ANXIETY OUTCOMES THROUGH ADOLESCENCE IN RELATION TO SOCIAL SUPPORT DURING THE COVID-19 PANDEMIC

by

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A THESIS

Presented to the Department of Psychology
and the Robert D. Clark Honors College
in partial fulfillment of the requirements for the degree of
Bachelor of Arts

June 2023

An Abstract of the Thesis of

Kellie Gunther for the degree of Bachelor of Arts
in the Department of Psychology to be taken June 2023

Title: Anxiety Outcomes through Adolescence in Relation to Social Support During the Covid-19 Pandemic

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Anxiety in adolescents is very prevalent in this day and age and was certainly impacted by the COVID-19 pandemic and increased social distancing. Social connectedness has been correlated with reduced anxiety. This longitudinal study investigates how social connectedness impacts anxiety responses and overall well-being for adolescents. More specifically, this study examines how social support and connectedness relate to anxiety outcomes for adolescents across the first months of social distancing. Survey data were collected between April and June of 2020 from 50 participants aged 10 to 18 years. Participants completed up to 10-time points of data, across 10 weeks. This study specifically analyzes data from two surveys administered to the participants each week: The Youth Anxiety Measure for DSM-5 (YAM; Muris et. al., 2017), and the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al.,1988). The findings suggest that there is no significant correlation between total social support and total anxiety outcomes for this age group, however, exploratory analyses provided new results and further research is proposed to understand ways to help reduce anxiety in this age group.

Acknowledgements

I would like to express my sincere gratitude and appreciation to my primary advisor Professor Kathryn (Kate) Mills for supporting me throughout this entire process and dedicating so much time and energy to my project. Kate you have reignited my love for psychology research and I am so grateful!

I would also like to thank Dr. Lisa Munger for her continued support throughout this process, especially through the early stages of thesis brainstorming!

And I could not have completed this thesis without the continued love and support from my friends and family, I am so grateful to all of you!

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Introduction:

Anxiety disorders in adolescents are some of the most prevalent and debilitating psychiatric problems faced in this developmental age group, generally ranging from ages 10 to 18 (Muris et al., 2017). Stressful situations during adolescence, such as academic pressures or family conflicts, can act as risk factors for increased anxiety symptoms, and can potentially exacerbate mental health challenges during this developmental stage. However, social support can play a protective role by buffering against the impacts of stress. Access to supportive relationships including close friends, family members, and mentors can provide support and such relationships can help to minimize the negative effects of stress on mental health. Adolescents who report higher levels of social support are less likely to develop anxiety disorder (Scardera et al., 2020), which is why social support is an important public health target to reduce an adolescent's risk of developing an anxiety disorder.

During the early stages of the COVID-19 pandemic, social distancing measures resulted in a challenging combination of high stress and disrupted social support, as individuals faced increased stressors while also experiencing limited opportunities for in-person social interaction and support. Specifically, during the COVID-19 pandemic, adolescents were stressed by not receiving the same face-to-face social support and connectedness that they may have received prior to physical distancing mandates. The pandemic changed the way most individuals go about their daily lives, due to quarantine mandates, restrictions on social connections, and reduced community support. This in turn may have compounded the psychological impact of the pandemic on adolescents, during an already difficult developmental period. Given all the stress and disrupted social connectedness during the beginning of the pandemic, it is unclear whether

adolescents received the needed social support to navigate this unprecedented event, and if this increased possible anxiety outcomes.

The pandemic had varying impacts on anxiety levels depending on prior social connectedness of students. Widnall and colleagues conducted a study on 600 students ages 13-14 with school and peer connectedness as predictor variables, to examine how students were adjusting to lockdown in southwest England. Their findings indicated that symptoms of anxiety decreased the most for students who reported feeling the least connected to their school peers pre-pandemic (Widnall et. al., 2022). This is significant because it shows an example of how anxiety symptoms may have decreased for students during the lockdown, despite theoretically having less in-person social support and interaction during physical distancing.

Perceived Social Support:

Social connectedness and support can be understood through many different perspectives and approaches. For example, social support can be understood as the various types of emotional, instrumental, and informational assistance that people receive from their social network. Diendorfer and colleagues define social connectedness as a sense of belonging and a psychological bond a person may feel toward other people or groups (Diendorfer et. al., 2021). These researchers further explain how this sense of belonging and social connectedness is critical for the proper emotional and physical development of adolescents specifically. Additionally, an important consideration is the source of support. This can include family members, friends, romantic partners, coworkers, and other aspects of the social network. The quality of support is also variable with certain sources of support providing more effective or different types of support depending on the circumstances.

