Coping and Mental Health in Early Adolescence during COVID-19

Andrea M. Hussong (hussong@unc.edu)
University of North Carolina at Chapel Hill https://orcid.org/0000-0001-8683-9832
Allegra J. Midgette
University of North Carolina at Chapel Hill https://orcid.org/0000-0002-7316-8133
Taylor E. Thomas
University of North Carolina at Chapel Hill https://orcid.org/0000-0001-5527-9406
Jennifer L. Coffman
University of North Carolina at Greensboro https://orcid.org/0000-0001-6768-8573
Su Cho
University of North Carolina at Chapel Hill

Research Article

Keywords: COVID-19, coronavirus, adolescents, mental health, pandemic

Posted Date: October 6th, 2020

DOI: https://doi.org/10.21203/rs.3.rs-87135/v1

Version of Record: A version of this preprint was published on April 15th, 2021. See the published version at https://doi.org/10.1007/s10802-021-00821-0.

Abstract

The current longitudinal study examines changes in overall mental health symptomatology from before to after the COVID-19 outbreak in youth from the southeastern United States as well as the potential mitigating effects of self-efficacy, optimism, and coping. A sample of 105 parent-child dyads participated in the study (49% boys; 81% European American, 1% Alaska Native/American Indian, 9% Asian/Asian American; 4% Black/African American; 4% Latinx; and 4% other; 87% mothers; 25% high school graduate without college education; 30% degree from 4-year college; 45% graduate or professional school). Parents completed surveys when children were aged 6-9, 8-12, 9-13, and 12-16, with the last assessments occurring between May 13, 2020 and July 1, 2020 during the COVID-19 outbreak. Children also completed online surveys at ages 11-16 assessing self-efficacy, optimism, and coping. Multi-level modeling analyses showed a within-person increase in mental health symptoms from before to after the outbreak after controlling for changes associated with maturation. Symptom increases were mitigated in youth with greater self-efficacy and (to some extent) problem-focused engaged coping, and exacerbated in youth with greater emotion-focused engaged and disengaged coping. Implications of this work include the importance of reinforcing self-efficacy in youth during times of crisis, such as the pandemic, and the potential downsides of emotion-focused coping as an early response to the crisis for youth.

Main Text

Coping and Mental Health in Early Adolescence during COVID-19

Although many investigators are currently collecting data regarding the impact of the COVID-19 pandemic on a wide array of developmental, health and well-being outcomes, results pertaining to adolescents and children are just emerging. Studies from around the world suggest that some youth, although not all, may be experiencing elevated mental health symptoms associated with the pandemic (Saurabh & Ranjan, 2020; Xie, Xue, Zhou, Zhu, Liu, Zhang et al., 2020; Zhou, Zhang, Wang, Guo, Wang, Chen et al., 2020). However, very few such studies of youth in the United States have been published (see Oosterhoff, Palmer, Wilson, & Shook, 2020 as an exception). Moreover, our current understanding of what types of coping strategies mitigate the impact of pandemic-related stressors on youth relies primarily on studies of previous illness-related and other forms of trauma (Chew, Wei, Vasoo, Chua, & Sim, 2020). In the current study, we follow a longitudinal sample from childhood into adolescence assessed most recently in the months after the start of the COVID-19 outbreak in the United States. Through the use of an accelerated longitudinal cohort design, we evaluated the change in trajectories of mental health symptoms that coincided with the outbreak. We also tested whether four theoretically-grounded and well-validated forms of coping either mitigated or exacerbated increased risk for mental health symptoms, in addition to factors that may reduce a sense of helplessness (i.e., self-efficacy) and negativity (i.e., optimism) sometimes associated with uncontrollable life stressors.

Mental Health and the COVID-19 Pandemic

As many providers and scholars have noted, stressors associated with the COVID-19 outbreak are multi-faceted, unevenly distributed in society, and impact those across the age spectrum (Mukherjee, 2020; Prime, Wade, & Browne, 2020; Fortuna, Tolou-Shames, Robles-Ramamurthy, & Porche, 2020). For youth, noted stressors in emerging studies have mostly focused on ramifications of quarantine in the early weeks of the outbreak, including social isolation, changes to routine, and lack of activity. As predicted, cross-sectional studies (Wang, Zhang, Zhao, Zhang, & Jiang, 2020; Liu, Bao, Huang, Shi, & Lu, 2020; Power, Hughes, Cotter, & Cannon, 2020)

