

# **Economic strain, parental education, and psychotic experiences among college students in the United States: Findings from the Healthy Minds Study 2020**

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## **ABSTRACT**

**Aim:** Socioeconomic status (SES) is linked to psychosis, and much can be learned by examining how various indicators of SES —specifically economic strain and intergenerational transfer of resources — are related to sub-threshold psychotic experiences among college students.

**Methods:** Using data from the Healthy Minds Survey (September 2020 – December 2020), we used multivariable logistic regression models to examine the associations between five SES indicators and 12-month psychotic experiences, adjusting for age, gender, and race/ethnicity. We also examined the count of predictors and psychotic experiences.

**Results:** Each indicator of economic strain was associated with greater odds of psychotic experiences. In particular, increasing levels of financial stress (current, childhood, and pandemic-related) were associated with greater odds of psychotic experiences in a dose-response fashion. Food insecurity was associated with double the odds of psychotic experiences. In terms of intergenerational transfer of resources, having either one or no parents who attended college was associated with significantly greater odds of having psychotic experiences, when compared with having both parents who attended college. Examining all predictors in the same model, only childhood and current financial stress, and food insecurity were significantly associated with psychotic experiences. The count of predictors was significantly associated with greater odds of having psychotic experiences in a dose-dependent fashion.

**Conclusions:** Among college students, economic strain and intergenerational transfer of resources were associated with recent psychotic experiences, highlighting the importance of economic interventions targeting young adults to influence risk for psychosis.

**KEY WORDS:** Psychotic experiences; economic strain; parental education; financial stress; food insecurity

## 1. INTRODUCTION

Much of the literature linking socioeconomic status (SES) to psychosis has focused on psychotic disorders, revealing what appears to be a bidirectional association (Cantor-Graae, 2007; Hudson, 2005; Kwok, 2014; Sariaslan, Fazel, D'Onofrio, et al., 2016). In theory, individuals with low SES are likely to encounter harmful stressors and barriers to resources, which place them at increased risk for psychosis (i.e., social causation). Indeed, individuals living in poverty are at higher risk of experiencing social adversities that predict psychotic disorders (Selten et al., 2013; Varese et al., 2012). On the other hand, individuals with psychosis often experience symptoms (e.g., hallucinations, delusions, thought disorder, negative symptoms) that can interfere with educational attainment and employment, while incurring financial costs (e.g., medical bills, legal expenses). Further, the social stigma of exhibiting psychotic symptoms or having a diagnosis may hamper one's employment prospects. Thus, individuals with psychosis may descend into lower socioeconomic strata over time (i.e., social drift; Kwok, 2014).

Empirical studies have indeed shown that in the US, around 10% of individuals diagnosed with schizophrenia are employed, as compared to 68% of those in the general population (Cloutier, Aigbogun, Guerin, Nitulescu, Ramanakumar, Kamat, DeLucia, Duffy, Legacy, Henderson, et al., 2016). Relatedly, in Denmark, the cumulative income of individuals diagnosed with schizophrenia was around one-seventh the income of individuals without schizophrenia (Hakulinen et al., 2019). But findings on the relationship between SES and psychosis have been inconsistent across countries and difficult to interpret due to heterogeneity in measures of SES across contexts. For example, in a systematic review of 14 studies of social class at birth and adult-onset psychosis, Kwok and colleagues (2014) found that seven studies showed a significant association between low SES and psychosis, four studies showed no association, and three studies showed a significant association between high SES and psychosis. Some lower-income countries have comparable or lower rates of psychotic disorders than high-income countries (Esan et al., 2012). These diverging patterns call for more research to be conducted beyond crude measures of SES.

### 1.1. Psychotic experiences

Psychotic disorder is rare (Cloutier, Aigbogun, Guerin, Nitulescu, Ramanakumar, Kamat, DeLucia, Duffy, Legacy, & Henderson, 2016; Kessler et al., 2005; Wu et al., 2005), but is considered a burdensome illness that places people at greater risk for homelessness (Ayano et al., 2019), hospitalization (Weissinger et al., 2020), and premature death (Suvisaari et al., 2013). These associations also make it difficult to study

SES and psychosis through traditional epidemiological survey research. However, not all psychosis reaches a clinical level of significance, as there are expressions of psychosis that tend to be ephemeral without causing distress or impairment in functioning. These sub-threshold expressions of psychosis are commonly referred to as *psychotic experiences* (Linscott & Van Os, 2010), and they are much more common than psychotic disorders, affecting anywhere from roughly 10-20% of the general United States (US) population (Cohen & Marino, 2013; Oh et al., 2020). This higher prevalence grants us an opportunity to understand the nuanced relationship between the social/economic determinants of psychosis, since the same mechanisms that govern psychotic disorders in clinical samples likely apply to psychotic experiences in the general population as well (e.g., Loch et al., 2017).