Anxiety symptoms:

Anxiety can be understood as a complex and multifaceted construct that is very individualized and refers to a range of experiences including worry, fear, and apprehension. Anxiety can be a normal and adaptive response to stress or danger but when it becomes chronic or excessive it can significantly impact an individual's daily functioning and quality of life. Muris and colleagues define anxiety disorders as being characterized by excessive fear and anxiety that causes significant distress and functional impairment (Muris et. al., 2017). Additionally, anxiety can be classified into different types, such as generalized anxiety disorder, panic disorder, social anxiety disorder, and specific phobias (Muris et. al., 2017). It is important to differentiate between these subcategories because the manifestations of these anxiety disorders may display themselves very differently. For example, someone with generalized anxiety disorder may have experienced the pandemic very differently than someone with a fear of being alone.

Previous research has set the precedent for understanding the role that social support plays in future mental health outcomes. Researchers examined a population-based cohort study from the Quebec Longitudinal Study of Child Development. Scardera and colleagues (2020) collected yearly or biennial data on individuals starting from age 5 in March 1998, to age 20 in June 2018. Self-reported perceived social support was measured along with anxiety, depression, and suicidal ideation. Their findings indicated that individuals who received higher levels of perceived social support had better mental health outcomes as measured at age 19 (Scardera et. al., 2020). This is significant because it demonstrates how social support can impact an individual's mental health and well-being beyond just anxiety reduction.

Increased social support and connectedness have not only been correlated with a reduction in anxiety symptoms but also with a reduction of depressive symptoms as well. Van Harmelen and colleagues (2016) set out to study how friendships and/or family support may play a role in reducing depressive symptoms for adolescents who have experienced early life stress (ELS). Structural equation modeling was used to examine the impact of adolescent peer/family support at age 14 on later depressive symptoms at age 17. Results indicated that adolescent social support was negatively associated with later symptoms of depression (van Harmelen et al., 2016). While this study did not directly look at anxiety outcomes, the results can still be understood through a perspective of evaluating an individual's overall well-being and mental health. Additionally, anxiety and depressive symptoms are often comorbid (Brady & Kendall, 1992) which would allow researchers to form conjectures about how these results may differ if anxiety symptoms were measured as well.

Family and household member support are important to evaluate separately from peer support because there may be differing levels of support received from these two sources, and they may impact the individual in different ways (Gauze et al., 1996). Additionally, when examining social support from peers as opposed to household members, it is essential to examine the amount of support that participants feel they are receiving. Waldrip and colleagues set out to study this by providing assessments to youth participants to measure their friendships and peer relationships. Along with these assessments, teachers provided evaluations of each participant's overall adjustment. The findings of this study indicated that adolescents who had lower levels of peer acceptance, number of friends, and friendship quality had greater teacher-reported maladjustment (Waldrip et. al., 2008). This demonstrates how not only the presence of social support but also the quality of these friendships is crucial for positive adjustment during

adolescence. One element that the current study will examine in the context of the pandemic is how support from household members may differ from peer support when looking at well-being outcomes for adolescents.

Objective:

The present study examined how perceived social support relates to anxiety symptoms in a sample of adolescents during the beginning of the COVID-19 pandemic. While we know that social support is related to anxiety and adjustment outcomes, this study examined how different sources of social support impacted anxiety symptoms within and between individuals. Additionally, this study examined these relationships in the context of acute stress at the start of the COVID-19 pandemic. This offers a new perspective on how adolescents adjust to reduced social support and the anxiety-related outcomes that may result as a consequence of public health recommendations to socially isolate. We hypothesized social support would be negatively correlated with anxiety outcomes in adolescence. This is based on past research demonstrating the ways in which social support has reduced anxiety and/or depressive symptoms in alternative contexts (van Harmelen et. al., 2016; Scardera et. al., 2020). We explored how different sources of support, whether from family members or friends, are related to anxiety symptoms.

