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Abstract

In 2020, the COVID-19 pandemic sent adolescents home to shelter-in-place in relative social isolation, potentially disrupting support networks, and compromising youth mental health. This may particularly impact already vulnerable groups, such as girls and transgender/gender diverse (TGD) adolescents, who experience a greater risk for depression and anxiety disorders than their peers. The present study investigated the moderating effect of gender on adolescents' internalizing symptoms throughout the first wave of COVID-19. I hypothesized that the onset of the pandemic would increase TGD adolescents' internalizing symptoms to a greater degree than their cisgender peers, and girls' internalizing symptoms more than boys'. Data were collected cross-sectionally with three timepoints: pre-pandemic (Sep 2019 – Jan 2020), mid-first wave (Sep 2020 – Jan 2021), and post-first wave (Feb 2021 – May 2021). A community sample of Wisconsin adolescents (N = 5,487; M_{age} = 14.7, SD =1.4; 80.07% White) completed surveys through a school-based screening program. Internalizing symptoms were measured with the pediatric symptom checklist for youth. Rates of internalizing symptoms were highest for TGD adolescents at all timepoints, followed by girls, who were significantly higher than boys. Gender moderated the effect of time on internalizing symptoms. Specifically, internalizing symptoms increased for girls, but not for boys or TGD adolescents. These results suggest that during future widescale disasters, intervention efforts should focus on those with previous vulnerabilities to mental health struggles such as girls and TGD adolescents.

Keywords: COVID-19, transgender, adolescent, mental health, gender minorities, depression, anxiety

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In 2020, the onset of the Coronavirus (COVID-19) pandemic began to pose challenges to population-level mental health (Holmes et al., 2020). During such widespread disasters, we must identify where the greatest need lies to better allocate mental health services (Branje & Morris, 2021; Thu et al., 2020). COVID-19 may especially impact the mental health of previously vulnerable groups, such as adolescents. Adolescence marks an important time for the development of psychopathology. Across all disorders, onset occurs most commonly at the age of 14 (Kessler et al., 2005). Mental health symptoms during this time can lead to lifetime struggles with psychopathology (Paus et al., 2008). Thus, early identification of those who struggle the most in adolescence can inform intervention efforts during future widespread disasters.

Typically, anxiety and mood disorders, such as depression, onset in adolescence. These disorders (together, referred to as "internalizing;" Achenbach, 1966), have the highest lifetime prevalence rates across all mental disorders (Kessler et al., 2005), as well as high comorbidity (Hankin et al., 2016). During the adolescent years, the number of those suffering from internalizing disorders increases rapidly with age (Hankin & Abramson, 2001; Merikangas et al., 2010; Nolen-Hoeksema, 1990). This especially applies to Major Depressive Disorder, the prevalence of which nearly doubles between the ages of 13–14 and 17–18 (Merikangas et al., 2010). About 32% of U.S. adolescents aged 13 through 18 meet the criteria for an anxiety disorder, and 14% meet the criteria for a mood disorder (Merikangas et al., 2010). Mid-to-late adolescence may constitute a "critical time period" of increased vulnerability to onset (Hankin &

Abramson, 2001; Hankin et al., 1998), and thus this age group may need additional monitoring in times of greater stress, such as during COVID-19.

Internalizing Disorder Risk for Adolescent Girls and Boys

Rates of depression increase during adolescence more rapidly for girls than boys (Hankin et al., 1998). Throughout this critical time, and through adulthood, females experience anxiety and depression at twice the rate that males do (Hankin et al., 1998; Hankin & Abramson, 2001; Nolen-Hoeksema, 1990; Zahn-Waxler et al., 2008). Several proposed reasons may account for this discrepancy.

The disproportionate rates of internalizing disorders in adolescent girls could occur due to their experiencing of more stressors. Research shows that negative life events, chronic strains, and traumas cause substantial physical and psychological damage (Thoits, 2010). In Hankin and Abramson's (2001) review of the development of gender differences in depression, they found that adolescent girls report a significantly greater number of negative life events than adolescent boys, and that this difference leads to increased negative affect and internalizing symptoms in girls. Stressful life events and negative interpersonal events have been found to mediate the male/female gender difference in depression and negative affect (Hankin & Abramson, 2001). These negative events could lead to a self-reinforcing cycle in adolescent girls: more negative life events increase their depressive symptoms (Thoits, 2010), their negative affect then contributes to additional negative events, which cyclically reinforce the depression (Hankin & Abramson, 2001). Individuals who experience repeated negative life events in several domains may go on to develop negative cognitive biases, such as an internal, stable, global attributional style (Abramson et al., 1989), or habits of rumination (Nolen-Hoeksema, 1991), both of which increase one's cognitive vulnerability to depression (Hankin & Abramson, 2001). Adolescent

girls have also been found to ruminate more than boys, and rumination appears to at least partially explain the gender difference in adolescent depressive symptoms (Hilt et al., 2010). Negative attributional style and a ruminative response style may create cognitive vulnerabilities which further exacerbate the effects of negative life events on depressive symptoms.

