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Understanding the Role of Perceived Racial Discrimination on Adolescent Mental Health During the COVID-19 Pandemic

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Understanding the Role of Perceived Racial Discrimination on Adolescent Mental Health During the COVID-19 Pandemic

By

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Understanding the Role of Perceived Racial Discrimination on Adolescent Mental Health During the COVID-19 Pandemic
By Jill V. Klosky

Background: Adolescent mental health has declined since the onset of the COVID-19 pandemic. Racial discrimination, which may negatively affect adolescent mental health, has increased. The goal of this study was to gain an understanding of the role of racial discrimination on adolescent mental health during the COVID-19 pandemic. The primary research question was whether pre-pandemic racial discrimination predicted changes in adolescent depression, anxiety, and self-esteem from before to during the pandemic. A second research question looked for an association between experiences of racial discrimination and discrimination-related distress during the pandemic, and COVID-19 worry.

Methods: This secondary analysis of a longitudinal study consisted of two online surveys administered at two public high schools in semi-rural, north-central Georgia. The first survey was administered to ninth-graders in Spring 2020, just before the closing of public schools due to the COVID-19 pandemic. The second survey was administered to the same students in Fall 2020. This provided a unique opportunity for comparison of the pre-COVID-19 baseline data with the data collected during the pandemic.

Results: No significant associations were found between baseline perceived racial discrimination and changes in mental health outcomes (depression, $p=0.6194$; anxiety, $p=0.8240$; self-esteem, $p=0.0731$). Analysis between racial discrimination during the pandemic and associated distress, with COVID-19 worry yielded no significant associations.

Conclusions: Although this study did not find racial discrimination affected adolescent mental health during the COVID-19 pandemic, the importance of this topic should not be discounted. There is a need for future research to examine adolescent racial discrimination in rural communities while including diverse racial and ethnic groups and sub-groups. Additionally, there is a need to study racial discrimination and mental health stigma among rural adolescents. These findings could help to improve access to mental health services as well as promote policy reform to foster more equitable practices.

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Introduction

Background

Before the onset of the COVID-19 pandemic, adolescent mental health in the U.S. was declining (Centers for Disease Control and Prevention [CDC], 2019). Persistent feelings of sadness or hopelessness, prevalence of major depressive disorder, and suicidality had been on the rise (CDC, 2019; Substance Abuse and Mental Health Services Administration, 2020b). Concurrently, barriers have inhibited access and/or utilization of mental health services, particularly among historically marginalized groups (Krill Williston, Martinez, & Abdullah, 2019; Substance Abuse and Mental Health Services Administration, 2020a), and people living in rural communities (Cummings, Wen, & Druss, 2013). The long-term health implications of mental health difficulties experienced in adolescence are significant as they have the potential to negatively affect both mental and physical health into adulthood (McLeod, Horwood, & Fergusson, 2016).

When schools closed to in-person learning during the COVID-19 pandemic in mid-March of 2020, many students lost access to the school-based mental health services that they had previously relied upon (Substance Abuse and Mental Health Services Administration, 2020b). This sudden loss of mental health care, in combination with the additional, novel stressors of the pandemic, proved to be an unfortunate and challenging combination (Bartek, Peck, Garzon, & VanCleve, 2021; Maalla M'jid, 2020). COVID-19 mitigation strategies produced sudden, daily changes to routine, leading to social isolation and for some, loneliness (Loades et al., 2020). These changes, when combined with concerns of coronavirus infection, have been associated with depression and anxiety disorders in children and adolescents (Meherali et al., 2021), as well as post-traumatic

stress symptoms (Bartek et al., 2021; Meade, 2021). The Centers for Disease Control and Prevention (CDC) reported a 31% increase in emergency room (ER) visits due to acute mental health crises from April through October 2020 among 12-17 year olds (Leeb, 2020).

Adolescent experiences of racial and ethnic discrimination can adversely affect mental health (Benner et al., 2018; CDC, 2020; Cheah et al., 2020; Huynh & Fuligni, 2010; Niwa, Way, & Hughes, 2014; Seaton, Caldwell, Sellers, & Jackson, 2008; Seaton & Douglass, 2014; Smith & Pössel, 2021; Thurman, Johnson, & Sumpter, 2019). Specifically, such experiences can be detrimental to adolescents in terms of increases in anxiety, depression, difficulty in peer relationships (Benner et al., 2018; Niwa et al., 2014), and lower self-esteem (Benner et al., 2018; Huynh & Fuligni, 2010; Niwa et al., 2014). In addition, associations have been found between experiences of racial discrimination and distress, somatic symptoms, academic achievement, and risky health behaviors (Benner et al., 2018; Huynh & Fuligni, 2010).

During the volatile socio-political climate of 2020, many people who identified with racial and ethnic minority groups, reported increased incidences of racial discrimination (Cheah et al., 2020; Clawson et al., 2021; Ha et al., 2021; Liu, Finch, Brenneke, Thomas, & Le, 2020; Meade, 2021; Miconi, Li, Frounfelker, Venkatesh, & Rousseau, 2021). Various media sources and politicians placed blame on the Asian American community as a source of spread of COVID-19; thus during the pandemic, some Asian-Americans reported experiencing higher rates of discrimination and more concerns about physical assault (Ha et al., 2021; Meade, 2021). Additionally, the summer of 2020 was a time of increased media attention to the police murder of George Floyd, which sparked global

protests against race-based police killings and racial injustice in the U.S. (Chae et al., 2021; Meade, 2021). The widespread images shared by the media of George Floyd's murder had the potential to expose individuals to vicarious racism, which is when a person sees, reads, or hears about an act of racism aimed at another person of the same race (Chae et al., 2021; Cheah et al., 2020). Also unique to this time was the prevalence of COVID-19-associated discrimination (CAD) which is discrimination towards those who may possess similar social characteristics to individuals who are assumed to be contagious with COVID-19, despite their infection status not being publicly known (Liu et al., 2020). Almost half of Chinese-American parents and their children reported either experiencing or witnessing CAD. Adolescent mental health appears to be more negatively affected by vicarious racism and Sinophobia compared to adults (Cheah et al., 2020).

Theoretical Framework

The National Institute of Minority Health and Health Disparities (NIMHD) research framework, and the extant literature informed this study's design (Alvidrez, Castille, Laude-Sharp, Rosario, & Tabor, 2019; National Institute on Minority Health and Health Disparities, 2018). The NIMHD research framework is intended to be used to visualize and conceptualize the range of factors that may work alone or in concert to positively or negatively influence minority health, and health disparities. The framework is shaped by the socioecological model, and the National Institute of Aging (NIA) health disparities research framework. (Alvidrez, Castille, Laude-Sharp, Rosario, & Tabor, 2019; National Institute on Minority Health and Health Disparities, 2018). As the intent of the NIMHD framework is to be modified to study specific populations of interest (Alvidrez et al.,

2019), it was adapted for the specific adolescent population in this study, the variables available, and the unique influences of the COVID-19 pandemic.

Study Purpose and Research Questions

It is unclear how the unique and volatile combination of COVID-19-related stressors, the polarized socio-political environment, the increased focus on racial injustice, and increased incidences of racial discrimination and racism, may have affected youth in the U.S. (Meade, 2021). Given that experiences of racial discrimination and racism adversely affect adolescent mental health (Benner et al., 2018; CDC, 2020; Cheah et al., 2020; Huynh & Fuligni, 2010; Niwa et al., 2014; Seaton et al., 2008; Seaton & Douglass, 2014; Smith & Pössel, 2021; Thurman et al., 2019), and that adolescent mental health has declined since the pandemic (Bartek et al., 2021; Leeb, 2020; Loades et al., 2020; Maalla M'jid, 2020; Meade, 2021; Meherali et al., 2021), little research exists that examines the role of racial discrimination on changes in adolescent mental health during the COVID-19 pandemic. The purpose of this study is to understand whether perceived racial discrimination was associated with the mental health of high school students (as measured by depression, anxiety, and self-esteem) during the pandemic.

Specifically, this study seeks to answer the following questions:

Research Question 1: Do pre-COVID-19 pandemic perceptions of racial discrimination predict changes in mental health outcomes during the early COVID-19 pandemic, among high school students in semi-rural Georgia?

Research Question 2: Is perceived racial discrimination, and related emotional distress, associated with COVID-19-related worry?

Literature Review

Adolescent Mental Health Prior to COVID-19 Pandemic

Before the COVID-19 pandemic, adolescent mental health in the United States had been declining (CDC, 2019). High schoolers who reported experiencing persistent feelings of sadness or hopelessness increased from 26% in 2009 to 37% in 2019. These findings were consistent across races and ethnicities, with the highest prevalence among Latinx students (40%), followed by White students (36%), then Black students (32%). Almost half of female students (47%), reported these experiences in 2019 compared to about a quarter (27%) of their male counterparts (CDC, 2019). Major depressive episodes increased among adolescents aged 12-17 years, from nine percent in 2004 to over 15% in 2019, which translates to 3.8 million youths (Substance Abuse and Mental Health Services Administration, 2020b). Alarmingly, rates of suicidality, which includes seriously considering suicide, developing a plan, and suicide attempts, increased from 14% in 2009 to 19% in 2019 (CDC, 2019).

Co-occurring with worsening adolescent mental health are barriers to access, and\or low utilization of mental health services. Although more adolescents (aged 12-17) with a past year history of a major depressive episode received mental health services in 2019 compared to 2005, it remained relatively low at 43% for those without severe impairment and 50% for those with severe impairment (Substance Abuse and Mental Health Services Administration, 2020b). Access to mental health providers and utilization of such services is lower among racial and ethnic minorities, as well as those living in rural communities (Cummings et al., 2013; Substance Abuse and Mental Health Services Administration, 2020a). In 2008, less than half of rural counties in the U.S. had a clinic

capable of providing outpatient mental health services for children and adolescents, while only one-third of rural counties had the capacity to offer clinical care for youth who were diagnosed with severe emotional disturbances (Cummings et al., 2013).