Methods:

Participants:

Participants were recruited from the community through the Team Duckling Developmental Database at the University of Oregon via email and over the phone. Phone screening occurred for participants interested in the study to determine eligibility. The sample included in this study was comprised of 48 participants between the ages of 10 and 18 years (mean= 13.0 years sd=2.31 years), with 29 participants identifying as female and 19 identifying as male. Consent was obtained from legal guardians for minors. The informed consent process explained the purpose of the study and all the procedures, risks, benefits, and expectations of participants. Additionally, the consent form reiterated the relatively low risk for information being collected in this study such as participants' social connections and self-reports of their own feelings. Informed consent also included acknowledgment of the voluntary nature of the study and reminded participants of their right to withdraw from the project at any time.

Inclusion and exclusion criteria indicated that participants must be between the ages of 10-18 years old at the time of enrollment, be fluent English speakers, and regularly use an IOS device that has the Screen Time app (e.g. iPhone or iPad). Compensation included $5 per assessment, paid to the legal guardian of the minor, or directly to the participant if 18 years of age. There were 10 assessments (“time points”) conducted over a 10-week period that participants could opt into or out of. Only participants with more than one time point of data were included in the within-person analyses, which reduced the overall sample from 48 to 36. For the between-person analyses, 15 participants completed all 10 time points of data collection and about 50% completed half of the time points.

Materials:

The present study measured individuals' self-reported anxiety symptoms in relation to their perceived social support. Anxiety levels were measured with the Youth Anxiety Measure for DSM-5 (YAM-5; Muris et al., 2017) which included a 24-item questionnaire to measure the major anxiety disorders such as generalized anxiety disorder, social anxiety, and separation anxiety. Each item on the YAM-5 allowed participants to answer with a 4-point Likert scale (0= 'never' to 3= 'always'). Scores for this measure could range from 0 to 72 with higher scores indicating greater levels of anxiety symptoms.

For measuring perceived social support, the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) was utilized along with the Social Network Survey. The MSPSS is a 12-item measure of perceived social support from three sources: family, friends, and significant others. Four items correspond to each subscale equaling up to the 12 total items. This measure uses a 7-point Likert scale (1 = very strongly disagree, 7 = very strongly agree) to assess an individual's self-reported perceived social support. Total social support scores from the MSPSS were averaged to create a singular composite value for each individual, making the possible range of scores from 1 to 7 with higher scores indicating higher levels of perceived social support.

Procedure:

Once eligibility was determined, selected participants were emailed the URL to a Qualtrics survey. Participants (or their guardians) were then instructed to consent electronically. Once consent was confirmed, participants were asked to fill out their demographic information, the YAM-5, and the MSPSS. These surveys in entirety took no more than 30 minutes and participants were given one full day to complete them. After data collection, participants

specified whether they would like to be contacted again in one week to continue participation in the study. This data collection process lasted 10 weeks for a total of 10 time points.

Analysis Plan:

Planned Analyses:

The analyses for this study utilized the programming software R (Rstudio Team, 2021) to run multilevel modeling with packages including lme4 (Bates et al., 2015), nlme (Pinheiro et al., 2021), and ggplot2 (Wickham, 2016). Initially, data cleanup and preparation occurred before analysis. This included formatting the data and checking for missing items. Following this, the data were filtered by what was specifically being analyzed such as the subcategory of friendship support, or the subcategory of social anxiety symptoms. Sums were taken for total values from the YAM-5 and averages were taken from the MSPSS to create a composite score. Additionally, data were filtered by finding averages in specific subcategories of these measures (ie. YAM-Social Anxiety Disorder, and MSPSS-friends). These composite scores were utilized for analyses.

Between-Person Analysis:

The between-person analyses examined changes in variables between different individuals who participated in the study using multilevel modeling and nesting within individuals to test the hypotheses. Additionally, a likelihood ratio test was performed to compare a model with the fixed effect of interest (anxiety symptoms) to an unconditional means model (adding the predictor variable of perceived social support). We report unstandardized coefficients for the main effect, standard errors, likelihood ratios, and the p-value associated with that main effect, in the results section.

Within-Person Analysis:

The within-person analysis examined changes in variables within single participants over the course of the 10 weeks of data collection. To account for within-individual variability, we took an average for each participant across all waves and subtracted this from their weekly score. Additionally, for the within-person analysis, participants needed at least two or more time points of data, so only 36 individuals were included in this section of the analysis. Multilevel modeling tests were run to test our hypothesis, along with likelihood ratio tests. We report unstandardized coefficients for the main effect, standard errors, likelihood ratio tests, and the p-value associated with that main effect, in the results section to follow.