Additionally, socialized gender roles could account for the discrepancies between adolescent depression in girls and boys. Girls may experience higher levels of internalizing symptoms due to their socialized role which promotes uncertainty in one's self-worth (Zahn-Waxler et al., 2008). While boys and girls both experience limiting cultural scripts, the promotion of dependence, helplessness, and passive, self-sacrificing traits in girls may create increased risk for depression (Zahn-Waxler et al., 2008). Cultural self-image expectations also exert significant cultural pressure on adolescent girls. Negative cognitions about perceived attractiveness have been found to mediate the difference between adolescent girls and boys in internalizing symptoms (Hankin & Abramson, 2001). For adolescent girls, more negative life events, negative cognitive biases, greater levels of rumination, and restricting socialized gender roles may all contribute to greater levels of internalizing disorders than their male peers.

Internalizing Disorder Risk for Transgender and Gender Diverse Adolescents

Even more so at risk, evidence suggests that transgender and gender diverse (TGD) adolescents experience between two- and four-times higher rates of depression than their cisgender peers (Clark et al., 2013; Connolly et al., 2016). The TGD population includes those who identify as binary transgender (male-to-female or female-to-male), non-binary, genderfluid, genderqueer, and others who do not identify with the gender they were assigned at birth (Vance et al., 2014). Contrarily, cisgender refers to those who do identify with the gender they were assigned at birth (Vance et al., 2014). Some debate exists about possible over-diagnosis of

depression and anxiety in TGD populations. Evidence suggests that for TGD adults, gender dysphoria, or a feeling of distress caused by incongruence between one's body and their experienced gender, partially mediates the relationship between minority-based stressors and internalizing symptoms (Brokjøb & Cornelissen, 2021). Thus, a TGD individual could receive an anxiety or depressive disorder diagnosis, when in reality their internalizing symptoms result from gender dysphoria (Vance et al., 2014). However, TGD adolescents also face additional stressors which may put them at heightened risk for internalizing symptoms.

Minority stress poses another possible driving factor in TGD adolescents' heightened levels of internalizing symptoms in comparison to their cisgender peers. Differences in group exposure to stressful events have been shown to produce inequalities in physical and mental health (Thoits, 2010). Even after controlling for additional life factors, discriminatory experiences are significantly associated with internalizing disorders (Thoits, 2010). Minority stress theory focuses on Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) people specifically, suggesting that the prejudice that they experience causes unique stressors which negatively impact physical and mental health (Meyer, 2015). Studies have supported this theory, finding that stressors related to marginalization do impact the health of TGD people, strongly predicting adolescent levels of depression and anxiety (Brokjøb & Cornelissen, 2021; Meyer, 2015). These distressing interpersonal experiences such as social rejection or lack of family support may cause high levels of internalizing disorders in TGD adolescents (Vance et al., 2014). For TGD adolescents, gender dysphoria, discrimination stress, and interpersonal stressors may contribute to higher levels of internalizing disorders than cisgender adolescents.

Adolescents Internalizing During COVID-19

Given adolescents' general vulnerability to internalizing disorders, it becomes doubly important to understand the risks they have faced following a stressful global disaster, such as onset of COVID-19. For adolescents, internalizing disorders significantly worsen in response to disruptive events such as natural disasters or pandemics (Kar & Bastia, 2006; Reijneveld et al., 2003). The pandemic also caused most schools to transition to distance-learning, which could greatly diminish adolescents' connections to social support. It has been shown that social support buffers the effects of stressors and reduces internalizing symptoms (Thoits, 2010), so its removal may worsen adolescent mental health. Thus, I expect adolescents' internalizing symptoms to worsen in response to the COVID-19 pandemic. Given that girls rely on social support more than boys (Cheng & Chan, 2004), and TGD adolescents with gender-affirming social support report significantly better mental health than those without it (Vance et al., 2014), distance-learning could alter these groups internalizing symptoms the most. Thus, I expect TGD adolescents and girls to experience a greater increase in internalizing in response to the COVID-19 pandemic than adolescent boys. These groups should especially receive support for potential adverse effects on mental health during this time.

Conflicting trends in adolescents' internalizing symptoms following COVID-19's onset (i.e., from March through July of 2020) have been documented across the world. Some studies have found an improvement in mental health for adolescents during the first wave. For example, Bernasco et al. (2021) found a decrease in internalizing symptoms among Dutch adolescents from pre- to mid-COVID-19. Similarly, a longitudinal study with Canadian adolescents reported a decrease in anxiety symptoms post-COVID-19 onset (Hollenstein et al., 2021). Other studies have found no change in internalizing symptoms: A longitudinal study by Swords et al. (2021)

with American adolescents reported no change in negative affect post-stay-at-home-order, as well as decreased rumination for those with average and below-average depressive symptoms. Additionally, a longitudinal study of adolescents in the Netherlands found no change in negative affect from pre- to mid-first wave (Janssen et al., 2020). Some propose that school closings could have improved adolescent mental health due to fewer school-related stressors or increased time for recreation, relaxing, and sleeping (Bernasco et al., 2021; Hollenstein et al., 2021; Janssen et al., 2020; Swords et al., 2021). A study by Gruber et al. (2020) concurred and reported that the majority of Canadian adolescents reported improvements in sleep quality and/or duration after the school's shutdown for COVID-19.