The long-term implications of mental health challenges experienced in adolescence are significant as they have the potential to progress and negatively affect health well into adulthood (McLeod et al., 2016; World Health Organization [WHO], 2003). Adults who had experienced depression in adolescence, are at greater risk for anxiety and depression (Johnson, Dupuis, Piche, Clayborne, & Colman, 2018; McLeod et al., 2016; Tuisku et al., 2014), risky sexual behavior (Lehrer, Shrier, Gortmaker, & Buka, 2006), physical health challenges, social problems (Chen et al., 2006), parenting difficulties (Hammen, Brennan, & Le Brocque, 2011; McLeod et al., 2016), engagement in illegal activity (WHO, 2003), violence, unemployment (McLeod et al., 2016; WHO, 2003), as well as substance abuse, and suicidality (Weissman et al., 1999). If depression becomes a chronic condition in adulthood, it is associated with an increased risk of serious physical comorbidities such as cardiovascular disease and type-II diabetes (Johnson et al., 2015).

Pandemics and Adolescent and Child Mental Health

A 2021 rapid systematic review exploring the psychological effects of pandemics on children and adolescents, indicated that the most frequently reported adverse outcomes were higher rates of depression, anxiety, fear, stigmatization, and symptoms of posttraumatic stress (Meherali et al., 2021). Thirty percent of children who were quarantined in the H1N1 pandemic met the clinical cutoff score for posttraumatic stress disorder (Sprang & Silman, 2013). In addition, children and adolescents who have experienced a pandemic are more likely to have increased stress, worry, feelings of

helplessness, and behavioral challenges including higher rates of substance use, relational conflicts, academic difficulties, missed work, and even suicidality (Meherali et al., 2021).

COVID-19 and Youth and Parent Mental Health

In 2019, over three million children (15.4%) in the U.S., received mental health services exclusively through their schools (Substance Abuse and Mental Health Services Administration, 2020b). Mental health services delivered in the school setting provide invaluable early access to interventions for challenges that might otherwise progress to clinical levels of psychological or behavioral disorders (Bartek et al., 2021). When schools closed to in-person learning during the COVID-19 pandemic, students suddenly lost access to school-based mental health services (Bartek et al., 2021); thus, existing barriers to accessing mental health care were significantly increased (Maalla M'jid, 2020; Power, Hughes, Cotter, & Cannon, 2020). This trend was reflected in a UK survey of more than 2,000 adolescents and young adults (aged 13-25) with a history of mental health disorders. Eighty-three percent of the respondents reported worsening mental health during the COVID-19 pandemic, as well as a lack of access to mental health services (YoungMinds, 2020).

The sudden daily changes due to COVID-19 mitigation strategies such as physical school closures, social distancing, sporadic quarantine requirements, and the subsequent social isolation and loneliness (Loades et al., 2020) combined with the concern of infection, have been associated with depression and anxiety disorders for children and adolescents (Meherali et al., 2021), as well as post-traumatic stress symptoms (Bartek et al., 2021; Meade, 2021). While adhering to quarantine requirements, adolescents were more likely to report insomnia, social isolation, boredom, and sadness (Meherali et al.,

2021). In a recent study, 14% of parents observed worsening mental health in their children under the age of 18 during the COVID-19 pandemic (Patrick et al., 2020). A systematic review of parents reporting on their adolescents' mental health during the COVID-19 pandemic, found elevated reports of depression, anxiety, and isolation, as well as poor behavior, decreased attentiveness, and increased impulsivity (Meade, 2021). Furthermore, the CDC reported a 31% increase in ER visits due to acute mental health crises from April through October 2020 for 12-17 year olds (Leeb, 2020). During the COVID-19 pandemic, many youths spent more time on social media, which is associated with increased experiences of pandemic-related stress and depression (Ellis, Dumas, & Forbes, 2020). Female adolescents had higher reports of anxiety, depression, and mental health-related ER visits than their male counterparts (Meade, 2021; Meherali et al., 2021), and older adolescents reported more depression and anxiety symptoms than younger adolescents, during the COVID-19 pandemic (Meherali et al., 2021).

When quarantining for COVID-19, adolescents have reported feelings of worry, fear, and helplessness (Saurabh & Ranjan, 2020). A recent study found that compared to White parents, parents identifying as Black, American Indian/Alaskan Native, Latinx, Asian, multiracial, or as another racial or ethnic group, reported more distress during the pandemic. Specifically, these parents worried about losing employment and other resources (Clawson et al., 2021).

Racial Discrimination and Adolescent Mental Health

Racism has been defined as a "…system of structuring opportunity and assigning value based on the social interpretation of how one looks (which is what [people] call 'race'), that unfairly disadvantages some individuals and communities, unfairly

advantages other individuals and communities and saps the strength of the whole society through the waste of human resources." (Jones, 2018, p.231). Whereas discrimination may be defined as:

> "[U]nequal treatment on the basis of some socially defined category; it involves behavior aimed at denying members of a particular groups equal access to societal reward…[t]here are two aspects of discrimination – differential treatment and differential effects: differential treatment describes behavior, often intentional, to treat someone less favorably based on some socially defined category; differential effects are practices that adversely impacts one group but not another without a sufficiently compelling reason." (Reischel & Krusky, 2013, as cited in Ford, Griffith, Bruce & Gilbert, 2019, p.525).

Experiences of racial and ethnic discrimination and racism among adolescents who identify with racial and ethnic minoritized groups, have been associated with poorer mental health outcomes (Benner et al., 2018; CDC, 2020; Cheah et al., 2020; Huynh & Fuligni, 2010; Niwa et al., 2014; Seaton et al., 2008; Seaton & Douglass, 2014; Smith & Pössel, 2021; Thurman et al., 2019), including anxiety, depression, difficulty with peer relationships (Benner et al., 2018; Niwa et al., 2014), and lower self-esteem (Benner et al., 2018; Huynh & Fuligni, 2010; Niwa et al., 2014). Incidents of racial discrimination have also significantly predicted higher rates of distress, adverse somatic symptoms, and lower grade point average among Latino and Asian American 12th graders (Huynh & Fuligni, 2010). A 2018 meta-analysis noted relationships between adolescent perceived racial and/or ethnic discrimination and increased psychological distress, higher likelihood of participating in risky health behaviors, and reduced academic achievement,

engagement, and motivation (Benner et al., 2018). Perceived racial discrimination was associated with increased depressive symptoms, and lower self-esteem and life satisfaction among African American and Caribbean Black youth (Seaton et al., 2008). For Black high school students, experiences of racial discrimination were associated with depressive symptoms the following day (Seaton & Douglass, 2014). Additionally, experiences of microaggressions among Asian and Latinx adolescents have been related to depressive and somatic symptoms (Huynh, 2012). Repeated incidents of racism are a persistent stressor that may provoke a physiological response that when compounded over time, can erode both mental and physical health outcomes (Krill Williston et al., 2019; Smith & Pössel, 2021; Trent et al., 2019).

Prevalence of Racial Discrimination

A paucity of research exists regarding the prevalence of experiences of racial discrimination among adolescents; however, a study of over 500 African American adults reported that 96% had experienced racial discrimination in the past year (Klonoff & Landrine, 1999). Within the adolescent literature, a 2010 study of 277 urban children and adolescents who identified as African American, Latino, multiracial/multicultural, West Indian/Caribbean, European American, or "other," found that 88% had ever experienced racial discrimination (Pachter, Bernstein, Szalacha, & Coll, 2010). A national study reported that 87% of African American adolescents and 90% of Caribbean Black adolescents (ages 13-17), had experienced at least one occurrence of racial discrimination over the past year (Seaton et al., 2008). In a study of 75 Black adolescents (aged 14-18) from a southeastern city in the U.S., 97% reported experiencing at least one episode of discrimination at school during a two week period, regardless of the racial and ethnic

diversity of the school (Seaton & Douglass, 2014). Although this topic is underrepresented in the literature, especially in rural communities, the few existing studies very clearly demonstrate that experiences of racial discrimination are common among adults and adolescents who identify as racial and ethnic minorities.

Racial Discrimination and Racism During the COVID-19 Pandemic

During the COVID-19 pandemic in 2020, some media outlets and politicians routinely blamed the Asian American community as a source of spread of COVID-19, contributing to increased discrimination and violence toward Asian Americans (Ha et al., 2021; Meade, 2021). Additionally, during the summer of 2020, there was a higher potential for increased race-based discrimination owing to media attention to the police murder of George Floyd (Chae et al., 2021; Meade, 2021). The news of his murder, and that of Breonna Taylor, Ahmaud Arbery, and others, inspired numerous national and global protests focusing on racial injustices in the U.S. (Meade, 2021). During that time, video footage of the murder of Mr. Floyd was easily accessible to the public. This type of media coverage is significant in terms of promoting vicarious racism, which is when a person sees, reads, or hears about an act of racism aimed at another individual of the same race (Chae et al., 2021; Cheah et al., 2020). Twenty-five percent of Chinese American parents and youth reported experiencing vicarious racial discrimination, both online and in-person, almost daily, early in the COVID-19 pandemic. Compared to adults, vicarious racism is more detrimental to the mental health of adolescents (Cheah et al., 2020).