suggest increases in mental health symptoms among youth following confinement or quarantine (see Sajid et al, Preprint, June 29 2020). Parents report noticing more distress, worry, fear and helplessness in youth in India (Saurabh & Ranjan, 2020), China (Xie et al., 2020; Zhou et al., 2020) and Italy (see Pisano, Galimi, & Carniglia, Preprint, April 13 2020), as well as in Spain and Portugal (see Orgilés et al, Preprint, June 26 2020). Although prior data suggest that social isolation, one of the posited core stressors of the outbreak for youth, shows longitudinal associations with greater mental health problems (Loades, Chatburn, Higson-Sweeney, Reynolds, Shafran, Bridgen et al., 2020), longitudinal data are sorely needed to identify developmental processes linking experiences of the outbreak with youth mental health during COVID-19 (Wade, Prime, & Browne, 2020).

Mitigating Factors

Although many commentaries suggest a myriad of strategies for reducing risk for mental health symptoms among youth during the pandemic, we could locate only two cross-sectional studies that examined potential mitigating factors. In an online survey of parents in Wuhan from the early days of the outbreak (February, 2020), Xie et al. (2020) found parents who saw their youth as more optimistic about the pandemic also reported fewer depressive symptoms in their youth. In addition, Orgilés et al (Preprint, June 26 2020) found that Italian, Spanish, and Portuguese parents of 3-18-year-olds who reported that their children used more task-oriented or avoidant coping strategies had fewer mood, sleep, behavioral and cognitive/attentional symptoms, whereas those who used more emotion-oriented coping had more symptoms. Notably, although findings varied somewhat across countries, many parents retrospectively reported no change in symptoms for their children with the pandemic, and many saw their children use task-oriented and avoidant coping.

These results align with prior studies showing that emotion-focused coping, as opposed to problem-focused coping, is often associated with more distress and behavioral disturbances (Carlo, Mestre, McGinley, Samper, Tur, & Sandman, 2012). However, these effects may vary depending on whether stressors are viewed as controllable (and thus addressable via problem-focused coping) or uncontrollable (Compas, 1987). In addition, these forms of coping may be further distinguished as either engaged coping (in which the goal is to change the situation, one's view of the situation, or how one manages emotion around the stressor) or disengaged coping (involving denial and avoidance of the situation or one's feelings about the stressor).

In addition to optimism and coping styles, we examined whether changes in mental health symptom trajectories coinciding with the pandemic were mitigated by greater self-efficacy. Self-efficacy has been associated with lower rates of depression (Ehrenberg, Cox, & Koopman, 1991; Muris, 2002; Tahmassian & Moghadam, 2011), more positive affect (Caprara, Steca, Pacielloi, & Vecchio, 2006), and a greater sense of agency (Bandura, 2006), which may promote more active problem solving or coping (Cicognani, 2011).

The Current Study

In the current study, we analyzed data from a longitudinal study originally designed to study the development of gratitude and other-oriented behavior among relatively well-resourced families, with the goal of learning how to encourage other-oriented, equity, and justice perspectives and behaviors in youth with social privilege. For this study, the sample provides an examination of how the pandemic impacts youth who are perhaps better resourced (both within the family and within the larger societal structures affected by the pandemic) as one of many groups of interest. Specifically, we tested two primary hypotheses.

H1. We hypothesized that mental health symptoms would increase as a result of the pandemic effect.

H2. We hypothesized that optimism, self-efficacy, and coping styles would each mitigate the risk for greater within-person symptomatology coinciding with the pandemic.

Method

Participants and Procedures.

We follow STROBE guidelines for reporting. Participants from the BLINDED study (BLINDED) comprised the sample for this longitudinal analysis. We originally recruited participating parents and children from North Carolina, USA in 2013-2014 through mass emails to faculty, staff, and students at an affiliated university, flyers distributed through public and independent schools in first- to third-grade classrooms, and community postings. Inclusion criteria were English proficiency and having a child aged 6-9 years. The analysis sample included parent-child dyads who participated in at least two waves of data collection before and during the pandemic (all but one family), resulting in 105 families (self-reported: 49% boys; 81% European American, 1% Alaska Native/American Indian, 9% Asian/Asian American, 4% Black/African American, 4% Latinx, and 4% other; 87% mothers; 25% high school graduate without college education; 30% degree from 4-year college; 45% graduate or professional school graduate). Families entered the study primarily in wave 1 but four families were added through pilot protocols at waves 2 and 3. At wave 1, children (aged 6-9; mean age 7.4) and a parent completed a lab visit and surveys (n = 100). Parents only completed a 2 year follow-up online survey (wave 2; children aged 8-12; mean age 9.51; n = 102). Parents and children then completed a lab visit and survey at a 3 year follow-up (wave 3; children aged 9-13; M=10.6; n=94). And, 90 parents and 88 children (aged 12-16 at wave 4; mean age 13.6) completed a six-year follow-up online survey between May 13, 2020 and July 1, 2020. Data collection for all waves received institutional review board approval prior to data collection. Participants were compensated for their time.