## 1.2. Examining SES and psychotic experiences using the bioecosystems perspective

To examine the linkages between SES and psychotic experiences, we draw from the Ecological Model of Human Development (Bronfenbrenner, 2005), whereby the development of the individual is shaped by complex interactions within and between multiple interlocking systems. Prior studies have used this model to understand the development of psychotic symptoms (see Strauss, 2021). As such, the relation between SES and psychotic experiences may be understood as individuals interact with their immediate environments, such as micro-systems (e.g., family) and exosystems (e.g., economic conditions) that mutually impact one another, shaping life trajectories and risk for psychotic experiences across time within the person and within the person's ecosystems. With this framework, we examine two indicators of SES that extend beyond basic measures of income and education.

### 1.2.1. Economic strain

The first indicator of SES is economic strain, which the literature describes as subjective financial stress and material deprivation (see Schenck-Fontaine & Panico, 2019). Self-reported financial stress has been shown to negatively impact psychological well-being (Hughes et al., 2014), with evidence of an association among college students (Jones et al., 2018; Richardson et al., 2017; Tran et al., 2018). While current financial stress is especially relevant, it is also important to examine financial stress during sensitive stages of development during childhood within the family microsystem, which can have a lasting impact on risk for psychosis in young adulthood. We also examine financial stress within the context of crisis by treating the COVID-19 pandemic as a 'shock' in the exosystem that uncovers those who are most financially insecure and have fewer resources to buffer the effects of the pandemic. In terms of material deprivation, we measure this through food insecurity, which is a vital aspect of day-to-

day life. Several studies have found that the uncertainty about one's ability to obtain enough adequate amounts of nourishing food is a strong determinant of mental health outcomes, and has been associated with depression, substance use, and suicidal ideation (Pourmotabbed et al., 2020; Pryor et al., 2016).

### 1.2.2. Parental education

The second indicator of SES that we examine is the intergenerational transfer of resources, which we operationalize as parental education. A large body of literature shows correlations between parental education and their children's socioeconomic positions and life course variation (see Cheng et al., 2016). Examining parental characteristics is important because traditional measures of SES are typically inadequate for understanding youth and young adults, who have low levels of education and little to no income given that they are often not in the labor market. Parental characteristics may include risk factors, such as substance use, criminal history, history of mental illness, which may confer risk for psychosis to their children. At the same time, parents also possess knowledge and resources to pay for their children's tutoring, assist their children with homework, pay for extracurricular activities, navigate the road to college, connect their children to internships and professional networks. This can be described as the intergenerational transfer of resources (see Serbin & Karp, 2004). Prior studies have used proxies such as occupational prestige of parents (Werner et al., 2007); however, in this study, we focus on parental education.

### 1.3. College populations

While public health research often uses level of education and income to measure SES, we recognize that these indicators fail to capture the nuances of deprivation/capability that affect psychosis risk (for example, see multidimensional poverty indices based on the capabilities framework; Alkire & Foster, 2011). Moreover, the relationship between income and health is not always linear [e.g., mortality (Rehkopf et al., 2008); self-assessed health depending on the country/context (Mackenbach et al., 2005)]. Even among people with the same level of education or income bracket, there is significant variation in terms of economic strain and intergenerational transfer of resources. Examining the relationships between SES and psychotic experiences in a sample of college students is a unique opportunity, in that college students not only fall within the median age range for onset of psychotic experiences (McGrath et al., 2016), they have also functioned well enough throughout childhood and adolescence to attain higher education, making it unlikely for psychosis to have resulted in social drift, at

least not at this life stage. Further, examining the college population allows us to exploit the heterogeneity within social stratum to isolate the effects of other indicators of SES, independent of education and income, given that students come from different backgrounds that place them at varying levels of risk for psychotic experiences.

#### 1.4. Study aims

The aim of the current study was to examine indicators of SES (economic strain and intergenerational transfer of resources) are related to psychotic experiences over the past year in large sample of students from across multiple colleges.

## 2. METHODS

### 2.1. Sample

We analyzed data from the Fall semester cohort of the 2020 Healthy Minds Study (HMS), a cross-sectional, web-based survey examining mental health and related factors in undergraduate and graduate student populations. The survey was administered at 36 universities between September through December of 2020. At each university, a random sample of 8000 students was invited by e-mail to participate, except at smaller universities (<8,000 students) where all students were invited to participate. The response rate was 14%, which is typical of online surveys of university populations. The HMS was approved by the Institutional Review Boards at the Health Sciences and Behavioral Science Institutional Review Board at the University of Michigan and at all participating campuses. The data that support the findings of this study are available upon request at: <https://healthymindsnetwork.org/hms/>.