COVID-19-associated discrimination (CAD) is described as stigmatization and discrimination towards those who may possess similar social characteristics to those who

are assumed to be contagious with COVID-19, despite their infection status not being publicly known (Liu et al., 2020). A recent study found that early in the pandemic, almost half of Chinese-American parents and their children (aged 10-18) reported either being the recipients of or witnessing CAD. This was associated with increased levels of generalized anxiety and symptoms of depression. Similar to the effects of vicarious racism, youth were more inclined to be negatively affected by experiences of Sinophobia than adults (Cheah et al., 2020).

Theoretical Framework

The National Institute of Minority Health and Health Disparities (NIMHD) research framework informed this study's design. This framework is intended to be used to visualize and conceptualize the range of factors that may work alone or in concert to positively or negatively influence minority health, and health disparities. The NIMHD framework is shaped by the socioecological model, and the National Institute of Aging (NIA) health disparities research framework (Alvidrez et al., 2019; National Institute on Minority Health and Health Disparities, 2018). In this model, the determinants for health disparities of the NIA framework are employed along the Y-axis and include the domains of biological, behavioral, physical/built environment, sociocultural environment, and the addition of health care system. The socioecological model considers the influences on human behavior and development from the individual to the societal level (Alvidrez et al., 2019; National Institute on Minority Health and Health Disparities, 2018). The X-axis is made up of the levels of influence along the socioecological model which include individual, interpersonal, community, and societal domains. In addition, a life-course perspective is depicted with a bi-directional arrow along the Y-axis. This illustrates the

influences of early trauma, chronic events, and cumulative experiences in one's lifetime that may influence all levels along the NIA framework (Alvidrez et al., 2019). (See *Appendix A* for the NIMHD Research Framework).

The intent of the NIMHD framework is to be modified to reflect specific populations of interest; therefore, it was adapted for the specific adolescent sample that is the focus of this study, and the unique influences of the COVID-19 pandemic. For this analysis, the NIMHD framework was used to identify key covariates that may have influenced the outcomes of interest along the individual and interpersonal levels of influence and the biological, behavioral, physical/built environment, and sociocultural environment domains of influence. Applying the entire framework was beyond the scope of this study as community, societal and health care system data was unavailable. (See *Appendix B* for Adapted NIMHD Research Framework for Adolescents in the COVID-19 Pandemic).

Study Purpose and Research Questions

It is unknown how the volatile combination of COVID-19-related stressors, the polarized socio-political environment, the increased focus on racial justice, and increased discrimination and racism, affected our youth in the U.S. (Meade, 2021). Adolescents of racial and ethnic minority groups may be at higher risk of mental health difficulties during, and after the pandemic due to the additional, compounding effects of racial discrimination and racism on health (Chae et al., 2021; Cheah et al., 2020; Meade, 2021). During the pandemic, when incidences of discrimination increased (Cheah et al., 2020; Clawson et al., 2021; Ha et al., 2021; Liu et al., 2020; Meade, 2021; Miconi et al., 2021), and adolescent mental health challenges have become more pervasive (Bartek et al., 2021; CDC, 2019; Ellis et al., 2020; Leeb, 2020; Loades et al., 2020; Meade, 2021;

Meherali et al., 2021; Patrick et al., 2020; Saurabh & Ranjan, 2020; YoungMinds, 2020), while access to mental health services have declined (Bartek et al., 2021; Maalla M'jid, 2020; Meade, 2021; Power et al., 2020; Substance Abuse and Mental Health Services Administration, 2020b), it seems possible that our country will be facing increased post-pandemic related mental health challenges for years to come. Given the known adverse effects of racism and perceived discrimination on health, little research exists that examines the role of discrimination on adolescent mental health outcomes during the COVID-19 pandemic, particularly in semi-rural locations. Previous research has determined that racial discrimination and COVID-19-related worry contribute to declines in mental health, and that parents who identify with racial and ethnic minority groups may report increased pandemic-related worry compared to those who are not racial and ethnic minorities (Clawson et al., 2021). However, to our knowledge, racial discrimination has not been studied as a potential contributor to COVID-19-related worry. This study has the unique opportunity to analyze data collected from the same students before and during the COVID-19 pandemic.

This research study seeks to answer the following questions:

Research Question 1: Do pre-COVID-19 perceptions of racial discrimination predict changes in mental health outcomes during the COVID-19 pandemic, among high school students in semi-rural Georgia? We hypothesized that racial discrimination would predict changes in mental health outcomes (as measured by depression, anxiety, and self-esteem), particularly for students who identified as Asian, Black, Latinx, and multiracial.

Research Question 2: Does perceived racial discrimination, and related emotional distress, associate with COVID-19 worry? We hypothesized that racial discrimination

would be associated with COVID-19 worry as the pandemic has disproportionately affected people of racial and ethnic minority groups.

The findings of this study will help to gain a deeper understanding of the effects of racial discrimination on adolescent mental health during the COVID-19 pandemic which may help to inform public health and school policies as we move forward in the pandemic and beyond.

Methods

Study Design

This study is a secondary analysis of data collected for the parent longitudinal study: Effects of Sleep on Academic and Health Outcomes Among Adolescents with Dr. Gazmararian as the principal investigator (R21 HD097491). The original project examined measures of sleep to determine whether sleep deprivation among high schoolers is related to educational and health outcomes. Data were collected through two online surveys administered at two public high schools in semi-rural, north-central Georgia. The first online survey administration occurred between February 17 – March 4, 2020, just prior to the closing of public schools in Georgia due to the COVID-19 pandemic, to the ninth graders. When schools quickly closed to in-person learning in mid-March 2020 as a COVID-19 mitigation strategy, the study adapted to examine emerging issues related to the pandemic. Therefore a revised survey, which included supplemental COVID-19 survey items, was developed and administered from November 16 - December 17, 2020, to the then 10th grade students. This provided a unique opportunity for comparison of the pre-COVID-19 baseline data with the data collected during the early pandemic. The Emory University Institutional Review Board reviewed and approved all study protocols and surveys.

Population and Sample

The study population was a sample of high school students who were 9th graders in Spring 2020, and 10th graders in Fall 2020, attending two semi-rural public high schools in north-central Georgia. The student bodies of both high schools were majority White at

54-56% and less than half of the students qualified for Free and Reduced Priced Lunch (FRPL) (Georgia Department of Education, 2021).

In the spring of 2020, 9th graders (N=1,133) from both schools, were recruited for participation in an online survey with 558 potential student participants from one school, and 575 from the other. Parents could opt their child out of the study, and the participating students indicated assent. Ultimately, 863 total students provided assent and participated in the survey (417 from one school, 340 from the other, and 106 students who did not indicate their school). A total of 615 eligible students participated in the first survey in the Spring 2020 administration, 408 in Fall 2020, with 223 students completing both the spring and fall surveys. Of these, students who completed all of the items for the depression, anxiety, and self-esteem measures on both surveys, (n=129) were included in the pair-wise analysis.

Data Sources

Three data sources were used: 1) Time 1 (T1), Spring 2020 online high school student survey, 2) Time 2 (T2), Fall 2020 online high school student survey, and 3) demographic data (gender, race, ethnicity, FRPL eligibility) from the school district's Office of Student and Data Services. Data collected from the two schools were combined for analyses. All surveys were estimated to take 15 minutes to complete.

The T1 survey administration was conducted online via Qualtrics (Qualtrics, 2021) with students using school-provided laptops during their advisory periods or health classes to complete the survey. This Spring survey was administered over two sittings within fifteen days. Part one of the Spring survey consisted of 102 items. Survey domains included: demographics, sleep habits and hygiene, daytime sleepiness, physical health,

health conditions, activities, physical activity, and nutrition. The second part of the spring survey consisted of 106 items and the survey domains included: technology use, perceived discrimination, mental health, stress, self-esteem, bullying, social support, loneliness, home and neighborhood.

The T2 survey was also administered online during class on students' school laptops if the student was attending school in person (n=89). For the 40 students attending school virtually, the survey was sent to the student through their school email address, and was also completed online. This survey consisted of 180 items. Survey domains included: demographics, sleep habits and hygiene, daytime sleepiness, COVID-19 (worry, exposure, experience, beliefs, online learning, behavior, social norms), physical health, health conditions, activities, physical activity, caffeine, technology use, perceived discrimination, mental health, stress, self-esteem, bullying, social support, loneliness, home and neighborhood.

Study Measures

Exposures

Perceived Racial Discrimination. Perceived racial discrimination was queried with an item that was modified from the Reactions to Race Module of the 2010 CDC Behavioral Risk Factor Surveillance System Survey Questionnaire (CDC, 2010). At T1, participants answered the question, "Since the start of the school year (Fall 2019) **at school**, do you feel you were treated worse than, the same as, or better than people of other races?" At T2, as some students attended school in person, while others attended virtually, the item was modified to, "Since the start of the school year (Fall 2020), do you feel you were treated worse than, the same as, or better than people of other races?"

Participants could answer, “worse than other races,” “the same as other races,” or “better than other races.” The data were dichotomized into “worse,” and “same/better” categories due to the small number of students (n=6) who reported being treated better than other races at T1. The racial and ethnic groups represented in the group reporting “better” treatment were Latinx (n=1), multiracial (n=1), and White students (n=4).

Distress Related to Perceived Racial Discrimination. At T2, participants responded to the question, “Within the past 30 days, have you felt emotionally upset, for example angry, sad, or frustrated, as a result of how you were treated based on your race?” Participants could select, “yes”, “no,” or “don’t know” (CDC, 2010).

Outcome Measures

Mental health was analyzed by three measures: depression, anxiety, and self-esteem.