Still, other studies have found that adolescents experienced a worsening of mental health during COVID-19's first wave. For example, a cross-sectional, retrospective study with Chinese adolescents showed a significant increase in general anxiety, separation anxiety, social phobia, and panic disorder symptoms during the epidemic (Duan et al., 2020). Several longitudinal studies have shown significant increases in depressive (De France et al., 2021; Hollenstein et al., 2021; Romm et al., 2021) and anxiety symptoms (De France et al., 2021; Hawes et al., 2021) for Canadian and American adolescents. Another longitudinal study by Magson et al. (2020) found that Australian adolescents experienced worsening in both anxiety and depression during the first wave of COVID-19. The results of studies concerning adolescents' internalizing symptoms during COVID-19 often contradict, and therefore, further research should work towards determining what may have contributed to this discrepancy.

Adverse internalizing effects during the first wave of COVID-19 have not been reported equally across gender. Girls generally rely on social support more than boys (Cheng & Chan, 2004), and as a result, they may have experienced worsening symptoms due to isolation. One

longitudinal study found that adolescent girls from Canada experienced an increase in anxiety symptoms during COVID-19 while boys did not (De France et al., 2021). Another longitudinal study with Australian adolescents found that although boys experienced some increased anxiety, girls experienced significantly more (Magson et al., 2020). Reports on anxiety levels during COVID-19 have concurred, but results concerning depressive symptoms conflict.

A longitudinal study with Canadian adolescents found that boys experienced a significant increase in depressive symptoms during COVID-19 while girls did not (De France et al., 2021). However, other longitudinal studies with Canadian and American adolescents found the opposite: Girls experienced a significant increase in depressive symptoms while boys did not (Hawes et al., 2021; Hollenstein et al., 2021). Another longitudinal study reported that Australian adolescent boys and girls both experienced increased depression symptoms, but girls did so significantly more (Magson et al., 2020). A cross-sectional study found complementary evidence that Canadian adolescent girls experienced higher levels of depression and loneliness than boys (Ellis et al., 2020). These differences may depend on the studies' varying methods, as well as their use of samples from different countries and a large variety of sample sizes. Conflicting findings indicate a need for further investigation of gender’s effect on internalizing symptoms during COVID-19. Additionally, while these studies address that gender can moderate symptomology during a pandemic, they fail to extend these questions beyond the gender binary.

Before COVID-19, TGD adolescents were already at increased risk for negative mental health when compared to their cisgender peers. A meta-analysis by Connolly et al. (2016) aggregating 15 studies from 2011 to 2016, found that transgender youth have significantly higher rates of depression, suicidality, self-harm, and eating disorders than cisgender youth. A study by Clark et al. (2014) concurred, reporting that 41% of transgender high school students from New

Zealand experienced depressive symptoms, compared to 12% of cisgender students. Given this vulnerability, TGD adolescents may have a heightened risk for increased mental health struggles during COVID-19. Minimal research involves TGD populations' mental health during the pandemic, and none exists on adolescents alone. One retrospective study surveyed Canadians aged 18 through 24 during COVID-19 and found significantly higher reports of mental health challenges among TGD people than their cisgender peers based on measures of worry, affect, enjoyment, anxiety, restlessness, fatigue, concentration, irritability, loneliness, and negative cognitions (Hawke et al., 2021). Similarly, another study surveyed American college students aged 18 through 59 and found that TGD individuals reported higher levels of distress during COVID-19 than cisgender individuals (Hunt et al., 2021). A third study found that nonbinary young-adults aged 18 through 35 from North America reported more anxiety and depression following COVID-19's onset than their cisgender peers (Alonzi et al., 2020). While TGD adolescents were a vulnerable group before the pandemic, research should investigate their internalizing symptoms throughout COVID-19.

These studies begin to assess the first wave of COVID-19's impact on the mental health of TGD versus cisgender adolescents, but more research needs to clarify the variation of internalizing symptoms between these groups. This is especially important given the pre-existing differences in cisgender and TGD adolescents' internalizing symptoms. The present study aims to address this by examining the internalizing symptoms of boys, girls, and TGD adolescents before and during the first wave of COVID-19. I hypothesize that COVID-19 (1) increased adolescent girls' internalizing symptoms to a greater degree than for boys and (2) increased TGD adolescents' internalizing symptoms to a greater degree than their cisgender peers. These

findings would establish a need for further mental health treatment attention for these groups in the wake of the pandemic, as well as during future disasters of the same widespread nature.