Exploratory Analyses:

In addition to testing our *a priori* hypothesis that overall social support would relate to overall anxiety levels, we conducted two post-hoc exploratory analyses. Although the null hypothesis statistical testing approach is typically not valid for exploratory analyses, we constrained our testing space to the 4 and 3 subscales available for the YAM and MSPSS, respectively. This means we could have possibly tested 12 associations, and therefore we interpret the significance of these unplanned analyses correcting for multiple comparisons, with an alpha of $0.05/12 = 0.004$.

Results:

The primary goals of the analyses were to understand if there was a significant effect of perceived social support on anxiety symptoms in the context of the COVID-19 pandemic. The findings for the between-persons analysis indicated that there was not a significant relationship between total perceived social support and total anxiety symptoms ($\chi 2$ (1)=1.26, p-value= 0.261; B= -0.5, st dev =0.44, p-value= 0.256). These findings suggest that the null hypothesis cannot be rejected, and there was no evidence to support the hypothesized relationship between the total composite score for MSPSS and the total composite score for YAM. The within-person analysis for the total composite scores for YAM and MSPSS yielded similarly insignificant results (B= -0.07 sd=0.445, p=0.87, $\chi 2$ (1)= 0.0267).

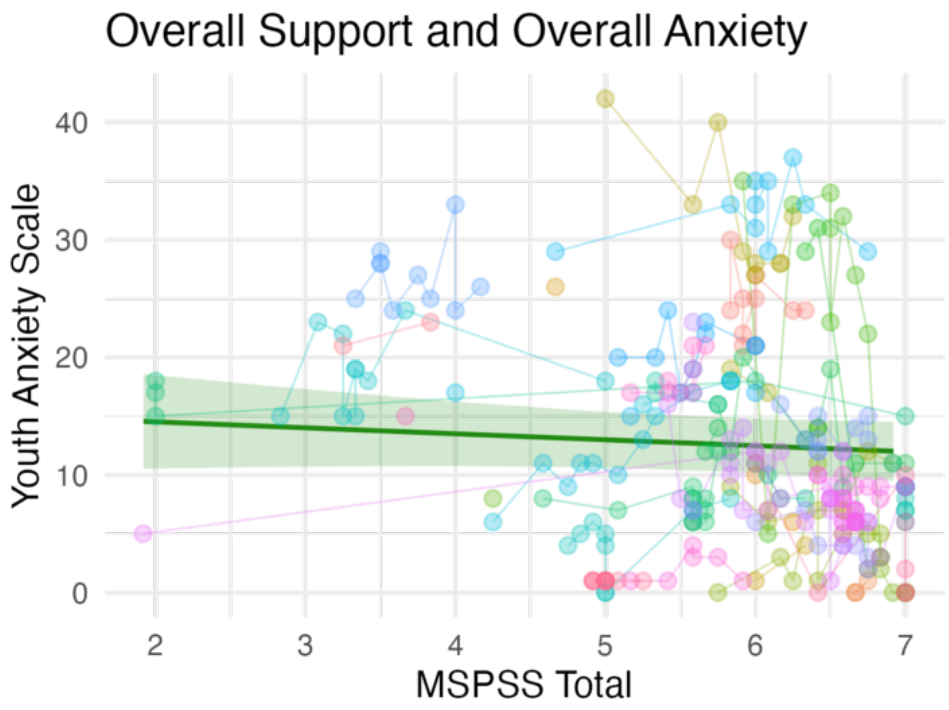

Figure 1: Graph comparing composite Youth Anxiety Measure score and composite Multidimensional Scale of Perceived Social Support scores for between-person analysis. The bold green line represents the average, and the shaded region represents the confidence intervals. Each dot represents one participant's data point per week, color coordinated and connected by the smaller lines.

Exploratory Analyses:

Friendship Support and Social Anxiety:

Analyses for the between person's analysis regarding the MSPSS-friendship support and the YAM-social anxiety subcategory were compared. The possible range of scores for the MSPSS subcategory of friendship support is from 1 to 7 with higher scores indicating higher levels of perceived social support. The possible range of scores for the subcategory of the YAM-5 titled 'social anxiety' is from 0 to 18 with higher scores indicating higher levels of social anxiety. Likelihood ratio tests comparing an unconditional means model to one with MSPSS-social support as a fixed-effect predictor for YAM-social anxiety outcomes yielded non-significant results ($\chi 2$ (1) = 0.047, p = 0.828), with the unstandardized coefficient as B= 0.04, sd=0.17.