### 2.2. Measures

#### 2.2.1. *Economic strain* was measured four indicators:

2.2.1.1. Current financial situation. Current financial situation was assessed using the single item: How would you describe your financial situation right now? Respondents could answer: always stressful, often stressful, sometimes stressful, rarely stressful, and never stressful (reference group). This variable was treated ordinally in the regression models.

2.2.2.2. Past financial situation. Past financial situation was assessed using the single item: How would you describe your financial situation while growing up? Respondents could answer: always

stressful, often stressful, sometimes stressful, rarely stressful, and never stressful (reference group). This variable was treated ordinally in the regression models.

2.2.2.3. COVID-19 related financial distress was assessed using the single item: How has your financial situation been affected by the COVID-19 pandemic? Respondents could answer: a lot more stressful, somewhat more stressful, no significant change, somewhat less stressful, a lot less stressful (reference group). This variable was treated ordinally in the regression models.

2.2.2.4. Food insecurity. Food insecurity was measured using two items: (1) Within the past 12 months I was worried whether our food would run out before we got money to buy more; (2) Within the past 12 months the food I bought just didn't last and I didn't have money to get more. Respondents could answer: never true, sometimes true, often true. Individuals were identified as food insecure with an affirmative answer (sometimes true or often true) to either question, following the two-item screen for families at risk of food insecurity (Hager et al., 2010).

2.2.2. *Intergenerational transmission of resources* was measured using parental education, which was assessed using the item: What is the highest level of education completed by your parents or step-parents? Respondents were categorized into three groups: both parents earned a post-secondary degree, one parent earned a post-secondary degree, or neither parent earned a post-secondary degree, where the following responses were considered post-secondary degrees—Associate's, Bachelor's, or Graduate Degree. This item was recoded to reflect: no parent attended college (or beyond), one parent attended college (or beyond), and both parents attended college (or beyond; reference group).

2.2.3. *Psychotic experiences (past 12-months)*. Psychotic experiences were measured using an abbreviated version of the World Health Organization Composite International Diagnostic Interview Psychosis Screen, which has been used in large global epidemiology studies (McGrath et al., 2015). Respondents were asked if they had ever experienced the following: (1) A feeling something strange and unexplainable was going on that other people would find hard to believe; (2) A feeling that people were too interested in you or that there was a plot to harm you?; (3) A feeling that your thoughts were being directly interfered or controlled by another person, or your mind was being taken over by strange forces?; and (4) An experience of seeing visions or hearing voices that others could not see or hear when you were not half asleep, dreaming, or under the influence of alcohol or drugs? Respondents were then asked a single item (yes/no) about whether any of these experiences occurred over the past 12 months,

reflecting either the recent onset of psychotic experiences, or the recent re-occurrence/persistence of psychotic experiences.

*2.2.4. Sociodemographic covariates.* Respondents self-reported sociodemographic characteristics, including gender (man, woman, and other), race/ethnicity (white, Black, Asian American Pacific Islander [AAPI], Latinx, multi-racial), and age (continuous).

### *2.3. Analysis*

The HMS was administered to 34,168 college students across 36 campuses, and a total of 30,582 respondents completed the items on 12-month psychotic experiences. We used complete case analysis, allowing sample sizes to vary depending on the data that were available. We used multivariable logistic regression analyses to test for associations between each predictor (current financial stress, childhood financial stress, COVID-19 related financial stress, food insecurity, and parental education) and outcome (12-month psychotic experiences), adjusting for age, gender, and race/ethnicity. We examined each predictor in separate models, to show the strength and significance of each predictor's association with psychotic experiences, testing for dose-response associations whenever possible to see if greater levels of economic strain or fewer intergenerational resources were related to greater odds of psychotic experiences. In another model, we examine all five predictors in the same model to examine whether predictors are more strongly associated with psychotic experiences net the effects of other predictors. Finally, to capture the depth and the breadth of economic strain and deprivation, we then dichotomized each predictor and counted them to assess their additive effects on psychotic experiences. We used sample probability weights to adjust for non-response using administrative available data on full student populations at each institution. Using multivariable logistic regression, response propensity was estimated based on gender, race/ethnicity, academic level, and grade point average. We then assigned response propensity weights to each student who completed the survey. Students who were less likely to have completed the survey were assigned a larger weight in the analysis. Sample weights gave equal aggregate weight to each school in the national estimates rather than assigning weights in proportion to school size, so that overall national estimates were not dominated by schools in our sample with large enrollment. Standard errors were clustered by university. We present results as odds ratios with 95% confidence intervals.