Methods

Screening Program Procedure

Data were collected from participants who completed mental health screenings through the Connected Community Wellness Screen (CCWS). The CCWS is a Northeastern-Wisconsin-based multistage screening program which primarily assesses for suicide risk, as well as risk for general psychopathology (Hilt et al., 2018). The CCWS screen has demonstrated high sensitivity and specificity (Hilt et al., 2018). It is designed to be taken yearly by high school and middle school students and currently serves approximately 45 schools across five Wisconsin counties.

First, the Lawrence University IRB approved this study. Most schools used a passive consent process in which parents were notified by letter on three occasions (one paper and two electronic) with details of the screening program at least 30 days before screening with the option to opt their child out. Active consent forms for three schools were distributed to parents by school counselors. Assent was also obtained for all participants. Students completed the 10–15 min screening questions online. During the pre-pandemic timepoint of the present study, participants took the screen at school. During mid- and post-first wave, schools were operating virtually, and thus students took the screen at home through an emailed link. During mid- and post-first wave, students also received information about the screening through a Zoom meeting rather than at school before assenting.

The CCWS screening questionnaire consists of the 35-item pediatric symptom checklist for youth (PSC-Y; Pagano et al., 2000) as well as questions regarding the interpersonal theory of suicide (IPTS; Joiner, 2005; Van Orden et al., 2010), self-harm, suicidal ideation and attempts,

and substance use (Hilt et al., 2018). Participants whose scores indicated concern, met with a master's-level mental health clinician to debrief and assess any areas needing attention. If the clinical interviewer determined that further evaluation and mental health services were warranted, parents were notified by phone within a day. After this notification phone call to parents, a referral packet was mailed with a letter outlining general results from the screening, a release of information form, and a list of recommended mental health care providers in the community. If parents completed a release of information form to allow it, case managers also connected the students to mental health resources within their schools.

Participants

See Table 1 for participant characteristics by timepoint.

Timepoints

I collected data cross-sectionally at three timepoints from 2019 through 2021:

Pre-Pandemic

This timepoint served as a comparison group used to assess community mental health prior to COVID-19. I defined the pre-pandemic timepoint as September 1, 2019, through January 31, 2020 (n = 1,950). This measurement took place prior to the first significant surge of COVID-19, also referred to as the 'first wave' of the pandemic.

Mid-First Wave

This timepoint assessed students' mental health during a high-risk point of the pandemic. This took place during the first wave of COVID-19 cases in Wisconsin, which I defined as September 1, 2020, through January 31, 2021 (n = 1,573). Wisconsin's first wave peaked with a seven-day-average of new reported COVID-19 cases ranging from 748 to 7,045 new cases per day ("Tracking Coronavirus in Wisconsin", 2020). Throughout the first wave, Wisconsin's case

numbers per 100,000 exceeded the United States averages ("Tracking Coronavirus in Wisconsin", 2020).

Post-First Wave

This timepoint took place after the first wave of COVID-19 in Wisconsin. I defined this timepoint as February 1, 2021, through May 31, 2021 (n = 1,964). In contrast to the high of 7,048 new cases per day that Wisconsin experienced during the first wave, the post-first wave period experienced a seven-day-average between 261 through 1,492 new cases per day ("Tracking Coronavirus in Wisconsin", 2020).

Measures

Internalizing

Anxiety and depression symptoms were measured using the pediatric symptom checklist for youth (PSC-Y; Pagano et al., 2000). This measure demonstrates strong associations with parent-reported child dysfunction and child-reported depression and anxiety, as well as strong internal consistency (Pagano et al., 2000). The PSC-Y lists a total of 35 behaviors (e.g., Feel hopeless, Worry a lot), then asks participants to mark "what best fits them" on a 3-point Likert scale with options of *never* (0), *sometimes* (1), or *often* (2). The PSC-Y includes an internalizing subscale comprising five items that the present study used. The highest possible score for internalizing is 10, and 5 is used as a clinical cut-off based on prior research (Massachusetts General Hospital, n.d.).

Gender

Participants were asked to "Choose the option that best describes your gender" and given options of "female", "male", "non-binary", and "other", with an additional space for self-

description. For my analysis, I included non-binary participants in the TGD category, as well as those who wrote in answers such as “genderfluid”, “agender”, “bigender”, or “transgender”.

Data Analytic Plan

I planned to conduct all analyses using SPSS (version 28.0.0.0). To examine normality, I inspected a box plot and histogram, as well as skew and kurtosis. To test the change in mean internalizing scores between timepoints, I first planned to run a univariate ANOVA with time and gender as predictors, and Tukey post hoc tests. I then planned to follow up a significant interaction with separate one-way ANOVAs to examine each gender separately over time.

Results

Overall Results

Analysis showed no outliers and approximately normal distributions (skew and kurtosis < 2.0). Table 2 provides *n*, mean, and standard deviation for internalizing scores by timepoint.

A univariate ANOVA showed a significant interaction between timepoint and gender on adolescents’ internalizing scores F (4, 5476) = 3.353, p = .009, η_p^2 = .002 (Figure 1).