After wave 3, families were randomly assigned to receive a brief online family communications program to foster gratitude in children either immediately (n = 53) or after a one-month delay (n=52) with all but eight participants completing the program at some point. Due to this embedded intervention, we control for treatment exposure in subsequent analyses although no effects on children's mental health were found to distinguish the eight non-completers from their peers.

Measures.

Child age was derived from parent-reports of children's date of birth. Parents also reported on child gender, race, and ethnicity at wave 1.

Parent-reported Pediatric Symptom Checklist. The Pediatric Symptom Checklist was used to assess parent report of child symptomatology (Jellinek, Murphy, Robinson, Feins, Lamb, & Fenton, 1988). Parents indicated how often in the past month their child had exhibited thirty-five behaviors and emotions on a scale ranging from 0 (never) to 2 (often). Items included emotions such as irritability, hopelessness, sadness, and behaviors such as loss of interest in friends, fighting with other children, having trouble sleeping. Items were averaged at each wave to characterize children's overall symptomatology, with higher scores indicating greater child impairment as reported by parents. (See Table 1 for descriptive statistics for all measures).

Child-reported General Self-Efficacy. An adaptation of the General Self-Efficacy Scale was used to assess children's perceived self-efficacy (Schwarzer & Jerusalem, 1995). Children rated the extent to which eight statements related to self-efficacy (e.g., "I can always solve problems if I try hard enough", "I am sure that I can deal with unexpected events") were true for themselves on a scale ranging from 1 (not at all true for you) to 4 (exactly true for you). Items were averaged and used as an indicator of children's perceived self-efficacy.

Child-reported Optimism We adapted six items from the Life Orientation Test-Revised scale for child self-report (Scheier, Carver, & Bridges, 1994). Children indicated the extent to which statements related to dispositional optimism (e.g., "In uncertain times, I usually expect the best", "I'm always optimistic about the future") described themselves on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). Three items were reverse scored and all items were averaged to create a score that characterized children's optimism, with higher scores indicating greater levels of optimism.

Child-reported Coping. An adaption of the Coping Strategies Inventory was used to assess children's thoughts and behaviors in response to COVID-19 (Tobin, Holroyd, & Reynolds, 1984; Tobin, Holroyd, Reynolds, & Wigal, 1989). Children reflected on the past month of their experiences during COVID-19 and rated the extent to which they used twenty-nine different coping strategies on a scale ranging from 1 (not at all) to 5 (very much). Subscales were created by averaging respective items to characterize children's Problem-Focused Engagement (e.g., "I tackled the problem head-on"), Emotion-Focused Engagement (e.g., "I talked to someone about how I was feeling"), Problem-Focused Disengagement (e.g., "I hoped the problem would take care of itself"), and Emotion-Focused Engagement (e.g., "I blamed myself").

Analytical Strategy

We conducted multi-level modeling analyses to test each of our hypotheses (Curran & Bauer, 2011; Bauer & Curran, 2005). This included examining descriptive analyses to establish the functional form of trajectories, estimating unconditional models, and adding time (as age) and a pandemic indicator as time-varying indicators (to test hypothesis one). We then conducted separate analyses to test the mitigating effects of self-efficacy, optimism, and four forms of coping by adding main effects of these variables and their interactions with pandemic to the pandemic model (to test hypothesis two).

Results

Mental Health Trajectories.

We analyzed patterns of growth in parent-reports of child symptomatology using multi-level modeling. Treating the data like an accelerated longitudinal cohort design, we analyzed developmental trajectories of symptomatology both before (in waves 1-3) and during (in wave 4) the pandemic outbreak, using age as the metric of time and wave (1-3 versus 4) as an indicator of pandemic exposure. Figure 1 depicts mean-levels of symptomatology over age – separated by wave – and shows the two ages of overlap for pre- versus post-pandemic outbreak reporting and the associated jump in symptomatology.