Depression. Depression was measured using a modified version of the 8-item Patient Health Questionnaire for Adolescents (PHQ-8) (Johnson, Harris, Spitzer & Williams, 2002; Wu et al., 2020). The mental health measures made up a small portion of the overall survey; therefore, in an effort to reduce recall bias, and to be consistent with the anxiety measure, the amount of time students were asked to consider their depressive symptoms was modified from two weeks to seven days. As such, an additional answer response of “one day,” (over the past 7 days) was included in the answer options. Answers for each item were recoded from 1-5 to 0-4. (See *Appendix C*).

Anxiety. Anxiety was measured with the 10 item Severity Measure for Generalized Anxiety Disorder – Child Age 11-17 (GAD) (Craske M, 2013). Answers were recoded from 1-5 to 0-4. (See *Appendix D*).

Self-esteem. Self-esteem was measured with the Single Item Self-Esteem Scale (Robins, Hendin, & Trzesniewski, 2001). Participants were asked to indicate how strongly they felt the statement, "I have high self-esteem," if true for them. A 5-point Likert scale reflected the answer choices from 1 representing, "not very true of me," to 5 representing "very true of me." The scores were reverse coded so that higher scores on all mental health items represent worse mental health outcomes.

COVID-19 Worry. At T2, participants chose answers on a 5-point Likert scale to the question, "Generally, how worried are you about COVID?" Answers ranged from 1 "not at all worried," to 5 "extremely worried." Answers were recoded from 1-5 to 0-4.

Covariates

The modified NIMHD research framework and the extant literature were used to inform the selection of covariates. The covariates included: demographics (race, ethnicity, gender, and eligibility for FRPL), parental/guardian employment, self-reported physical health status, health behaviors (sleep and physical activity), stress, loneliness, and experiences of bullying. All student reported covariates were taken from T1.

Demographics. Information regarding student race/ethnicity, gender, and FRPL eligibility data were provided by the school district's Office of Student and Data Services. Student race and ethnicity were characterized as Hispanic, non-Hispanic Asian, non-Hispanic Black, non-Hispanic multi-racial, or non-Hispanic White. Gender was reported as male or female. Students were reported as either being eligible for FRPL or not.

Parental Employment. Students were asked if the parent/guardian(s) worked outside of the home at T1. This question was asked twice for up to two parent/guardian(s) if applicable. Participants could respond with “yes” or “no.”

Physical Health Status. These data were collected from responses to the question, “In general, how would you rate your physical health?” Answers were reported on a 5-point Likert scale from 1 “poor,” to 5 “excellent.” This question was taken from the Patient-Reported Outcomes Measurement Information System Global Health Items (Hays, Spritzer, Thompson, & Cella, 2015). Answers were categorized into three groups: “poor/fair,” “good,” and “very good/excellent.”

Sleep Behaviors. Sleep behavior was asked with the following question, “In general, do you feel you usually get...” with the choice of three responses, “Too much sleep?” “Enough sleep?” or “ Too little sleep?” Answers were dichotomized into the categories “enough,” or “too much/too little,” due to the small number of students (n=3), who reported getting too much sleep.

Physical Activity. The CDC recommends children and adolescents achieve a cumulative 60 minutes of moderate to vigorous-intensity physical activity daily (CDC, 2021). Participants were asked, “During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spend in any kind of physical activity that increases your heart rate and makes you breathe hard some of the time.)” Respondents could choose between 0-7 days. The answers were dichotomized as “meets CDC standards” and “does not meet CDC standards.”

Stress. Stress was measured using 25 items taken from the Adolescent Stress Questionnaire – Short (Ertanir, Rietz, Graf, & Kassis, 2021). Two items were removed by

the team for redundancy and survey length. Summed scores were categorized into three groups: “none,” “a little,” or “moderate to very.” (See *Appendix E*).

Loneliness. To measure loneliness participants answered four questions on the 4-Item Loneliness Scale (Roberts, Lewinsohn, & Seeley, 1993). Answers were recoded from 1-4 to 0-3. (See *Appendix F*).

Bullying. Respondents answered the question, “During the past 12 months, have you ever been bullied?” Answer options were “yes,” or “no.”

Data analysis

All data were analyzed using SAS 9.4 (SAS Institute Inc., 2013). Descriptive statistics of student demographics, covariates, and exposures were performed. Mean item scores of depression, anxiety, and self-esteem were calculated for T1 and T2. A change score for each mental health variable was created by subtracting the means of T1 from T2 and the direction and amount of the change were noted.

Bivariate analyses (t-test, and ANOVA) were conducted to examine if relationships existed between the covariates, exposures, and mental health change scores, as well as the mean mental health scores at T1, and T2 for comparison purposes.

Before any multivariate model testing was conducted, we first examined whether the exposure (perceived racial discrimination) was associated with the depression, anxiety, or self-esteem change scores at the $p<0.20$ level (Hosner & Lemeshow, 1989). If a significant relationship did not exist with a particular outcome, then the multivariate analysis was not performed. If a significant relationship was found between the exposure and an outcome, then a multivariate regression model was built and tested with any covariates that were significant at $p <0.20$ for that outcome.

For Research Question 2, a bivariate analysis was performed between T2 perceived racial discrimination and associated distress, and COVID-19 worry using t-test and ANOVA.

Two additional analyses were conducted. First, comparisons between the different groups of T1 perceived discrimination (worse and same/better) were examined between the mental health change scores, and race and ethnicity using ANOVA. Secondly, Pearson correlation tests were used to examine whether associations exist between the mental health change scores within this study population.

Results

Demographics and Descriptive Statistics

The majority of the participants were White (62%), and 22% were Latinx. Six percent of the students identified as Asian, six percent were Black, and four percent were multiracial. Over half (57%) were reported as female. Less than half (42%) qualified for FRPL and the majority (93%) reported that at least one parent was employed (Table 1).

At both T1 and T2, the majority of respondents reported being treated the same or better compared to other races, at 87% at both time periods. Most students (70%), reported that they had not experienced emotional upset related to perceived racial discrimination at T2.

Bivariate analyses

Depression

Depression scores were consistently low (Table 2). On a scale of 0-4, with higher scores indicating higher rates of depression, T1 depression mean=1.41 (SD=0.96), T2 depression mean=1.46 (SD=1.15), and depression change mean=0.04 (SD=1.05). None of the covariates, nor perceived racial discrimination (p=0.6194) were found to be significantly associated with depression change. Therefore a regression model was not created for this outcome variable.

Gender was the only demographic factor significantly associated with T1 and T2 mean depression (p=0.0043) and (p=0.0007) respectively, with females having higher mean depression. Concerning behavioral factors, non-optimal sleep was associated with T1 ($p<0.0001$), and T2 (p=0.0028) with higher mean depression. Moderate to high reports of stress was associated at T1 ($p<0.0001$) and T2 (p=0.0001) with mean

depression. Reports of experiencing loneliness “often” were associated with increased depression both at T1 and T2 ($p<0.0001$) for each.

Anxiety

Anxiety scores were also consistently low (Table 3). On a scale of 0-4, with higher scores indicating higher rates of anxiety, T1 anxiety mean 0.92 (SD=0.91), T2 anxiety mean=1.09 (SD=1.09), and anxiety change mean=0.17 (SD=0.93). Gender was the only covariate significantly associated with the anxiety change score ($p=0.1022$) with females displaying more anxiety. There was no association with perceived racial discrimination ($p=0.8240$); therefore a regression model was not created for this outcome variable.

Sub-optimal sleep was associated with more anxiety at T1 ($p=0.0006$) and T2 ($p=0.0289$). Higher reports of stress and loneliness were also associated with anxiety at T1 and T2 with both covariates associated at T1 ($p<0.0001$) and T2 ($p<0.0001$).

Self-esteem

Self-esteem scores ranged from 1 to 5 with higher scores indicating poorer self-esteem (Table 4). Scores were consistently moderate over time with T1 self-esteem mean=3.02 (SD=1.16), T2 self-esteem mean=3.26 (SD=1.18), and self-esteem change mean=0.24 (SD=1.08).

At the bivariate alpha threshold, three covariates were associated with the self-esteem change score: race and ethnicity, ($p=0.1818$), parent/guardian employment ($p=0.1143$), and sleep, ($p=0.0661$). Self-esteem worsened for adolescents identifying as Black, Latinx, or White, and improved for adolescents identifying as Asian or multiracial. The exposure, perceived racial discrimination was associated with the self-esteem change score ($p=0.0731$); therefore these variables were all included in the linear regression model.

Self-esteem improved for those reporting worse racial discrimination and declined slightly for those reporting better/same treatment.

Similar to depression and anxiety, gender was significantly associated with T1 and T2 mean self-esteem (p=0.0004) and (p=0.0136) respectively, with females having poorer self-esteem scores. Higher reports of stress and loneliness had associations with self-esteem at T1 and T2. Stress was associated at T1 (p=0.0092) and T2 (p=0.0076) as well as loneliness at T1 (p<0.0001) and T2 (p<0.0016).

Multivariate Linear Regression

Multivariable linear regression was only conducted for the self-esteem change score as it was the lone mental health change score to associate with perceived racial discrimination at p<0.20 on the bivariate level (Table 5). The covariates of race and ethnicity, parent employment, and sleep also met the criteria for inclusion in the model.

Racial discrimination was not found to predict changes in self-esteem at a statistically significant level in the model when controlling for race and ethnicity, parent employment, and sleep (p=0.0626).