### **3. RESULTS**

In the HMS sample of university students, approximately one in seven reported psychotic experiences over the past year. More than a third of the sample characterized their current financial situation as being often or always stressful; over a quarter reported that their childhood financial situation was often or always stressful; around two thirds of the sample reported that the COVID-19 pandemic made their financial situations somewhat or a lot more stressful; over a quarter of the sample reported food insecurity; and around half of the sample had at least one parent who did not attend college. Economic strain was significantly higher and parental education was significantly lower among those with psychotic experiences when compared with those without psychotic experiences. Descriptive statistics are presented in **TABLE 1**.

#### **TABLE 1 HERE**

Multivariable logistic regression showed that each indicator of economic strain (financial stress and material deprivation) was associated with greater odds of 12-month psychotic experiences, adjusting for race/ethnicity, gender, and age. Increased current financial stress, for instance, was associated with greater odds of having 12-month psychotic experiences in a dose-dependent fashion (Table 2, Model 1). The same was true for childhood financial stress (Table 2, Model 2), COVID-19 related financial stress (Table 2, Model 3), and food insecurity (Table 2, Model 4). Intergenerational transfer of resources was also significantly related to psychotic experiences, with greater odds of psychotic experiences among those with either one or no parents who attended college (Table 2, Model 5).

#### **TABLE 2 HERE**

When including all five SES variables in the same model, current and childhood financial stress were related to psychotic experiences in a dose-response fashion, though the lowest levels (rarely or sometimes) of childhood financial stress did not achieve a conventional level of statistical significance. Food insecurity was also significantly associated with psychotic experiences; however, COVID-19 related financial stress and parental education were not significantly related to psychotic experiences (Table 3).

#### **TABLE 3 HERE**

After dichotomizing each predictor, the count of predictors was associated with greater odds of having 12-month psychotic experiences in a dose-dependent fashion. That is to say, when compared with having none of the predictors, endorsing one predictor was associated with a 1.84 times greater odds of having 12-month psychotic experiences (aOR 1.84; 95% CI: 0.98-3.46; p=0.059), while endorsing all five predictors was associated with 4.72 times greater odds (aOR: 4.72; 95% CI: 2.44-9.14; p=0.000). (Figure 1).

### [FIGURE 1]

## 4. DISCUSSION

### 4.1. Main findings

While prior US-based epidemiological studies have examined associations between certain SES indicators (e.g. unemployment) and psychotic experiences among adults in the general population (DeVylder et al., 2014), to our knowledge, this is the first study to examine economic strain and intergenerational transfer of resources and their relations to psychotic experiences among a large sample of college students in the United States. In our study, we found that economic strain (current financial stress, childhood financial stress, financial stress in the context of the pandemic, and food insecurity) and intergenerational transfer of resources (parental education) were linked to recent psychotic experiences, and that each of these SES factors appeared to increase odds of psychotic experiences in a dose-response fashion. When accounting for all the SES factors in the same model, only current and childhood financial stress and food insecurity remained significant predictors of psychotic experiences. Finally, the breadth and scope of SES factors (measured by the count of factors) were related to psychotic experiences in a dose-response fashion, where experiencing multiple SES factors were increasingly related to higher odds of having psychotic experiences.

### 4.2. College populations

These findings are revealing given the study population, as college students represent a particular stratum of society that enjoys more opportunity, higher income, and greater access to resources throughout their lives than those with less education. While level of education (which is more stable from year to year than income) is widely used in public health research as a proxy for SES, it is also a relatively crude indicator that does not capture the nuances of economic strain and intergenerational transfers of resources. Examining only college students granted us the opportunity to assess within-

group heterogeneity of the student population, to explore the effects of specific SES factors. We found that while epidemiological studies would have normally grouped college students together as having a high level of education (versus those less education, i.e., having less than a high school diploma), we found that some college students are more advantaged than others. We should note that future earnings may depend on major and school ranking (Eide, Hilmer, & Showalter, 2016). Moreover, wealth returns to education may be conditional on race/ethnicity (Tomaskovic-Devey, Thomas, & Johnson, K., 2005; Herring & Henderson, 2016) attributable to structural racism in the United States, which has produced racial inequities that shape risk for psychotic experiences over the entire life course (Anglin et al., 2021).