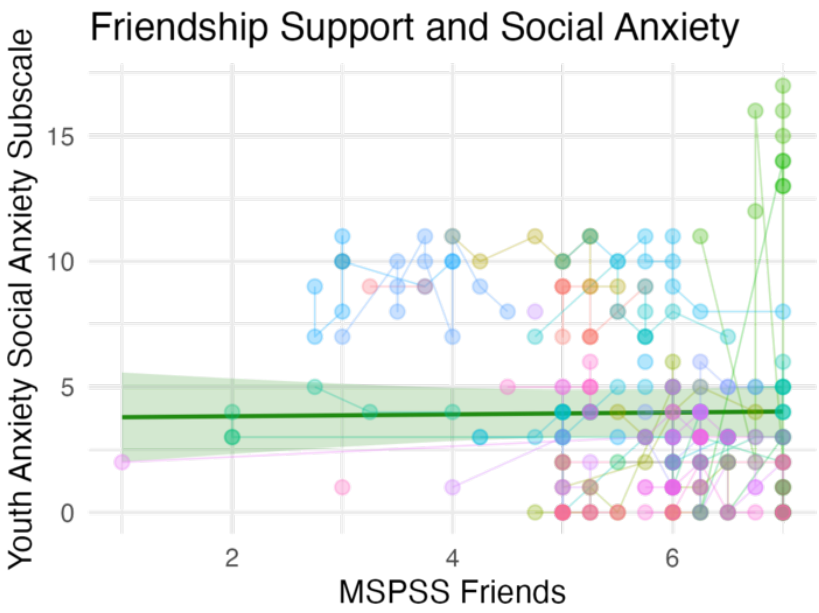

Figure 2: Graph comparing friendship support from the Multidimensional Scale of Perceived Social Support and social anxiety scores from the Youth Anxiety Measure. The bold green line represents the average, and the shaded region represents the confidence intervals. Each dot represents one participant's data point per week, color coordinated and connected by the smaller lines.

Family Support and Total Anxiety:

Additional exploratory analyses utilized the MSPSS-family support subcategory with scores ranging from 1 to 7 where higher scores indicated higher levels of familial support. The YAM total composite score was utilized with scores ranging from 0 to 72 where higher scores indicated higher levels of overall anxiety. A likelihood ratio test demonstrated that our predictor variable of family support was able to explain the variance in the outcome of anxiety symptoms across participants ((χ2 (1) = 15.76, p = 0.0001), with the unstandardized coefficient B= -1.59, sd=0.395.