Correlation Matrix between COVID-19 Worry with Perceived Racial Discrimination and Associated Distress

Regarding the second research question, no statistically significant associations were found between COVID-19 worry and perceived racial discrimination (p=0.2821) nor discrimination-related distress (p=0.0955) (Table 6). Those reporting worse treatment compared to other races, did have slightly higher, but statistically insignificant, rates of COVID-19 worry, mean=1.94 (SD=1.34), compared to students reporting being treated better or the same as other races mean=1.56 (SD=1.05). Similarly, students who reported

experiencing distress related to perceived racial discrimination had slightly higher but statistically insignificant, rates of COVID-19 worry mean=1.76 (SD=1.03) compared to those reporting no distress mean=1.67 (SD=1.12) or unsure if they experienced distress mean=1.14 (SD=0.91).

Comparison of Perceived Discrimination and Mental Health by Race and Ethnicity

No statistically significant differences were found between reports of racial discrimination and mental health change scores when stratified by race and ethnicity. (See Table 7).

Correlation between Change Scores

Statistically significant correlations were found between depression and anxiety change scores ($r=0.66$, $p<0.001$), and less strongly with depression and self-esteem change scores ($r=0.32$, $p=0.0002$) (Table 8). These findings suggest that as depression increases, so do anxiety and poor self-esteem.

Discussion

The goal of this research was to gain an increased understanding of the role of racial discrimination on adolescent mental health to inform public health and school policies moving forward in the pandemic and after.

Key Results

The findings of this study differed from the extant literature regarding adolescent mental health during the COVID-19 pandemic, experiences of racial discrimination, and the effects of racial discrimination on adolescent mental health.

The depression, anxiety, and self-esteem of the students remained relatively healthy and stable throughout the study period which is a positive yet surprising outcome. The mean mental health scores of this sample did decline overall, but very slightly. These findings differ from the existing literature regarding increased incidences of mental health challenges for adolescents during the COVID-19 pandemic (Bartek et al., 2021; CDC, 2019; Ellis et al., 2020; Leeb, 2020; Loades et al., 2020; Meade, 2021; Meherali et al., 2021; Patrick et al., 2020; Saurabh & Ranjan, 2020; YoungMinds, 2020). Also contrasting with the extant literature was that racial discrimination did not associate with adolescent mental health (Benner et al., 2018; CDC, 2020; Cheah et al., 2020; Huynh & Fuligni, 2010; Niwa et al., 2014; Seaton et al., 2008; Seaton & Douglass, 2014; Smith & Pössel, 2021; Thurman et al., 2019).

Relationships between gender, sleep, stress, and loneliness were consistently found to exist with depression, anxiety, and self-esteem at T1 and T2 as anticipated. Gender was expected to associate with mental health change scores as female adolescents tend to have more mental health challenges than males (CDC, 2019). Similarly, increased stress,

sub-optimal sleep, and loneliness are known to associate with poorer mental health (McLaughin & Hatzenbueler, 2009; Owens, 2014; Wang et al., 2017). It is not understood why these relationships did not associate with more of the mental health change scores.

In this study, there were consistently low reports of discrimination, which differs from what would be expected based on the existing literature. For example, a 2014 study of 277 African American youth found that on average, students reported 2.4 incidences of racial discrimination per day over two weeks (Seaton & Douglass, 2014).

Perceived racial discrimination at T2 and associated distress, were not found to significantly associate with COVID-related worry which, although had not been previously studied, was unexpected. This might have been due to the relatively low number of new COVID-19 cases during the time of the second survey administration. As of November 16, 2020, the day of the first fall survey administration, there were seven new cases of COVID-19 in the county where the two high schools are located. This increased to 70 by the last day of the fall survey administration (December 17, 2020) which is much less compared to more populous counties in the state that had more than 500 new cases at that time (USAFacts, 2022).

While the findings of this study were surprising, we cannot discount the possibility that the results may be representative of these particular students, as many of the domains of this research are not well studied in rural communities. Although the low reports of racial discrimination in this study were unexpected, the prevalence of adolescent experiences of racial discrimination in rural and semi-rural communities is under-represented in the literature. Regarding the lower than expected reports of mental health

challenges, this particular county experienced fewer COVID cases than other regions at that time, most students returned to in-person school in the fall, and the vast majority of students had at least one parent/guardian who continued to work outside of the home. It is possible that this community experienced fewer pandemic-related changes to their daily routine, and thus faced less declines in their mental health compared to others.

Strengths

This study has at least four notable strengths. The greatest strength of this study was the unique opportunity to examine data from the same students before and during the COVID-19 pandemic. Secondly, data concerning many covariates along several domains were collected. Third, many of the instruments used in the study were grounded in theory and well-validated. Finally, the primary and secondary research questions of the study were novel and not previously considered in the literature.

Limitations

Despite the strengths of the study, there were at least three limitations. First, there was a sub-optimal survey response rate of students who fully completed all of the mental health outcomes. This could be due to some aspects of the survey design. The instructions stated the survey would take about 15 minutes to complete; however, with a range of 102 to 180 survey items, this time frame might not have been accurate for many students. As mental health was not the primary focus of the parent study, the placement of the mental health and racial discrimination items later in the survey may have contributed to survey fatigue. Additionally, perceived confidentiality bias may have been an influence as the surveys were administered electronically during school, or during class time if the students were attending virtually, and shared their student ID numbers. As stigma can be

associated with mental health challenges (Crumb, Mingo, & Crowe, 2019; Gulliver, Griffiths, & Christensen, 2010; Haynes et al., 2017; Kaushik, Kostaki, & Kyriakopoulos, 2016; Krill Williston et al., 2019; Morales, Barksdale, & Beckel-Mitchener, 2020; Radez et al., 2021; Velasco, Cruz, Billings, Jimenez, & Rowe, 2020; WHO, 2003), and questions about perceived racial discrimination may be sensitive, privacy concerns could have been a prohibitory factor.

A second limitation was that sampling biases may have been present in our study regarding race and ethnicity. According to the Georgia DOE, during the time of survey administration, between 54-56% of the student body over the two schools consisted of White students, and 15-16% of the students identified as Black. In our study, 62% of the students were White and 6% were Black (Georgia Department of Education, 2021). The students who were Asian, Latinx, and multiracial were represented consistently between the study and the DOE data. Although the Georgia DOE data are not delineated by grade, it appears that Black students may have been underrepresented, and White students overrepresented in our study.

Third, sampling biases may have prevented this study from capturing the mental health data of the students who were experiencing challenges. It is possible that the students with better mental health fully completed these items, and/or the students who did fill them out may have under-reported their mental health challenges.

Implications

The unexpected findings of this study lead to speculation about what may have deterred more students from fully completing the mental health survey data.

Anticipated stigma is a major barrier for children, adolescents, their parents, as well as young adults to seek treatment for mental health concerns (Gulliver et al., 2010; Radez et al., 2021; Velasco et al., 2020). Youth (aged 18 or younger) with a history of mental health challenges, consistently reported having experienced stigma (either personal or public) compared to peers without such difficulties (Kaushik et al., 2016).

Little research exists regarding mental health stigma for adolescents in rural communities; however, stigma has been associated with whether or not adults seek mental health care among low-income, rural populations. Some low-income residents of rural communities reported fearing consequences for seeking mental health care, such as loss of employment (Crumb et al., 2019). A study of rural African American adults found that stigma is one of the largest barriers to seeking mental health services (Haynes et al., 2017).

Studies of experiences of racial discrimination, among adults of racial and ethnic minority groups, found these experiences to be associated with increased negative beliefs about mental health difficulties, and more worry about stigma from family and friends for experiencing mental health challenges (Krill Williston et al., 2019). In a study of barriers to mental health treatment among adults who identify as Black, participants discussed the double discrimination of experiencing mental health stigma and racial discrimination from providers (Alang, 2019).

Moving forward, care should be taken in research study and survey design when inquiring about mental health and experiences of racial discrimination. When possible, sensitive topics would be best studied as a primary research aim, rather than as a secondary analysis. The potential for mental health stigma should be considered when

asking individuals to report on their mental health. Similarly, sensitivity ought to be employed when asking about experiences of racial discrimination. This can maximize comfort, trust, perceived confidentiality, and privacy, and thus improve survey response rates.

Future Directions

There is a paucity of research examining experiences of racial discrimination and mental health stigma among rural adolescents who identify as racial and ethnic minorities. It will be important to fill this gap as mental health, which has declined for many adolescents during the COVID-19 pandemic (Bartek et al., 2021; Chae et al., 2021; Ha et al., 2021; Leeb, 2020; Loades et al., 2020; Meade, 2021; Meherali et al., 2021; Patrick et al., 2020; YoungMinds, 2020), has the potential to be compounded by pre-existing barriers to mental health care access and utilization, especially in rural communities and for people of historically marginalized groups (Alang, 2019; Cummings et al., 2013; Substance Abuse and Mental Health Services Administration, 2020a). In addition, much of the current research regarding racial discrimination in rural communities tends to focus on individuals who identify as Black. Future studies should expand to include more diverse racial and ethnic groups and sub-groups.

Conclusion

Although this study was unable to identify the role of discrimination on adolescent mental health during the COVID-19 pandemic within our sample, the importance of this topic should not be discounted. There is a need for future research to examine adolescent racial discrimination in rural communities while including diverse racial and ethnic groups and sub-groups. Additionally, there is a need to study racial

discrimination and mental health stigma among rural adolescents. The findings of such research may help schools and rural communities to improve access to mental health services for adolescents. Improved understanding of adolescent experiences of racial discrimination may help inform policy changes that would foster acknowledgment of racism and discrimination in society, the harm these forces cause, and thus promote more equitable practices.