Results by Timepoint

Table 3 contains statistical differences between the genders’ mean internalizing symptoms by timepoint. I found no significant effect of time alone on internalizing scores F (2, 5476) = 2.131, p = .119, η_p^2 = .001.

Pre-COVID-19, there was a significant difference between gender groups’ mean internalizing scores, with an effect size approaching medium. Tukey post hoc tests showed significant differences between mean internalizing scores between all gender comparisons. TGD adolescents had the highest internalizing scores, followed by girls, and then boys.

For mid-first wave, gender differences in internalizing scores also significantly differed with a medium effect size. There was a significant difference between all gender comparisons, in the same order as pre-COVID-19.

For the post-first wave timepoint, gender differences in internalizing scores also significantly differed with an effect size approaching large. Again, there were significant differences between all gender comparisons in the same order as the previous two timepoints.

Results by Gender

A univariate ANOVA of between-subject effects found a significant effect of gender on internalizing symptoms F (2, 5476) = 222.449, $p < .001$, $\eta_p^2 = .075$. Table 4 contains statistical results of internalizing over time for each gender.

For male adolescents, a univariate ANOVA found no significant effect of time on internalizing scores, with a very small effect size.

For girls, a univariate ANOVA found a significant effect of time on internalizing symptoms, with a very small effect size. Tukey post hoc tests found significant differences between girls internalizing scores pre-COVID-19 and post-first wave, and mid-first wave and post-first wave, but not between pre-COVID-19 and mid-first wave.

For TGD adolescents, a univariate ANOVA found no significant effect of time on internalizing symptoms, with a small effect size.

Discussion

In 2020, the COVID-19 pandemic, and the resulting shift to distance-learning, caused considerable upheaval for adolescents globally. This shift has the potential to adversely affect adolescents' mental health, especially since this group was previously vulnerable. Anxiety and depression, the most prevalent of all mental disorders, typically emerge in adolescence. Girls

experience anxiety and depression at twice the rate of boys by late adolescence (McLaughlin et al., 2007; Pratt & Brody, 2014), and evidence suggests that TGD adolescents experience between two- and four- times greater rates of depression and anxiety disorders than their cisgender peers (Clark et al., 2013; Connolly et al., 2016). The present study investigated the moderating effect of gender on adolescents' internalizing symptoms throughout the first wave of COVID-19.

Internalizing symptom severity during COVID-19's first wave significantly differed based on gender. Girls reported significantly higher internalizing symptoms than boys, and TGD adolescents reported significantly higher symptoms than cisgender adolescents (i.e., both girls and boys) across every timepoint. This aligns with prior studies which find that adolescent girls experience significantly higher rates of depression and anxiety than boys, and that TGD adolescents experience significantly more depression than cisgender adolescents (Alonzi et al., 2020; Connolly et al., 2016; Hankin et al., 1998; Zahn-Waxler et al., 2008). For girls, stressful life events may contribute to this discrepancy, as well as differences in negative interpersonal events, rumination, and negative cognitions about perceived attractiveness, which all mediate the difference between adolescent girls' and boys' depressive and anxiety symptoms (Hankin & Abramson, 2001; Hilt et al., 2010). For TGD adolescents, minority stressors such as interpersonal or family rejection strongly predict levels of internalizing symptoms and may account for their elevated distress (Brokjøb & Cornelissen, 2021; Meyer, 2015; Vance et al., 2014).

Regardless of gender, results found a significant main effect of time on adolescents' internalizing scores. Specifically, adolescents' mean internalizing scores were higher after the first wave of the COVID-19 pandemic than pre- or mid-first wave. These findings align with previous research that has found an increase in adolescents' internalizing symptoms during

COVID-19 (De France et al., 2021; Duan et al., 2020; Hawes et al., 2021; Hollenstein et al., 2021; Magson et al., 2020; Romm et al., 2021), but also contradict previous research which has found a decrease or no change in adolescents' internalizing symptoms during COVID-19 (Bernasco et al., 2021; Janssen et al., 2020; Swords et al., 2021). However, the present study found no significant difference in mean internalizing scores between pre-COVID-19 and *mid*-first wave, when case severity reached its highest point during this study. The fact that internalizing score severity did not follow the same trend as COVID-19 case severity suggests that either negative changes in mental health were delayed or occurred due to another factor. Previous research suggests that the duration of a negative or traumatic stressor significantly changes its effect on the mental health of children (Kar & Bastia, 2006). As the present study defined mid-first wave as about six months after the onset of COVID-19 in Wisconsin, participants may have still been experiencing the pandemic as a short-term stressor. However, post-first wave took place about a year into the pandemic, by which time participants could have been experiencing the pandemic as more of a long-term, chronic stressor. Longer-term research should investigate whether internalizing symptoms reflect current case severity, or if symptoms are unrelated.

