	13579	13561	13563	13562
Entropy	-	0.783	0.700	0.732	0.752
VLMR p-value	-	0.017	0.013	0.370	0.090
LMR p-value	-	0.020	0.016	0.380	0.100
Bootstrap p-value	-	0.000	0.000	0.090	0.010
Class proportions	1.00	0.06/0.94	0.04/0.37/0.59	0.38/0.57/0.01/0.04	0.55/0.02/0.04/0.01/0.38

*Model had convergence issues.

Figure 1: Trajectories of Financial Distress from April 2020 to July/August 2021

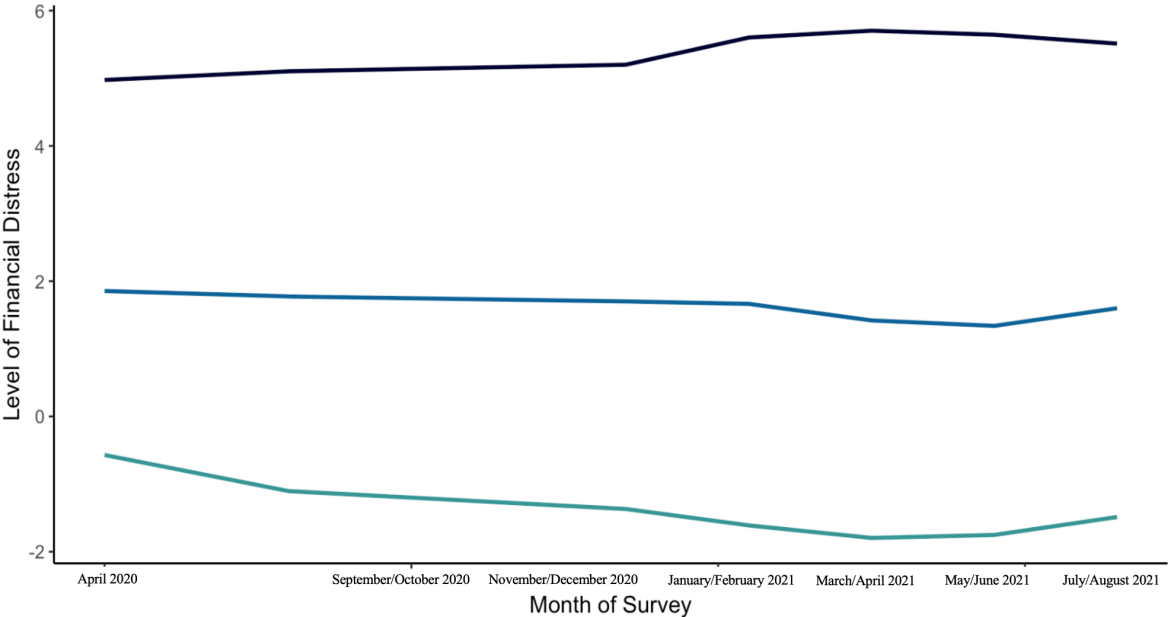


Table 4

Demographic Characteristics for Low, Moderate, and High Financial Distress Trajectory Classes with Chi-Square Test of Independence p-Values

	Low n(%)	Moderate n(%)	High n(%)	p-value
Class Total	288	166	19	
Female Sex	184 (63.9)	113 (68.1)	12 (63.2)	0.65
Non 4-year College Grad	210 (72.9)	119 (71.7)	15 (78.9)	0.78
LGBTQ+	61 (21.2)	44 (26.5)	8 (42.1)	0.07
Race				0.03*
Asian	52 (18.1)	39 (23.5)	3 (15.8)	
Black/Af. Am	9 (3.1)	12 (7.2)	3 (15.8)	
White	180 (62.5)	78 (47.0)	8 (42.1)	
Other Race	16 (5.6)	11 (6.6)	2 (10.5)	
>1 Race	30 (10.4)	24 (14.5)	3 (15.8)	
Hispanic/Latinx	21 (7.3)	15 (9.0)	1 (5.3)	0.74

Table 5: Results from Negative-Binomial regression models* for associations between most-likely latent trajectory class** and Distal Outcomes (July/August 2021)

	Depression Severity (PHQ-8)	Anxiety Severity (GAD-7)	Alcohol Use Severity (AUDIT)	Cannabis Use Severity (CUDIT)
<i>Without Controlling for Pre-Pandemic Measurement of Outcome</i>				
Parameter	CR (95% CI)	CR (95% CI)	CR (95% CI)	CR (95% CI)
Latent Class				
Low (Ref)	-	-	-	-
Moderate	1.43 (1.19, 1.73)	1.49 (1.22, 1.82)	0.94 (0.78, 1.13)	1.10 (0.81, 1.51)
High	2.36 (1.55, 3.74)	2.13 (1.35, 3.52)	0.96 (0.61, 1.56)	1.36 (0.68, 3.07)
<i>Controlling for Pre-Pandemic Measurement of Outcome</i>				
Parameter	CR (95% CI)	CR (95% CI)	CR (95% CI)	CR (95% CI)
Low (Ref)	-	-	-	-
Moderate	1.22 (1.03, 1.46)	1.36 (1.13, 1.63)	0.98 (0.85, 1.13)	0.97 (0.76, 1.24)
High	1.73 (1.18, 2.62)	1.46 (0.97, 2.26)	0.98 (0.69, 1.39)	0.90 (0.51, 1.66)

*All models were adjusted for age at baseline, sex, race/ethnicity, and education status

**n for each class is as follows: Low (288), Moderate (166), and High (19)