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Tables

Table 1. *Participant characteristics, health behaviors, intra- and interpersonal experiences of student participants from two high schools (N=129)*

Participant Characteristics and Covariates	n	Percentages
Race and Ethnicity		
Non-Hispanic Asian	8	6%
Non-Hispanic Black	8	6%
Latinx	28	22%
Multiracial	5	4%
Non-Hispanic White	80	62%
Gender		
Female	73	57%
Male	56	43%
Free and Reduced Price Lunch - Yes	54	42%
Parent/Guardian Employment - Yes	98	93%
Physical Health Status		
Poor/Fair	30	25%
Good	53	44%
Very Good/Excellent	37	31%
Sleep		
Enough	47	39%
Too Much or Too Little	74	61%
Physical Activity (Meets CDC guidelines?) - Yes	14	12%
Stress		
None	24	22%
A Little	70	64%
Moderate to Very	15	14%
Loneliness		
Never	24	19%
Rarely	38	30%
Sometimes	43	34%
Often	22	17%
Bullying in Past 12 months - Yes	22	17%

Table 1. Continued

Participant Characteristics and Covariates	n	Percentages
Racial Discrimination (Spring)		
Worse	15	12%
Same/Better	114	88%
Racial Discrimination (Fall)		
Worse	17	13%
Same/Better	110	87%
Emotional Upset Related to Racial Discrimination (Fall)		
No	90	70%
Yes	17	13%
Unsure	21	16%

Table 2. *Bivariate analysis of covariates and risk factor, with depression from Spring 2020 (T1), Fall 2020 (T2), and depression change score*[†]

Covariates from T1	Depression T1 Mean M=1.41 (SD=0.96)	Depression T1 Statistic	Depression T1 p-value	Depression T2 Mean M=1.46 (SD=1.15)	Depression T2 Statistic	Depression T2 p-value	Depression Change Mean M=0.04 (SD=1.05)	Depression Change Statistic	Depression Change p-value
Race and Ethnicity									
Asian	1.98 (0.90)	F=(4,124)	0.4433	1.84 (1.31)	F=(4,124)	0.5193	-0.14 (1.36)	F=(4,124)=	0.6995
Black	1.33 (0.98)	=0.94		1.02 (1.11)	=0.81		-0.31 (0.86)	0.55	
Latinx	1.33 (0.91)			1.56 (1.05)			0.24 (1.11)		
Multiracial	1.73 (1.04)			1.90 (1.25)			0.18 (1.44)		
White	1.38 (0.98)			1.40 (1.17)			0.02 (1.00)		
Gender									
Female	1.62 (0.93)	t=-2.91,	0.0043*	1.75 (1.17)	t=-3.46,	0.0007*	0.13 (1.00)	t=-1.03,	0.2961
Male	1.14 (0.94)	df=127		1.07 (1.01)	df=127		-0.07 (1.11)	df=111.33	
FRPL[§]									
Yes	1.53 (1.05)	t=-1.16,	0.2489	1.66 (1.21)	t=-1.68,	0.0963*	0.13 (1.10)	t=-0.76,	0.4502
No	1.33 (0.89)	df=101.89		1.31 (1.09)	df=106.32		-0.02 (1.01)	df=108.52	
Parent Employ-ment		t=1.98,	0.0868*	1.30 (1.11)	t= 2.13,	0.0721*	0.20 (1.12)	t=0.99,	0.3293
Yes	1.32 (0.95)	df=7.17		2.42 (1.36)	df=6.58		-0.03 (1.03)	df=39.03	
No	1.96 (0.83)								
Physical Health									
Poor/Fair	1.67 (0.99)	F=(2,117)=	0.0727*	1.7 (1.16)	F= (2,117)=	0.2056	0.03 (0.82)	F= (2,117)=	0.8368
Good	1.50 (0.98)	2.68		1.43 (1.16)	1.60		-0.08 (1.03)	0.18	
Very Good/ Excellent	1.15 (0.88)			1.19 (1.14)			0.04 (1.21)		
Sleep									
Enough	0.93 (0.81)	t=-5.15,	0.0001*	1.04 (1.10)	t=-3.05,	0.0028*	0.11 (0.15)	t=-0.97,	0.3363
Too Much/ Too Little	1.76 (0.92)	df=106.5		1.68 (1.13)	df=99.78		-0.08 (1.03)	df=96.77	

Table 2. Continued

Covariates from T1	Depression T1 Mean M=1.41 (SD=0.96)	Depression T1 Statistic	Depression T1 P-value	Depression T2 Mean M=1.46 (SD=1.15)	Depression T2 Statistic	Depression T2 P-value	Depression Change Mean M=0.04 (SD=1.05)	Depression Change Statistic	Depression Change P-value
Physical Activity¶									
Yes	1.34 (1.05)	t=-0.37,	0.7198	1.00 (1.13)	t=-1.49,	0.1555*	-0.34 (1.23)	t=-1.08,	0.2953
No	1.45 (1.00)	df=16.04		1.48 (1.16)	df=16.82		0.03 (1.01)	df=15.41	
Stress									
None	0.60 (0.69)	F=(2,106)=	0.0001*	1.02 (1.11)	F=(2,106)=	0.0001*	0.41 (0.94)	F=(2,106)=	0.2391
A Little	1.39 (0.84)	25.42		1.40 (1.02)	9.71		0.01 (0.97)	1.45	
Moderate to Very	2.45 (0.66)			2.52 (1.13)			0.07 (1.29)		
Loneliness									
Never	0.58 (0.66)	F=(3,123)=	0.0001*	0.82 (0.95)	F=(3,123)=	0.0001*	0.24 (1.06)	F=(3,123)=	0.5704
Rarely	1.28 (0.81)	18.80		1.23 (0.82)	7.64		-0.06 (1.02)	0.67	
Sometimes	1.56 (0.85)			1.69 (1.23)			0.13 (1.06)		
Often	2.33 (0.86)			2.20 (1.20)			-0.13 (1.11)		
Bullying									
Yes	1.69 (0.73)	t=-1.84,	0.0733*	1.81 (1.31)	t=-1.41,	0.1708*	0.11 (1.39)	t=-0.27,	0.7878
No	1.36 (0.99)	df=38.92		1.39 (1.10)	df=27.47		0.03 (0.97)	df=25.41	
Racial Discrimin-ation									
Worse	1.25 (0.88)	t= 0.76,	0.4579	1.15 (1.17)	t=1.09,	0.2918	-0.10 (1.19)	t=0.51,	0.6194
Same/Better	1.44 (0.97)	df=18.81		1.50 (1.14)	df=17.74		0.06 (1.03)	df=16.92	

* Statistically significant at $p<0.20$

† Depression change score is T2 mean – T1 mean. Higher score indicates worse mental health. Scale of 0-4.

§ Free and Reduced Price Lunch

¶ Meets CDC guidelines

Table 3. *Bivariate analysis of covariates and risk factor with anxiety from Spring 2020 (T1), Fall 2020 (T2), and anxiety change score*[†]

Covariates from T1	Anxiety T1 Mean M= 0.92 (SD=0.91)	Anxiety T1 Statistic	AnxietyT1 p-value	Anxiety T2 Mean M=1.09 (SD=1.09)	Anxiety T2 Statistic	Anxiety T2 p-value	Anxiety Change Mean M=0.17 (SD=0.93)	Anxiety Change Statistic	Anxiety Change p-value
Race and Ethnicity									
Asian	1.09 (0.60)	F=(4,124)=	0.5431	1.56 (1.41)	F=(4,124)	0.2648	0.48 (1.32)	F=(4,124) =	0.4143
Black	0.65 (0.61)	0.78		0.38 (0.45)	= 1.32		-0.28 (0.66)	0.99	
Latinx	0.86 (0.92)			1.02 (1.09)			0.16 (1.16)		
Multiracial	1.50 (1.38)			1.24 (1.18)			-0.26 (0.48)		
White	0.91 (0.93)			1.13 (1.08)			0.22 (0.84)		
Gender									
Female	1.05 (0.86)	t=1.93,	0.0556*	1.35 (1.11)	t= 3.23,	0.0016*	0.29 (0.81)	t=1.65,	0.1022*
Male	0.74 (0.96)	df=111.27		0.75 (0.98)	df=124.28		0.01 (1.05)	df=100.46	
FRPL[§]									
Yes	0.90 (0.95)	t=0.14,	0.8871	1.16 (1.18)	t=-0.61,	0.5421	0.26 (0.95)	t=-0.87,	0.3864
No	0.93 (0.89)	df=109.97		1.04 (1.03)	df=104.45		0.11 (0.92)	df=112.14	
Parent Employ-ment	0.82 (0.80)	t=1.29	0.2431	0.94 (0.97)	t=2.32,	0.0569*	0.89 (1.52)	t=1.31,	0.2354
Yes	1.37 (1.13)	df=6.44		1.48 (2.26)	df=6.37		0.13 (0.83)	df=6.26	
No									
Physical Health Status									
Poor/Fair	0.96 (1.00)	F= (2,117)	0.2732	1.09 (1.03)	F=(2,117) =	0.5822	0.13 (0.68)	F=(2,117) =	0.9215
Good	1.04 (0.92)	= 1.31		1.17 (1.13)	0.54		0.13 (0.82)	0.08	
Very Good/ Excellent	0.73 (0.79)			0.93 (1.03)			0.20 (1.10)		
Sleep									
Enough	0.60 (0.72)	t=-3.54,	0.0006*	0.82 (1.00)	t=-2.22,	0.0289*	0.23 (0.91)	t=0.66,	0.5086
Too Much/ Too Little	1.13 (0.95)	df=115.52		1.25 (1.09)	df=104.46		0.11 (0.86)	df=94.05	