Main effects should be interpreted in the context of interaction effects: gender moderated the relationship between time and internalizing symptoms. Specifically, results indicated that internalizing symptoms significantly worsened throughout the first wave of the pandemic for adolescent girls only. This effect, although small, suggests that girls may be particularly vulnerable to the stressors associated with the pandemic. These results align with prior studies which show more significant increases in internalizing symptoms throughout COVID-19 for adolescent girls than for boys (Ellis et al., 2020; Magson et al., 2020).

Adolescent boys' internalizing symptoms did not differ across COVID-19's first wave, however, this does not necessarily mean that boys were not affected. These results build upon prior findings that adolescent boys did not report significant changes in internalizing symptoms throughout COVID-19 (De France et al., 2021; Hollenstein et al., 2021). This could result from a gender difference in response styles. In response to negative events, adolescent girls more often respond with rumination and internalizing, but adolescent boys more often respond with risk behaviors like substance use and conduct disorder (Daughters et al., 2013; Zahn-Waxler et al., 2008). Thus, boys may have coped with the stress of COVID-19 through increased externalizing behaviors, rather than internalizing behaviors.

Although TGD adolescents reported significantly higher internalizing symptoms than their peers at all timepoints, results found no significant change in their symptoms across the first wave. Several possibilities may explain this. For one, a ceiling effect could have occurred, as mean levels of internalizing symptoms for this group initially exceeded the PSC-Y's clinical cut-off. Additionally, the relatively smaller number of TGD participants and differences in sample size across timepoints may have obscured a potential effect. Another possibility is that TGD participants may have displayed higher levels of resilience to stress than their peers. Some suggest that because it takes resilience to overcome stressors such as discrimination, those who face consistent marginalization develop a greater skill to withstand additional negative events (Meyer, 2015). It remains unclear what effect COVID-19 has had on TGD adolescents, and further research with larger TGD samples is needed to clarify the effect.

Because girls generally rely on social support more than boys (Cheng & Chan, 2004), they may have experienced worsening symptoms due to the social isolation of distance learning. Ellis et al. (2020) found that adolescent girls reported more feelings of loneliness during

COVID-19 than boys. It has been shown that social support buffers against various stressors, and peer support is negatively correlated with internalizing symptoms (Thoits, 2010) thus, an intervention in belongingness or community could benefit girls at this time. Additionally, Magson et al. (2020) found that feeling socially connected during COVID-19 significantly moderated changes in adolescents internalizing symptoms. In the face of loneliness and major life stressors such as COVID-19, an intervention in social support could buffer against internalizing, especially for adolescent girls.

For TGD adolescents, gender-affirming social supports can significantly decrease psychopathological symptoms (Vance et al., 2014). In a longitudinal study of TGD adults during COVID-19 by Kidd et al. (2021), over half of participants reported reduced access to LGBTQ or TGD specific supports during the pandemic. Losing this access was associated with increased distress, even after controlling for pre-pandemic symptoms (Kidd et al., 2021). This pattern is likely similar in TGD adolescents, especially due to their younger age which requires greater reliance on others such as the family or school to provide access to these resources and supports. The diminishing of school-based contacts of support due to distance learning would only exacerbate this problem, as adolescents spent time at home with the family rather than in school with peers. Hawke et al. (2021) noted that during stay-at-home and quarantine measures, TGD adolescents were likely spending less time with LGBTQ peers, and more time at home with potentially unsupportive families. During COVID-19, TGD youth reported significantly less social support from family members than cisgender youth (Hawke et al., 2021). This is especially relevant, given that social support buffers the negative effects of minority stressors (Meyer, 2015). If the removal of peer support during COVID-19 negatively impacted TGD

adolescents, an intervention in belongingness or community could significantly support this group as well.

Limitations

This study should be interpreted within its limitations. First, the data were collected cross-sectionally rather than longitudinally; thus, cohort effects unrelated to the pandemic could have affected the outcome. Secondly, the sample was largely white (80.1%), and from a moderately sized region of the midwestern United States, which may limit generalizability. The spread of COVID-19 varies highly based on location (Thu et al., 2020), making location a critical feature of empirical studies during the pandemic. Wisconsin experienced a higher average number of cases per 100,000 than the U.S. average ("Tracking Coronavirus in Wisconsin", 2020). This discrepancy in the severity of COVID-19 spread makes it difficult to compare COVID-19's impact on this sample with national and international samples. Further research should include larger and more varied geographical areas. Another limitation was an unbalanced sample: There was a very large sample of cisgender participants (n = 5,397) but a small number of TGD participants (n = 88). The proportion of TGD participants in the sample varied depending on the timepoint, ranging from 0.9% pre-pandemic to 2.6% post first-wave. This variability could have caused the differing results seen between the statistical significance and effect sizes of TGD adolescents' internalizing symptoms across the first wave. Additionally, while a major strength of the study was the large sample size, having participants from multiple schools introduces variability in the learning modalities adolescents experienced, especially during the 2020–2021 school year when some schools were fully virtual, some were fully in-person, and others were hybrid.