#### 4.3. The COVID-19 pandemic

Of particular note, we were able to examine financial distress resulting from the COVID-19 pandemic, which demonstrates the concept of 'chronosystem' (Bronfenbrenner, 2005), that is the changes that occur within and between systems over time. The COVID-19 pandemic resulted in a tremendous upheaval of various microsystems (e.g., moving back home to live with parents) and exosystems (e.g., economic turmoil). We expected that the pandemic would have impacted multiple microsystems, and that this 'shock' in the exosystem would reveal the most economically vulnerable individuals, who would in turn may have greater risk for psychotic experiences. Clearly, the COVID-19 pandemic negatively impacted people with low SES in the US in terms of infection and death (Buheji et al., 2020; Finch & Hernández Finch, 2020). However, we found that the stress resulting from the COVID-19 global pandemic was not significantly related to psychotic experiences net the effects of the other SES factors. While a period of financial stress due to the pandemic may impact mental health (Czeisler et al., 2020; Horigian et al., 2020), it appeared that the other forms of financial stress and insecurity were more prominent.

#### 4.4. Social causation

The value of examining college populations is that they were able to function reasonably well enough to attain higher education, and thus may not have exhibited signs of social drift at this stage of life. The wording of the items on childhood financial stress and parental education asks respondents to recall experiences and details about their lives that temporally precede 12-month psychotic experiences; thus, the associations could suggest childhood financial stress and parental education are linked to the subsequent emergence of psychotic experiences, or the persistence or recent re-occurrence of psychotic

experiences, conceivably lending evidence in support of the social causation hypothesis (see Wicks et al., 2005). If this is the case, the pathways by which economic strain and intergenerational transfer of resources can influence psychotic experiences are complex and likely operate through multiple microsystems. It is possible that economic strain impacts children by limiting parents' ability to invest materials, supports, time, and resources in their children's growth and development (see Family Investment Model; Conger & Donnellan, 2007). In turn, this may lead to increased childhood adversity, a known predictor of psychotic experiences (Varese et al., 2012). Economic strain can also apply pressure on parents wellbeing and create marital conflict, which negatively impact children (see Family Stress Model; Conger & Donnellan, 2007; Elder, 2018).

In terms of intergenerational transfer of resources, prior studies have shown that low parental education worsens health among people who are poorly educated themselves, and that attaining higher education tends to benefit health for those who have poorly educated parents (Ross & Mirowsky, 2011). Among this sample of students who have already achieved higher education, we found that having both parents with higher education was associated with lower odds of having psychotic experiences. It is possible that educated parents not only have higher paying jobs to provide salutary resources to their children, but also have social and cultural capital to help their children navigate healthcare systems, depending on the centrality of the parents in the family microsystem. Childhood financial stress and parental education may be correlated with how individuals respond to current financial stress, COVID-19 related financial stress, and current food insecurity, which prior research would suggest may contribute to the onset of psychosis (McCarthy-Jones, 2017). Moreover, in terms of food insecurity, being unable to feed oneself may result in higher levels of stress, which has been implicated as a risk factor for psychosis via the dysregulation of the Hypothalamic-Pituitary-Adrenal axis (Chaumette et al., 2016) and also via long-term malnutrition (e.g., deficiencies in vitamin C, vitamin E, and other carotenoids compounds) (García et al., 2018). However, more research is needed to confirm these pathways.

#### 4.5. Social drift

There has been mixed evidence regarding social drift, with some studies casting doubt on the idea that severe mental illness is necessarily associated with social drift (Lee et al., 2020), while other studies have shown that people with genetic liability for schizophrenia predicts subsequent residence in socioeconomically deprived neighborhoods (Sariaslan, Fazel, D'onofrio, et al., 2016). However, the current study focused on individuals with subthreshold psychotic experiences, who have functioned

reasonably well enough to achieve higher education, which is a marker of high SES. However, the majority of the respondents in the sample fell within the peak age range for the onset of psychotic experiences (McGrath et al., 2016). While most people who report psychotic experiences do not develop a psychotic disorder (McGrath et al., 2015), it is important to acknowledge that subthreshold psychotic symptoms are still associated with increased likelihood of developing more persistent psychosis (Dominguez et al., 2011), and that these experiences may sometimes actually be prodromal symptoms of psychotic disorder (Kessler et al., 2007). In other words, it remains to be seen whether these students will drift into poverty later on in life. Notably, social drift cannot be ruled out since self-report measures are subject to recall and social desirability biases, and it is conceivable that people with psychotic experiences may be more likely perceive their childhood and adolescence as being more difficult than people without psychotic experiences, though studies in support of this are lacking. The social causation and social drift debate remains confounded by parents with psychiatric disorders who may drift with their families into lower SES while also passing along to their children the genetic liability for psychosis. At the same time, being raised in a low SES environment may make one more likely to encounter adversities, which can result in emotional reactivity/hypersensitivity to stressors (Landau et al., 1972; Lardinois et al., 2011) that are linked to psychotic experiences. It should be noted that while psychotic experiences are usually not in and of themselves distressful or impairing, they are often linked to several mental and physical health outcomes, disability, suicidal thought and behaviors (DeVylder et al., 2014, 2015; Oh, DeVylder, et al., 2021; Oh et al., 2018), which may lead to financial stress and food insecurity.