Table 3. Continued

Covariates from T1	Anxiety T1 Mean M= 0.92 (SD=0.91)	Anxiety T1 Statistic	AnxietyT1 p-value	Anxiety T2 Mean M=1.09 (SD=1.09)	Anxiety T2 Statistic	Anxiety T2 p-value	Anxiety Change Mean M=0.17 (SD=0.93)	Anxiety Change Statistic	Anxiety Change p-value
Physical Activity¶									
Yes	0.91 (1.12)	t=-0.06,	0.9491	0.84 (1.32)	t=-0.71,	0.4885	-0.06 (1.20)	t=- 0.73,	0.4791
No	0.93 (0.88)	df=15.21		1.10 (1.04)	df=15.18		0.18 (0.83)	df=14.68	
Stress									
None	0.29 (0.47)	F=(2,106)=	0.0001*	0.67 (1.03)	F=(2,106)=	0.0001*	0.38 (0.93)	F=(2,106)=	0.4466
A little	0.88 (0.80)	22.69		1.00 (0.92)	10.73		0.12 (0.70)	0.81	
Moderate to Very	2.01 (1.03)			2.16 (1.36)			0.15 (1.18)		
Loneliness									
Never	0.21 (0.48)	F=(3,123)=	0.0001*	0.53 (0.99)	F=(3,123)=	0.0001*	0.32 (1.03)	F=(3,123)=	0.8294
Rarely	0.71 (0.69)	19.93		0.9 (0.84)	8.34		0.19 (1.02)	0.29	
Sometimes	1.03 (0.83)			1.17 (1.04)			0.14 (0.78)		
Often	1.88 (0.95)			1.95 (1.20)			0.07 (1.01)		
Bullying									
Yes	1.38 (0.92)	t=-2.63,	0.0134*	1.51 (1.29)	t=-1.75,	0.0920*	0.13 (1.53)	t= 0.15,	0.8839
No	0.82 (0.88)	df=29.57		1.00 (1.03)	df=26.71		0.18 (0.76)	df=23.18	
Racial Discrimin-ation	0.73 (0.84)	t= 0.88,	0.3887	0.84 (1.12)	t=0.92,	0.3715	0.11 (1.24)	t=0.23,	0.8240
Worse	0.94 (0.92)	df=18.72		1.12 (1.09)	df=17.65		0.18 (0.89)	df=15.94	
Same/Better									

* Statistically significant at p<0.20

† Anxiety change scores is T2 mean- T1 Mean**.** Higher score indicate worse mental health. Scale of 0-4.

§ Free and Reduced Price Lunch

¶ Meets CDC guidelines

Table 4. *Bivariate analysis of covariates and risk factor with self-esteem from Spring 2020 (T1), Fall 2020 (T2), and self-esteem change score*[†]

Covariates from T1	**Self-Esteem T1 Mean** M=3.02 (SD=1.16)	**Self-Esteem T1 Statistic**	**Self-Esteem T1 p-value**	**Self-Esteem T2 Mean** M=3.26 (SD=1.18)	**Self-Esteem T2 Statistic**	**Self-Esteem T2 p-value**	**Self-Esteem Change Mean** M=0.24 (SD=1.08)	**Self-Esteem Change Statistic**	**Self-Esteem Change p-value**
Race and Ethnicity									
Asian	3.63 (1.06)	F=(4,124)	0.2720	3.25 (0.89)	F=(4,124)	0.9516	-0.38 (1.06)	F=(4,124)=	0.1818*
Black	2.75 (1.58)	=1.3		3.38 (1.19)	=0.17		0.63 (0.92)	1.59	
Latinx	2.96 (1.00)			3.11 (1.07)			0.14 (0.89)		
Multiracial	3.8 (1.10)			3.4 (0.55)			-0.40 (1.14)		
NH White	2.96 (1.63)			3.3 (1.28)			0.34 (1.14)		
Gender									
Female	3.34 (1.00)	t=3.66,	0.0004*	3.49 (1.03)	t=2.51,	0.0136*	0.15 (1.07)	t=-1.07,	0.2865
Male	2.61 (1.23)	df=103.56		2.96 (1.29)	df=102.89		0.36 (1.10)	df=116.25	
FRPL[§]									
Yes	3.13 (1.10)	t=-0.89,	0.3771	3.44 (1.13)	t=-1.49,	0.1389*	0.31 (0.97)	t=-0.66,	0.5086
No	2.95 (1.20)	df=127		3.13 (1.20)	df=127		0.19 (1.16)	df=127	
Parent Employ-ment									
Yes	2.99 (1.12)	t= 0.02,	0.9867	3.16 (1.10)	t= 0.96,	0.3733	0.17 (1.01)	t=1.78,	0.1143*
No	3.00 (1.53)	df=6.47		3.71 (1.50)	df=6.47		0.71 (0.76)	df=7.60	
Physical Health Status									
Poor/Fair	3.47 (1.07)	F= (2,117)=	0.0014*	3.57 (1.22)	F=(2,117) =	0.0147*	0.1 (1.27)	F=(2,117) =	0.7455
Good	3.09 (1.02)	6.94		3.28 (0.91)	4.38		0.19 (0.96)	0.29	
Very Good/ Excellent	2.49 (1.22)			2.78 (1.27)			0.30 (1.00)		

Table 4. Continued

Covariates from T1	Self-Esteem T1 Mean M=3.02 (SD=1.16)	Self-Esteem T1 Statistic	Self-Esteem T1 p-value	Self-Esteem T2 Mean M=3.26 (SD=1.18)	Self-Esteem T2 Statistic	Self-Esteem T2 p-value	Self-Esteem Change Mean M=0.24 (SD=1.08)	Self-Esteem Change Statistic	Self-Esteem Change p-value
Sleep									
Enough	2.62 (1.07)	t=-3.17,	0.0020*	3.02 (1.11)	t=-1.50,	0.1370*	0.40 (0.85)	t=1.86,	0.0661*
Too Much/ Too Little	3.27 (1.15)	df=102.97		3.34 (1.16)	df=101.18		0.07 (1.14)	df=115.77	
Physical Activity¶									
Yes	2.50 (1.34)	t=-1.51,	0.1517*	2.79 (1.37)	t=-1.23,	0.2372	0.29 (1.38)	t=0.25,	0.8031
No	3.07 (1.11)	df=15.45		3.25 (1.10)	df=15.32		0.19 (1.01)	df=14.87	
Stress									
None	2.54 (1.25)	F=(2,106)=	0.0092*	3.00 (1.25)	F=(2,106)=	0.0076*	0.46 (1.02)	F=(2,106)=	0.5511
A little	3.03 (1.05)	4.90		3.25 (1.13)	5.11		0.21 (1.15)	0.60	
Moderate to Very	3.67 (1.05)			4.13 (0.74)			0.47 (1.19)		
Loneliness									
Never	2.17 (1.13)	F=(3,123)=	0.0001*	2.67 (1.09)	F=(3,123)=	0.0016*	0.5 (1.02)	F=(3,123)=	0.4015
Rarely	2.82 (0.93)	11.37		3.03 (1.20)	5.41		0.21 (0.99)	0.99	
Sometimes	3.26 (1.07)			3.53 (1.12)			0.28 (1.20)		
Often	3.86 (1.08)			3.82 (1.05)			-0.05 (1.10)		
Bullying									
Yes	3.41 (0.96)	t=-1.99,	0.0548*	3.5 (1.02)	t=-1.16,	0.2530	0.09 (1.23)	t=0.64,	0.5274
No	2.94 (1.18)	df=35.43		3.22 (1.21)	df=34.47		0.27 (1.05)	df=27.65	
Racial Discrimin-ation									
Worse	3.53 (1.06)	t=-1.96,	0.0650*	3.27 (0.96)	t=-0.01,	0.9899	-0.27 (1.10)	t=1.91,	0.0731*
Same/Better	2.96 (1.16)	df=18.66		3.26 (1.21	df=20.28		0.31 (1.07)	df=17.64	

* Statistically significant at $p<0.20$

† Self-esteem change scores is self-esteem T2 – self-esteemT1. Higher score indicate worse mental health. Scale of 1-5 for self-esteem.

§ Free and Reduced Price Lunch

¶ Meets CDC guidelines

Table 5. *Multivariate Linear Regression for Self-Esteem Change Score with risk factor and variables significant at the bivariate level*

	β	95% confidence interval	p-value
Racial Discrimination:			
Same/Better	Ref*		
Worse	-0.54	(-1.11,0.03)	0.0626
Race and Ethnicity:			
White	Ref		
Asian	-0.43	(-1.22, 0.36)	0.2829
Black	0.58	(-0.14, 1.29)	0.1133
Latinx	0.09	(-0.36, 0.50)	0.6832
Multiracial	-0.16	(-1.30, 0.98)	0.7807
Parent Employment:			
Yes	Ref		
No	0.38	(-0.35,1.11)	0.3041
Sleep:			
Enough	Ref		
Too Much or Too Little	-0.33	(-0.71, 0.04)	0.0814

*Ref denotes referent group

Table 6. *Bivariate analysis between COVID-19 Worry with perceived racial discrimination and racial discrimination-related distress, Fall 2020 (T2)*

	COVID-19 Worry * Mean=1.61 (SD=1.08)	Test Statistic p-value
Perceived Racial Discrimination (T2)		
Worse	1.94 (1.34)	t-value= -1.11, df=19.10
Same/Better	1.56 (1.05)	p=0.2821
Racial Discrimination Related Distress (T2)		
No	1.67 (1.12)	F=(2,125)=2.39
Yes	1.76 (1.03)	p=0.0955
Unsure	1.14 (0.91)	