Future Directions

Although this study focused on gender, future studies should investigate how other demographic factors influence the mental health of adolescents during COVID-19. These include, but are not limited to race, ethnicity, and socioeconomic status as potential moderators. For example, those in poverty have an established higher risk for depression (Pratt & Brody, 2014). Hispanic adolescent girls also report experiencing higher levels of depression, anxiety, and comorbidity than their peers, and black adolescent boys report higher levels of physiologic anxiety than boys from other racial/ethnic groups (McLaughlin et al., 2007). Additionally, people with multiple marginalized identities may experience cumulative risk for negative effects, due to interacting systems of oppressions (Swann et al., 2019). For example, both racial minority status and TGD status are shown to negatively affect internalizing symptoms in adolescents, and those with both racial minority and TGD status report more depression and anxiety than those with only one of these identities (Swann et al., 2019). This additive minority stress could lead to worse outcomes for racial minority TGD adolescents during COVID-19 than for those with a single marginalized identity. Future studies should evaluate these groups to provide a more well-rounded picture of how COVID-19 potentially impacted the mental health of those with various racial, cultural, and socio-economic identities differently. This would further clarify if such groups may need additional mental health resources during times of crisis.

Results supported my hypothesis that COVID-19 has increased adolescent girls' internalizing symptoms to a greater degree than for boys. Results did not support my second hypothesis that COVID-19 has increased TGD adolescents' internalizing symptoms to a greater degree than their cisgender peers. However, this may occur due to a ceiling effect where TGD adolescents were already experiencing an extreme level of internalizing symptoms. Overall,

results showed the most severe levels of internalizing symptoms expressed in TGD adolescents, followed by adolescent girls, and then adolescent boys. Thus, during future widescale disasters, intervention efforts should focus on allocating resources to those with previously vulnerabilities to mental health struggles.

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Table 1

Demographics by Timepoint

		Timepoint		
	Total *N* = 5,485	**Pre-COVID-19** *n* = 1,950	**Mid-first wave** *n* = 1,572	**Post-first wave** *n* = 1,963
Gender				
Male	2,634 (48.0)	983 (50.4)	713 (45.4)	938 (47.8)
Female	2,763 (50.4)	950 (48.7)	839 (53.4)	974 (49.6)
TGD	88 (1.6)	17 (0.9)	20 (1.3)	51 (2.6)
Age, mean (SD)	14.7 (1.4)	14.0 (1.3)	15.0 (1.5)	14.6 (1.3)
Ethnicity				
White	4,392 (80.1)	1,513 (79.0)	1,311 (83.6)	1,568 (80.3)
Asian	339 (6.2)	166 (8.7)	74 (4.7)	99 (5.1)
Biracial/multiracial	231 (2.2)	98 (5.1)	58 (3.7)	75 (3.8)
African American	144 (2.6)	50 (2.6)	26 (1.7)	69 (3.5)
American Indian/ Native American/ Alaskan Native	88 (1.6)	28 (1.5)	29 (1.9)	31 (1.6)
Other Race	114 (2.1)	55 (2.9)	25 (1.6)	34 (1.7)
Not Specified	177 (3.2)	6 (0.3)	45 (2.9)	78 (4.0)
Ethnicity				
Hispanic/Latino	453 (8.3)	181 (9.3)	124 (7.9)	148 (7.5)
Non-Hispanic/Latino	4,878 (89.0)	1,761 (90.4)	1,379 (87.7)	1,738 (88.5)
Not Specified	153 (2.8)	7 (0.4)	69 (4.4)	77 (3.9)

Note. TGD = Transgender/Gender Diverse

Table 2

Mean (SD) Internalizing Symptoms by Timepoint

	Pre-COVID-19				Mid-first wave				Post-first wave				Total No		
	Male	**Female**	**TGD**	**Total**	**Male**	**Female**	**TGD**	**Total**	**Male**	**Female**	**TGD**	**Total**	**Male**	**Female**	**TGD**
N	983	950	17	1,950	713	839	20	1,572	934	974	51	1,963	2,634	2,763	88
M	2.3	3.4	5.5	2.8	2.3	3.4	5.6	2.9	2.1	3.7	6.4	3.0	2.2	3.5	6.1
SD	2.4	2.6	2.8	2.6	2.3	2.6	2.5	2.5	2.3	2.7	2.7	2.7	2.3	2.6	2.7

Note. TGD = Transgender/Gender Diverse

Table 3

ANOVA Results: Differences in Genders' Internalizing, Separated by Timepoint

	Gender	***F***	***df***	***p* (95% CI)**	**η_p^2 (95% CI)**
Pre-COVID-19	All genders	56.17	(2, 1947)	<.001***	.055 [0.036, 0.075]
	Boys vs. Girls			<.001*** [-1.37, -0.84]	
	Boys vs. TGD			<.001*** [-4.66, -1.76]	
	Girls vs. TGD			.002** [-3.56, -0.67]	
Mid-First Wave	All genders	53.01	(2, 1569)	<.001***	.063 [0.041, 0.087]
	Boys vs. Girls			<.001*** [-1.42, -0.84]	
	Boys vs. TGD			<.001*** [-4.58, -1.99]	
	Girls vs. TGD			<.001*** [-3.45, -0.86]	
Post-First Wave	All genders	143.94	(2, 1960)	<.001***	.128 [0.102, 0.155]
	Boys vs. Girls			<.001*** [-1.86, -1.32]	
	Boys vs. TGD			<.001*** [-5.14, -3.45]	
	Girls vs. TGD			<.001*** [-3.55, -1.86]	

Note. Tukey post hoc tests are used; TGD = Transgender/Gender Diverse; CI = Confidence Interval.