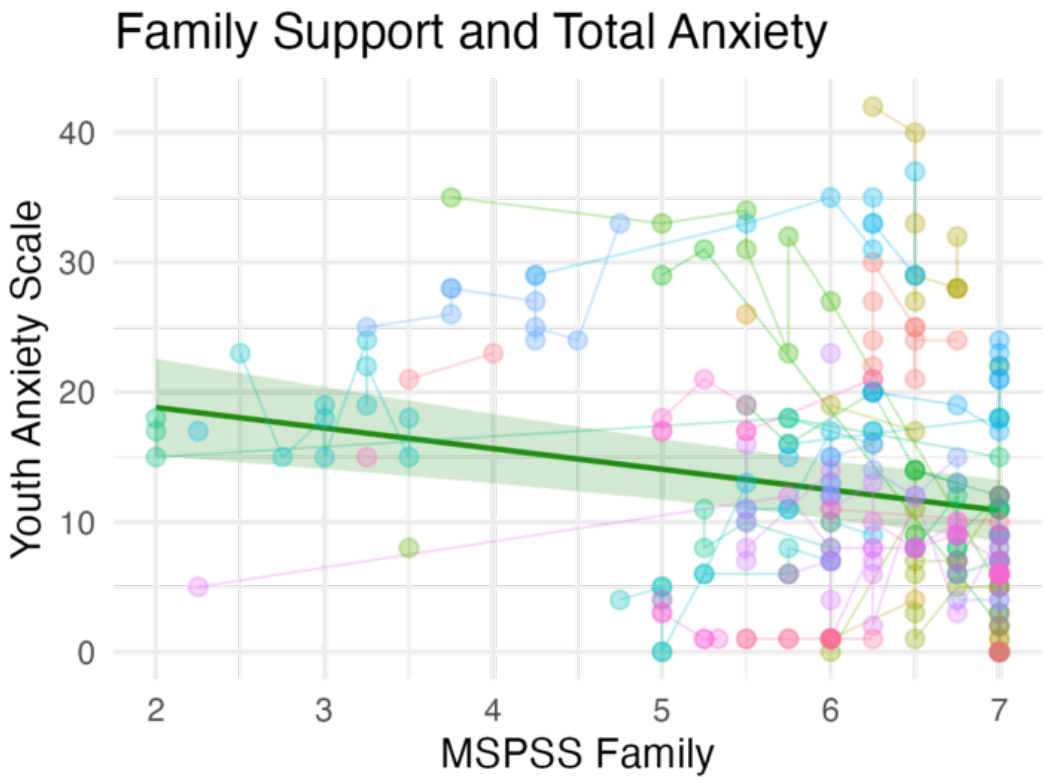

Figure 3: Graph of perceived family support from the Multidimensional Scale of Perceived Social Support and total composite anxiety scores from the Youth Anxiety Measure. The bold green line represents the average, and the shaded region represents the confidence intervals. Each dot represents one participant's data point per week, color coordinated and connected by the smaller lines.

Discussion:

The COVID-19 pandemic has presented a unique challenge for individuals worldwide, especially adolescents, with heightened levels of uncertainty, social isolation, and mental health challenges. Specifically studying how social support impacted this societal transition allowed us to gain a deeper understanding of the ways in which adolescents were impacted during this unprecedented time. In our study, we did not find a significant relationship between total levels of perceived social support and overall anxiety symptoms in adolescents. Even though the results were insignificant, it is still important to look at this beta value of -0.5 in the context of the range of possible scores. This standardized regression coefficient beta of -0.5 suggests that for every increase of social support measured by the MSPSS of one unit, the YAM score reduces by 0.5 units, and this is displayed in the graph (Figure 1). In the context of the range of scores from 0 to 72 for the Youth Anxiety Measure and 12 to 60 for the Multidimensional Scale of Perceived Social Support, it is clear that this beta is not displaying large changes in anxiety symptoms based on perceived social support.

While these results do align with the previously stated hypothesis, the p-value indicates that these results are not statistically significant because it is larger than the significance level alpha of .05. This indicates that there was a high possibility of these results occurring solely by chance. However, it should be noted that the lack of statistically significant evidence does not necessarily indicate the absence of an effect, as there are many limitations to this study which will be discussed later on.

Further exploratory analyses displayed different results, utilizing subcategories of the indicated measures. One category that I was specifically interested in was the relationship between social support from peers and social anxiety outcomes because these two categories

seemingly have the most interconnected relationship. Theoretically, if an individual has strong support from peers in their life, it could be expected that they would have reduced anxiety symptoms, specifically about social situations. This exploratory hypothesis was analyzed by comparing the 'social anxiety' subcategory of the YAM (YAM-social), and the 'friends' subcategory of the MSPSS. While no significant relationship was found (p=0.825, B= .04), when looking at the actual data spread, we could see that most individuals demonstrated lower levels of anxiety and higher levels of social support (Figure 2). The data spread also displays a very interesting individual outlier, a person with the highest levels of anxiety, who also happened to have the highest levels of social support. This is interesting because it shows to a very small degree the opposite of the exploratory hypothesis theorizing lower levels of anxiety for individuals who received more social support. Additionally, the very small beta of .04, and the p-value larger than .05 demonstrate statistically insignificant findings, meaning no conclusions can be drawn about the relationship between these two variables.

Another exploratory analysis was run between the subcategory of the MSPSS-family support and the total composite YAM score. The impulse behind this exploratory analysis was the consideration that adolescents were isolated at home during the pandemic and thus may have been receiving more direct support and interaction specifically from family/household members. This analysis did yield statistically significant results (p-value = 0.0001, B= -1.59) and demonstrates how social support, specifically from family members can act as a protective factor against anxiety symptoms. The reported unstandardized coefficient of beta signifies that for every increase in familial support of one unit, overall anxiety symptoms decrease by 1.59 units. Additionally, we can see in the data spread that individuals with higher levels of perceived family support reported lower levels of anxiety and the line of best fit demonstrates this negative

relationship (Figure 3). It is important to consider that this was a post-hoc analysis, however, even after controlling for all possible comparisons, the results would still have been significant. These findings speak to the importance of context in the consideration of perceived social support and reduced anxiety outcomes. It seems that the individuals with whom participants were in closest physical proximity were able to provide the type of support that accounted for reduced anxiety symptoms during this time.