* Scale 0-4 with higher scores indicating more worry

Table 7. *Comparison of perceived racial discrimination with mental health change scores by race and ethnicity, using ANOVA*

Mental Health Change	Perceived Racial Discrimination - Spring 2020			
	Worse, n=15*		Same/Better, n=114†	
	Mental Health Scores§ Mean (SD)	p-value	Mental Health Scores§ Mean (SD)	p-value
Depression				
Non-Hispanic Asian	1.75 (NA)	0.0581	-0.41 (1.21)	0.2467
Non-Hispanic Black	0.42 (0.41)		-0.75 (0.76)	
Latinx	1.06 (1.32)		0.17 (1.10)	
Multiracial	-0.25 (0.35)		0.46 (1.94)	
Non-Hispanic White	-0.88 (1.03)		0.11 (0.96)	
Anxiety				
Non-Hispanic Asian	2.4 (NA)	0.2285	0.20 (1.15)	0.3162
Non-Hispanic Black	0.1 (0.00)		-0.50 (0.78)	
Latinx	1.00 (1.41)		0.10 (1.14)	
Multiracial	-0.25 (0.78)		-0.27 (0.40)	
Non-Hispanic White	-0.37 (1.03)		0.27 (0.77)	
Self-Esteem				
Non-Hispanic Asian	-1.0 (NA)	0.7748	-0.29 (1.11)	0.1251
Non-Hispanic Black	0.33 (0.58)		0.80 (1.10)	
Latinx	0.00 (0.00)		0.15 (0.92)	
Multiracial	0.00 (0.00)		-0.67 (1.53)	
Non-Hispanic White	-0.57 (1.51)		0.42 (1.07)	

* Race and Ethnicity of students who identified as being treated worse than other races: non-Hispanic Asian (n=1), non-Hispanic Black (n=3), Latinx (n=2), multiracial (n=2), non-Hispanic White (n=7)

† Race and Ethnicity of students who identified as being treated the same or better than other races: non-Hispanic Asian (n=7), non-Hispanic Black (n=5), Latinx (n=26), multiracial (n=3), non-Hispanic White (n=73)

§ Mental Health change scores is T2 mean – T1 mean. Higher score indicating worse mental health. Scale of 0-4 for depression and anxiety, 1-5 for self-esteem.

Table 8. *Correlation matrix between mental health change scores* for depression, anxiety, and self-esteem*

	Depression Change Score	Anxiety Change Score	Self-Esteem Change Score
Depression Change Score	N/A	r=0.66, p<0.0001	r=0.32, p=0.0002
Anxiety Change Score	---	N/A	r=0.15, p=0.0879
Self-Esteem Change Score	---	---	N/A

* Mental health change scores are T2 mean – T1 mean.
--- Indicates repeated values

Appendices

Appendix A. National Institute on Minority Health and Health Disparities Research Framework

		Levels of Influence*			
		Individual	**Interpersonal**	**Community**	**Societal**
Domains of Influence *(Over the Lifecourse)*	**Biological**	Biological Vulnerability and Mechanisms	Caregiver–Child Interaction Family Microbiome	Community Illness Exposure Herd Immunity	Sanitation Immunization Pathogen Exposure
	Behavioral	Health Behaviors Coping Strategies	Family Functioning School/Work Functioning	Community Functioning	Policies and Laws
	Physical/Built Environment	Personal Environment	Household Environment School/Work Environment	Community Environment Community Resources	Societal Structure
	Sociocultural Environment	Sociodemographics Limited English Cultural Identity Response to Discrimination	Social Networks Family/Peer Norms Interpersonal Discrimination	Community Norms Local Structural Discrimination	Social Norms Societal Structural Discrimination
	Health Care System	Insurance Coverage Health Literacy Treatment Preferences	Patient–Clinician Relationship Medical Decision-Making	Availability of Services Safety Net Services	Quality of Care Health Care Policies
Health Outcomes		**Individual Health**	**Family/ Organizational Health**	**Community Health**	**Population Health**

National Institute on Minority Health and Health Disparities, 2018
*Health Disparity Populations: Race/Ethnicity, Low SES, Rural, Sexual and Gender Minority
Other Fundamental Characteristics: Sex and Gender, Disability, Geographic Region

(National Institute on Minority Health and Health Disparities, 2018)

Appendix B. Adapted National Institute on Minority Health and Health Disparities Research Framework for Adolescents in the COVID-19 Pandemic

		Levels of Influence			
		Individual	**Interpersonal**	**Community**	**Societal**
Domains of Influence	**Biological**	Physical health	N/A*	Onset of Global COVID-19 Pandemic†	N/A
	Behavioral/ Psychological	Sleep Physical Activity Stress Depression Anxiety Self-Esteem COVID-19 Worry	Loneliness Stress	N/A	N/A
	Physical/Built Environment	N/A	Parent/guardian employment	N/A	N/A
	Sociocultural Environment	Demographics Distress related to perceived racial discrimination	Bullying Perceived racial discrimination	N/A	Racial Discrimination† Political Climate†
Health Outcomes		**Individual Health**	**Family/Organizational Health**	**Community Health**	**Population Health**

* N/A refers to data not available from this study
†These variables were not directly studied but provided unique context relative to this research

Appendix C. Modified Patient Health Questionnaire (PHQ)-8

How often have you been bothered by each of the following symptoms **during the past 7 days**?

	Not at all (1)	One day (2)	Several days (3)	Nearly every day (4)	Every day (5)
Feeling down, depressed, irritable, or hopeless? (1)	○	○	○	○	○
Little interest or pleasure in doing things? (2)	○	○	○	○	○
Trouble falling asleep, staying asleep, or sleeping too much? (3)	○	○	○	○	○
Poor appetite, weight loss, or overeating? (4)	○	○	○	○	○
Feeling tired, or having little energy? (5)	○	○	○	○	○
Feeling bad about yourself or feeling that you are a failure, or that you have let yourself or your family down? (6)	○	○	○	○	○
Trouble concentrating on things like school work, reading, or watching TV? (7)	○	○	○	○	○
Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you were moving around a lot more than usual? (8)	○	○	○	○	○

(Johnson et. al., 2002 ; Wu et.al., 2020

Appendix D. Severity Measure for Generalized Anxiety Disorder – Child Age11-17

	During **the PAST 7 DAYS**, I have…	**Never**	**Occasionally**	**Half of the time**	**Most of the time**	**All of the time**
1.	felt moments of sudden terror, fear, or fright	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
2.	felt anxious, worried, or nervous	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
3.	had thoughts of bad things happening, such as family tragedy, ill health, loss of a job, or accidents	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
4.	felt a racing heart, sweaty, trouble breathing, faint, or shaky	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
5.	felt tense muscles, felt on edge or restless, or had trouble relaxing or trouble sleeping	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
6.	avoided, or did not approach or enter, situations about which I worry	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
7.	left situations early or participated only minimally due to worries	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
8.	spent lots of time making decisions, putting off making decisions, or preparing for situations, due to worries	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
9.	sought reassurance from others due to worries	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4
10.	needed help to cope with anxiety (e.g., alcohol or medication, superstitious objects, or other people)	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4

(Craske M, 2013)

Appendix E. Modified Adolescent Stress Questionnaire -Short

Please indicate how **stressful** you have found each of the following experiences or situations **during the past 6 months.**

	N/A or has not happened (1)	Not stressful at all (2)	A little stressful (3)	Moderately stressful (4)	Quite stressful (5)	Very stressful (6)
Arguments at home (1)	○	○	○	○	○	○
Disagreement between your parents (2)	○	○	○	○	○	○
Having to study things you do not understand (3)	○	○	○	○	○	○
Teachers expecting too much from you (4)	○	○	○	○	○	○
Keeping up with school work (5)	○	○	○	○	○	○
Getting up early in the morning to go to school (6)	○	○	○	○	○	○
Going to school (7)	○	○	○	○	○	○
Getting along with your boyfriend/girlfriend (8)	○	○	○	○	○	○
Breaking up with your boyfriend/girlfriend (9)	○	○	○	○	○	○
Making the relationship with your boyfriend/girlfriend work (10)	○	○	○	○	○	○
Pressure to fit in with peers (11)	○	○	○	○	○	○

Being hassled for not fitting in (12)	○	○	○	○	○	○
Peers hassling you about the way you look (13)	○	○	○	○	○	○
Being judged by your friends (14)	○	○	○	○	○	○
Lack of respect from teachers (15)	○	○	○	○	○	○
Not being listened to by teachers (16)	○	○	○	○	○	○
Getting along with your teachers (17)	○	○	○	○	○	○
Concern about your future (18)	○	○	○	○	○	○
Having to make decisions about future work or education (19)	○	○	○	○	○	○
Putting pressure on yourself to meet your future goals (20)	○	○	○	○	○	○
Not getting enough time for leisure (21)	○	○	○	○	○	○
Not enough time for activities outside of school hours (22)	○	○	○	○	○	○
Having too much homework (23)	○	○	○	○	○	○
Not enough money to buy the things you need (24)	○	○	○	○	○	○
Not enough money to buy the things you want	○	○	○	○	○	○

(Ertanir, Rietz, Graf, & Kassis, 2021)

Appendix F. 4-Item Loneliness Scale

Please indicate how often each of the statements below is descriptive of you.

	I never feel this way (1)	I rarely feel this way (2)	I sometimes feel this way (3)	I often feel this way (4)
I lack companionship (1)	○	○	○	○
I am no longer close to anyone (2)	○	○	○	○
I feel left out (3)	○	○	○	○
I feel isolated from others (4)	○	○	○	○

(Roberts, Lewinsohn, & Seeley, 1993)