We used multiple imputation (PROC MI in SAS/STAT® 14.1 software) to address missing data with 100 imputations that were combined across subsequent analyses using PROC MIANALYZE (with efficiency rates over 99% across models; n = 18 participants had any missing data). Using multi-level analysis (in PROC MIXED in

SAS) we first estimated an unconditional model (with a random intercept only; estimated on the first imputed dataset to obtain random effects) and found that 51% of the variance in symptomatology occurred across individuals and 49% occurred within person over time. To this model, we added the linear effect of age (both fixed and random), with the intercept centered at age 12 and a dummy variable to control for prior program exposure. This model showed that average levels of symptomatology at age 12 were modest, or 0.57 on a 0-2 scale (b = .57; t_{262}=6.82, P < .001) and the within-person average rate of change in symptoms over time is .02 per year (b = .02, t_{256} = 4.16, P <.001) such that symptoms, on average, range from 0.45 at age 6 to 0.65 at age 16 across the linear trajectory.

To test hypothesis one, we then added a fixed-effect pandemic indicator (0 for waves 1-3; 1 for wave 4) to this model. With the inclusion of the significant pandemic indicator (b = .18; t_{223} = 5.49, P <.001), the age trend became non-significant (b = -.01; t_{290} = -1.13, P = .26), suggesting that the age trend in the previous model was due to elevations in symptomatology during the pandemic. Unfortunately, we cannot fully differentiate non-linearity in the age trend from a pandemic effect, but the difference in symptoms at the same ages assessed before and during the pandemic supports the hypothesis that the pandemic and not simply maturation accounts for at least part of this increase in symptomatology.

Finally, we tested whether increases in symptomatology differed in this sample by child gender and race/ethnicity (coded as white versus other races). In these models, we added main effects of gender and race (in separate analyses) to the pandemic model, as well as the interaction between gender or race and the pandemic indicator. Interactions with gender and race were non-significant.

Buffers of Elevated Symptomatology.

In line with our hypotheses, we then tested three potential moderators of the pandemic effect on symptomatology; these included - child general self-efficacy, child optimism, and four forms of coping. To test these effects, we added the main effects of each moderator to the pandemic model, as well as the interaction between the moderator and pandemic indicator. We ignored less informative main effects of moderators and focused on interaction effects, which tested the buffering hypothesis. In the first model, children with greater self-efficacy indeed showed a smaller pandemic effect or jump in symptomatology from before to during the post COVID-19-outbreak (see Table 2 for multilevel moderating results). No buffering effect of child optimism was found in the second model. In the third model, we included four indicators of coping (problem-focused engagement, problem-focused disengagement, emotion-focused engagement, and emotion-focused disengagement) and interactions with the pandemic indicator in the same model. Results showed that two of the four interactions with coping were significant. Both greater emotion-focused disengaged and engaged coping exacerbated risk for heightened symptomatology during the COVID-19 outbreak. Moreover, a marginally significant interaction effect suggested that pandemic effects may have been buffered with greater problem-focused engaged coping.

Discussion

In the face of the COVID-19 pandemic, many scholars have turned to considering the impact that the pandemic has on children's and adolescents' mental health. Particularly, prior research has shown that social isolation is associated with increased rates of depression in children and adolescents (Loades et al., 2020). To date, however, most of the recent scholarship has been either commentary aimed at policy or practice or research (Wang et al.,

2020; Liu et al., 2020; Power et al., 2020; Ghosh, Dubey, Chatterjee, & Dubey, 2020; Golberstein, Wen, & Miller, 2020; Mahajan, Kapoor, & Prabhakar, 2020), or cross-sectional empirical studies (see Pisano, Galimi, & Carniglia, Preprint, April 13 2020) (Xie et al., 2020). Importantly, though, there has been rising awareness of the need for a longitudinal and developmental approach to investigating the mental health effects of COVID-19 (Wade et al., 2020).

Results of the current study confirm widely-anticipated increases in overall mental health symptoms among young adolescents who were followed from about six years prior to the COVID-19 outbreak to within three to five months after the outbreak in North Carolina. Importantly, these effects track within-person change in symptomatology using an accelerated longitudinal cohort design that permits some parsing of maturation (or age) effects from historical (year of assessment) effects. Thus, the increases in mental health symptoms reported here are not fully attributable to developmental processes.

These findings are consistent with most cross-sectional studies showing evidence of increased mental health symptoms in the earliest months following the COVID-19 outbreak in countries around the world (see Sajid et al, Preprint, June 29 2020). As in prior studies (see Orgilés et al, Pisano et al, Romero et al, Preprint, June 23 2020), we assessed symptomatology by parent report. (Note that we also have youth-reports but only at waves 3 and 4 so that even though we see increased symptoms in these data, we cannot differentiate maturational and historical/COVID-19 effects as we could in our four-wave longitudinal parent-report data). We anticipate that several factors may account for differences in the impact of COVID-19 on adolescent mental health across these studies, including the country of origin (that differ in responses to both COVID-19 and adolescent mental health, among other things) as well as in time since the outbreak and related sequelae took place. Ongoing studies will further illuminate the significance of these factors.