#### 4.6. Limitations

To our knowledge, our study is the first large-scale study to examine these SES predictors and psychotic experiences among students from multiple universities in the US. However, there were several limitations. First, data were cross-sectional and did not allow for us to ascertain the temporal order of events or make causal inferences. Still, through retrospective self-report, our findings suggest that perceptions of financial stress during childhood allude to the potential durable effects of poverty, though more longitudinal designs are needed to confirm these results. Second, the data were self-reported, and may have been vulnerable to recall and social desirability biases (e.g., reluctance to disclose economic strain or psychotic experiences). Third, the response rate was 14%, which raises concerns about selection bias and generalizability of findings, though this response rate is comparable to surveys of this nature (Lipson et al., 2014), and survey weights were used to adjust for non-response. Still, more research is needed to determine whether these findings are generalizable to the larger

population, especially using sampling strategies that over-sample people of color who were lacking in the current sample. We acknowledge that college students in the United States tend to be a particular stratum of society, and future research should continue to examine the nuances of SES and psychosis in low- and middle-income countries, non-western countries, across welfare states, and in low SES populations. Fourth, this study was unable to capture stress sensitivity, which is a notable omission given that all SES predictors and psychotic experiences were captured using subjective self-report measures. It is possible that the associations found in our study are partly explained by stress sensitivity, which has been linked to psychotic experiences in prior studies (DeVylder et al., 2016). Certainly, previous exposures to stressors and adversities may make heighten responsiveness to later exposures (Collip et al., 2011, 2013). It is possible that growing up with low SES can increase risk for adverse childhood experiences (e.g., abuse, neglect), which may have made individuals more reactive to daily stressors (Lardinois et al., 2011), leading to psychotic experiences. Finally, due to limitations in the data, we did not account for the transdiagnostic nature of psychotic experiences (Van Os & Reininghaus, 2016), as the various SES predictors examined in this study would also likely be related to other psychiatric outcomes, including depression, anxiety, and alcohol/substance use, which have been significantly associated with various aspects of the COVID-19 global pandemic (Czeisler et al., 2020; Oh, Marinovich, et al., 2021; Rajkumar, 2020).

#### 4.7. Future directions

An important direction for future research is to examine economic strain and intergenerational transfer of resources using objective and comprehensive metrics of deprivation/capability in relation to psychotic experiences across the lifecourse. Studies can use geocoded data to account for neighborhood factors when considering SES, examining availability of resources, crime rates, air pollution, and so forth, in line with prior studies on psychotic disorders and psychotic experiences (O'Donoghue et al., 2016)(Bhavsar et al., 2017; Johnson et al., 2015; Kirkbride et al., 2014; Lee et al., 2020; Sariaslan, Fazel, D'Onofrio, et al., 2016, 2016). In addition to neighborhood level factors, prior studies have shown that inequality may be linked to psychotic experiences: An international study of 50 different countries found that for each 1% increase in the wealth held by the top percentile of a country's population, there was a 1.28% increase in psychotic experiences (Johnson et al., 2015). Moreover, perceptions of inequality, social disadvantage, and injustice have been linked to psychotic experiences (Cooper et al., 2008; Morgan et al., 2008, 2009; Newbury et al., 2017; Reininghaus et al., 2010; Stilo et al., 2013, 2016),

underscoring the importance of how individuals view their positions in a given social hierarchy, which deserves further attention.

#### 4.8. Conclusion

Among college students, economic strain (both past and present) and intergenerational transfer of resources were associated with psychotic experiences over the past year. Our study highlights the additional stratification that can occur within a single socioeconomic strata, and the importance of reducing economic strain in young adulthood to potentially influence health trajectories and risk for psychosis into later life stages.

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## TABLES AND FIGURES

**TABLE 1**

Descriptive statistics (12-month psychotic experiences)

	<b>No psychotic experiences (12-month) (n = 26 311)</b>	<b>Psychotic experiences (12-month) (n = 4271)</b>	<b>Total (30 582)</b>	<b>p-value</b>
<b>Economic strain</b>				
How would you characterize your financial situation right now?				.00
Never stressful	1796 (6.84%)	187 (4.39%)	1983 (6.50%)	
Rarely stressful	5334 (20.31%)	608 (14.26%)	5942 (19.47%)	
Sometimes stressful	9575 (36.47%)	1357 (31.83%)	10 932 (35.82%)	
Often stressful	5993 (22.82%)	1180 (27.68%)	7173 (23.50%)	
Always stressful	3560 (13.56%)	931 (21.84%)	4491 (14.71%)	
How would you describe your financial situation while growing up?				.00
Never stressful	4099 (15.62%)	439 (10.31%)	4538 (14.88%)	
Rarely stressful	7621 (29.04%)	1063 (24.96%)	8684 (28.47%)	
Sometimes stressful	7530 (28.69%)	1228 (28.83%)	8758 (28.71%)	
Often stressful	4293 (16.36%)	879 (20.64%)	5172 (16.96%)	
Always stressful	2701 (10.29%)	650 (15.26%)	3351 (10.99%)	
How has your financial situation been affected by the COVID-19 pandemic?				.00
A lot less stressful	274 (1.04%)	45 (1.06%)	319 (1.04%)	