*p < .05. **p < .01. ***p < .001

Table 4

ANOVA Results: Internalizing Over Time for Each Gender

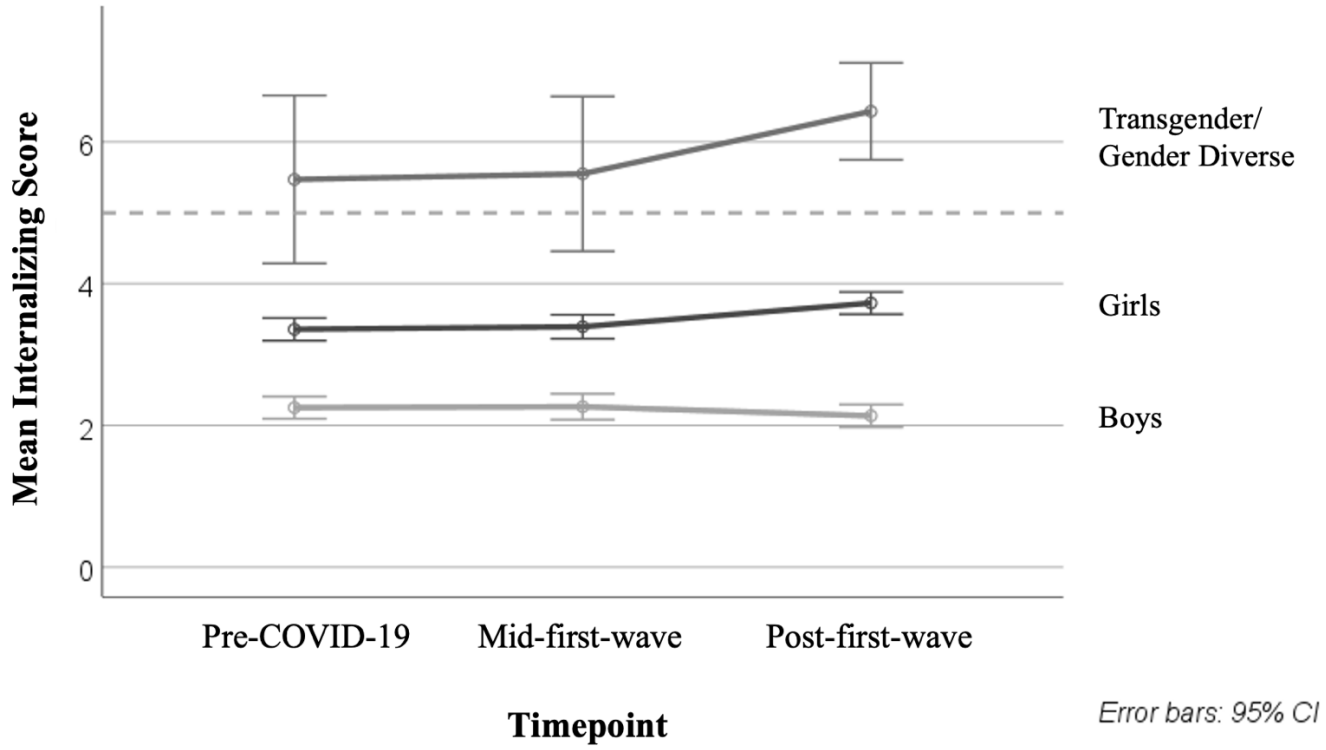
	Timepoint	***F***	***df***	***P* (95% CI)**	**η_p^2 (95% CI)**
Boys	All	0.82	(2, 2631)	.443	.001 [0.000, 0.003]
TGD	All	1.29	(2, 85)	.280	.030 [0.000, 0.114]
Girls	All	5.76	(2, 2760)	.003*	.004 [0.001, 0.010]
	Pre vs Mid			.954 [-0.33, 0.25]	
	Mid vs Post			.019* [-0.62, -0.04]	
	Pre vs Post			.006** [-0.65, -0.09]	

Note. Tukey post hoc tests are used; TGD = Transgender/Gender Diverse; CI = Confidence Interval

*p < .05. **p < .01.

Figure 1

Mean Internalizing Scores by Time and Gender Throughout COVID-19 First-Wave



Note. The horizontal dashed line marks an internalizing score of five, the cutoff point for internalizing on the pediatric symptom checklist for youth (PSC-Y; Pagano et al., 2000).