Implications:

The results of this study have several implications for the assessment, prevention, and treatment of anxiety symptoms in adolescents. As these results suggest, social support, specifically from family and household members, may play a crucial role in the reduction of anxiety symptoms. This has important implications for mental health professionals to consider in the context of their field. The significant negative correlation between family support and anxiety symptoms found in our study suggests that interventions to increase the quantity and quality of familial support are crucial for supporting adolescent mental health. Clinicians and other mental health professionals may consider incorporating social support interventions into their treatment plans for individuals experiencing anxiety symptoms. Policymakers may consider developing programs that promote social connectedness, particularly among vulnerable populations. Parent-focused treatments could be especially effective for improving the support that adolescents receive from their families, considering our exploratory finding that the family support subcategory had the most significant effect on reducing overall anxiety symptoms.

Limitations:

Several limitations should be noted when interpreting the findings of this study. First, the sample size was relatively small, leading to limited statistical power in the analyses. This could

have led to certain significant associations being missed due to the small sample size, and the significant associations that were detected should be interpreted with caution. Additionally, due to the underpowered sample and small geographical area from which the sample was drawn (Eugene/Springfield), these results cannot be generalized to larger populations which gives the study low external validity.

This study relied on the self-report measures of the MSPSS and the YAM-5 which are subject to response biases and may not capture the full range of experiences related to perceived social support and anxiety symptoms. As anxiety is an internalizing disorder, these measures may be insufficient in understanding the full range of experiences of individuals with anxiety symptoms, and perceived social support is a subjective measure that faces the same limitations.

Because this study was conducted during the specific period of the early months of the COVID-19 pandemic, these findings may not be applicable to other time periods. The rapidly evolving nature of the pandemic and associated public health measures may certainly have influenced these results and thus limit their generalizability to other contexts. Additionally, some of the data for this study were slightly inconsistent which is why we had to drop participants with less than two time points of data, and for this reason, attrition could be considered a limitation to consider. In general, due to the increased stress of the first few weeks of the pandemic, it is very understandable that people may have been unable to put their full time and energy into a study, which yielded the smaller sample size. Moreover, initial recruitment was fast-tracked to a shorter time period due to the increasing rate of the pandemic and under ideal conditions, we would have had more time to recruit participants.

Future Directions:

The present study contributes to the understanding of the role of perceived social support in mitigating anxiety symptoms for adolescents. During the unprecedented time of the COVID-19 pandemic, this research brought new avenues for understanding how acutely important family support was for coping during this turbulent period. Additionally, it is important to note the possibilities for future research that these findings may contribute to. While this study focused on the effects of perceived social support on anxiety symptoms for adolescents, future research could also examine the role of other factors such as coping strategies, resilience, and individual differences. This could support a comprehensive understanding of the factors contributing to positive mental health during a global pandemic. Additionally, while this was a longitudinal study, it only lasted for 10 weeks. Future research could design a longitudinal study that is much longer and would thus capture an even more extensive understanding of the ways adolescents operate in the face of adversity.

Personal statement:

Some aspects of this project that I feel are important to mention center around the fact that this was a study I jumped into after the data collection process had already been completed. While preregistration did take place for this study, it concerned other variables that I chose not to focus on for the purpose of my thesis. When deciding what analyses to run, some very important discussions around preregistration came up because as we found insignificant results and then later found significant results, it brought up the question of when we should stop running analyses and what analyses should be written up in this paper. The importance of preregistration addresses these issues before they take place and makes sure that the researchers are held accountable for reporting exactly what they set out to study at the start of the project. And that is exactly what I learned as I struggled with finding insignificant results and became worried about reporting significant results that were found in later analyses. There are still many ways that I am interested in continuing comparisons and analyses in this study, however, due to the nature of this project I had to limit myself due to time constraints. I feel it is worth mentioning that this was an important learning moment for me about the necessity of preregistration for scientific studies and as part of the thesis process, I am continually learning and growing through my research.

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