Somewhat less stressful	837 (3.18%)	133 (3.12%)	970 (3.18%)	
No significant change	8841 (33.64%)	1046 (24.56%)	9887 (32.37%)	
Somewhat more stressful	10 405 (39.59%)	1618 (37.99%)	12 023 (39.37%)	
A lot more stressful	5923 (22.54%)	1417 (33.27%)	7340 (24.03%)	
Food Insecure				.00
Not food insecure	19 546 (74.41%)	2544 (59.68%)	22 090 (72.35%)	
Food insecure	6722 (25.59%)	1719 (40.32%)	8441 (27.65%)	
Intergenerational transfer of resources				
Number of Parents who Went to College or Beyond				.00
Both parents went to college or beyond	13 171 (50.06%)	1998 (46.78%)	15 169 (49.60%)	
One parents went to college or beyond	6586 (25.03%)	1165 (27.28%)	7751 (25.34%)	
Neither parent went to college or beyond	6554 (24.91%)	1108 (25.94%)	7662 (25.05%)	
Sociodemographic characteristics				
Age	23.99 (23.63–24.35)	22.64 (22.29–22.98)	23.80 (23.45–24.15)	.00
Gender identity				.00
Man	7473 (28.40%)	1306 (30.58%)	8779 (28.71%)	
Woman	18 271 (69.44%)	2717 (63.62%)	20 988 (68.63%)	
Other	520 (1.98%)	234 (5.48%)	754 (2.47%)	
Missing/unknown	47 (0.18%)	14 (0.33%)	61 (0.20%)	
Race/ethnicity (all categories)				.00
White	16 617 (63.16%)	2618 (61.30%)	19 235 (62.90%)	
AAPI	3226 (12.26%)	416 (9.74%)	3642 (11.91%)	
Black	1582 (6.01%)	286 (6.70%)	1868 (6.11%)	

Latinx	2034 (7.73%)	341 (7.98%)	2375 (7.77%)	
Two or more	2386 (9.07%)	529 (12.39%)	2915 (9.53%)	
Other	363 (1.38%)	60 (1.40%)	423 (1.38%)	
Missing/unknown	103 (0.39%)	21 (0.49%)	124 (0.41%)	

**TABLE 2**

Multivariable logistic regression showing associations between economic strain, intergenerational transfer of resources and psychotic experiences over the past year (Healthy Minds Study, September–December 2020)

	aOR	p-value	N
Economic strain			
Model 1. Current financial stress			
Never stressful (ref)	1.00	—	30 521
Rarely stressful	1.11 [0.95, 1.30]	.206	
Sometimes stressful	1.42 [1.22, 1.64]	.000	
Often stressful	1.96 [1.67, 2.30]	.000	
Always stressful	2.69 [2.29, 3.16]	.000	
Model 2. Childhood financial stress			
Never stressful (ref)	1.000	—	30 503
Rarely stressful	1.31 [1.16, 1.47]	.000	
Sometimes stressful	1.55 [1.38, 1.74]	.000	
Often stressful	1.97 [1.74, 2.23]	.000	
Always stressful	2.42 [2.13, 2.76]	.000	
Model 3. COVID-19 related financial stress			
A lot less stressful (ref)	1.000	—	30 539
Somewhat less stressful	0.97 [0.66, 1.43]	.884	
No significant change	0.72 [0.51, 1.01]	.059	
Somewhat more stressful	0.93 [0.67, 1.30]	.685	
A lot more stressful	1.47 [1.06, 2.03]	.020	
Model 4. Food insecurity			
No (ref)	1.000	—	30 531
Yes	2.01 [1.87, 2.15]	.000	
Intergenerational transfer of resources			
Model 5. Parental education			
Both parents college or more (ref)	1.000	—	30 582
One parent college or more	1.18 [1.09, 1.28]	.000	
Neither parent college or more	1.21 [1.12, 1.32]	.000	

- *Note:* All models adjusted for age, gender and race/ethnicity.

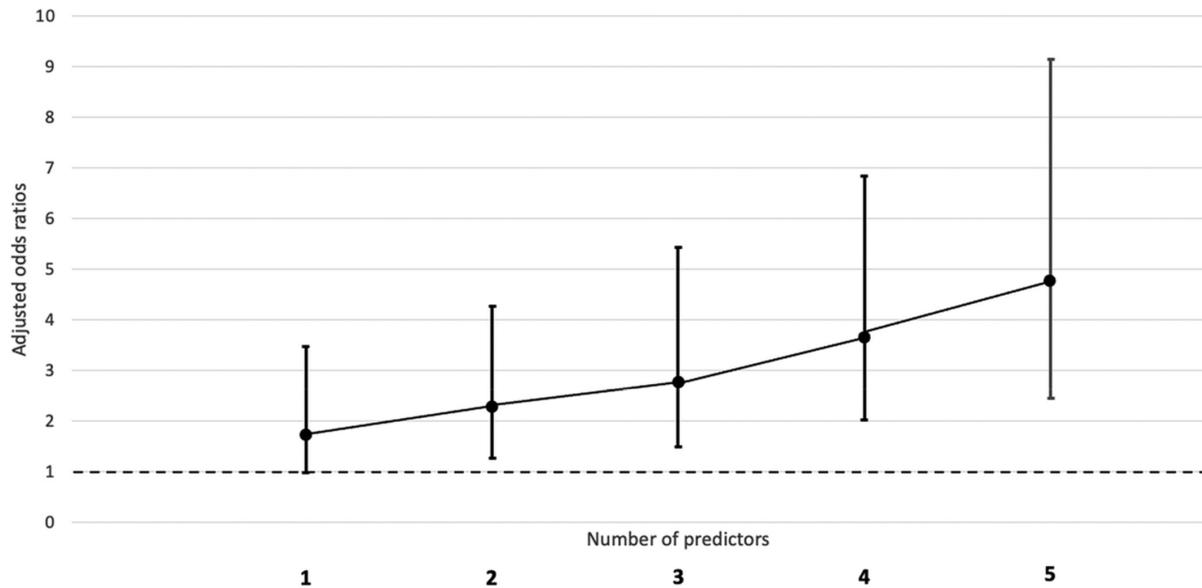
**TABLE 3**

Multivariable logistic regression showing associations between indicators of socioeconomic status and psychotic experiences over the past year (Healthy Minds Study, September–December 2020)

	12-month PE (mutually adjusted)		
	aOR	p-value	N
Current financial stress			
Never stressful (ref)	1.00	—	30 452
Rarely stressful	1.18 [1.04, 1.34]	.009	
Sometimes stressful	1.25 [1.09, 1.43]	.001	
Often stressful	1.41 [1.22, 1.63]	.000	
Always stressful	1.55 [1.33, 1.80]	.000	
Childhood financial stress			
Never stressful (ref)	1.00	—	
Rarely stressful	1.01 [0.85, 1.19]	.940	
Sometimes stressful	1.11 [0.94, 1.32]	.219	
Often stressful	1.24 [1.02, 1.50]	.030	
Always stressful	1.40 [1.15, 1.72]	.001	
COVID effect on financial situation			
A lot less stressful (ref)	1.00	—	
Somewhat less stressful	0.88 [0.60, 1.31]	.534	
No significant change	0.71 [0.50, 1.00]	.051	
Somewhat more stressful	0.77 [0.55, 1.09]	.137	
A lot more stressful	0.90 [0.64, 1.26]	.526	
Food insecurity			
Yes	1.50 [1.38, 1.62]	.000	
No	1.00	—	
Parental education			
Both parents college or more	1.00	—	
One parent college or more	1.01 [0.93, 1.10]	.752	
Neither parent college or more	0.95 [0.87, 1.03]	.219	

- *Note:* All models adjusted for age, gender and race/ethnicity.

**FIGURE 1**



Associations between count of predictors and 12-month psychotic experiences. Economic strain indicators and intergenerational transfer of resources (i.e., parental education indicator) were dichotomized and then summed to calculate the count of predictors, where 0 indicated no predictors were present and 5 indicated all predictors were present. Current and past financial situation indicators were coded as 1 (i.e., economic strain was present) if the respondents answered sometimes stressful, often stressful and always stressful and as 0 if the respondents answered rarely stressful or never stressful. The COVID-19 related financial distress indicator was coded as 1 if the respondents answered no significant change, somewhat more stressful and a lot more stressful and as 0 if the respondents answered somewhat less stressful or a lot less stressful. Food insecurity was already coded as a dichotomous variable, where 1 represented food insecure. Finally, parental education was dichotomized as 1 if at least one parent went to college or beyond and as 0 if neither parent went to college or beyond. All models are adjusted for age, gender and race/ethnicity