In addition to these systemic factors, individual differences appear to impact risk for increased mental health symptoms in youth after the pandemic onset. Like others (Xie et al., 2020), we anticipated that youth with a more optimistic perspective would have reduced risk for pandemic-linked increases in symptomatology via lower rates of negative cognitions about the future and the world (which have been linked to depression) (Weeks, Coplan, & Ooi, 2017). However, overall optimism did not mitigate risk, though perhaps if we had assessed optimism regarding the impact of the pandemic specifically, our effects may have mirrored those of Xie et al. (2020).

We did find that higher self-efficacy reduced risk for post-pandemic onset increases in symptomatology. Although only a marginally significant effect, problem-focused engaged coping (involving the use of problem solving skills and cognitive restructuring) also might have a mitigating effect (Tobin et al., 1984; Tobin et al., 1989). We posit that these protective factors share a focus on addressing controllable factors associated with pandemic stress and having the confidence that youth are capable of enacting such control. In the current study, the nature of stressors experiencing by youth related to the pandemic were not analyzed. However, we may find that the extent to which these factors are protective differ from groups of youth who experience different types of stressors (e.g., controllable vs. uncontrollable) related to the pandemic (Bhanji, Kim, & Delgado, 2016; Forsythe & Compas, 1987).

Finally, we also found that emotion-focused coping increased risk for elevated symptomatology that coincided with the pandemic onset. This was true for both disengaged emotion-focused coping (involving social withdrawal and self-criticism) and emotion-focused engaged coping (involving seeking social support and

emotional expression) (Tobin et al., 1984; Tobin et al., 1989). It will be informative to study whether these same effects of coping strategies persist among youth as they deal with the cumulative stress associated with the pandemic. The pandemic is lasting longer than some youth and parents may have anticipated (Prime et al., 2020). Given the cumulative nature of stress in impacting functioning (Prime et al., 2020), the early months of the pandemic for youth in early adolescence may have been marked by events at first welcome (e.g., an easing of school work expectations) that over time become more challenging (e.g., a lack of structure, reduced social interaction). These changing perceptions and experiences of pandemic-related stress may call over time for more engaged emotion-focused coping, as what were once viewed as time-limited controllable stressors become more prolonged and less controllable events. Regardless, our data suggest that a heavy emphasis on emotion coping can exacerbate mental health symptoms coinciding with the early months of the pandemic.

In sum, the current study found increases in mental health symptoms associated with the onset of the COVID-19 pandemic that were mitigated in youth with greater self-efficacy and (to some extent) problem-focused engaged coping and exacerbated in youth with greater emotion-focused engaged and disengaged coping. Strengths of the study include the accelerated cohort longitudinal design, the use of multiple reporter data, and the focus on mental health trajectories. Limitations include sample homogeneity, which did not permit adequately powered tests of racial/ethnic differences, and modest sample size. Implications of this work include the importance of reinforcing self-efficacy in youth during times of crisis, such as the pandemic, and the potential downsides of youths' use of emotion-focused coping as an early response to the crisis.

References

Bandura, A. (2006). Adolescent development from an agentic perspective. In F. Pajares & T. Urdan (Eds.) *Self-efficacy beliefs of adolescents* (pp. 1-43). Greenwich, CT: Information Age Publishing.

Bauer, D.J., & Curran, P.J. (2005). Probing interactions in fixed and multilevel regression: Inferential and graphical techniques. *Multivariate Behavioral Research*, *40*(3), 373-400. https://doi.org/10.1207/s15327906mbr4003_5

Bhanji, J.P., Kim, E.S., Delgado, M.R. (2016). Perceived control alters the effect of acute stress on persistence. *Journal of Experimental Psychology: General*, *145*(3), 356-365. https://doi.org/10.1037/xge0000137

BLINDED

Caprara, G.V., Steca, P., Gerbino, M., Pacielloi, M., & Vecchio, G.M. (2006). Looking for adolescents' well-being: Self-efficacy beliefs as determinants of positive thinking and happiness. *Epidemiology & Psychiatric Sciences*, *15*(1), 30-43. https://doi.org/10.1017/s1121189x00002013

Carlo, G., Mestre, M.V., McGinley, M.M., Samper, P., Tur, A., & Sandman, D. (2012). The interplay of emotional instability, empathy, and coping on prosocial and aggressive behaviors. *Personality and Individual Differences, 53*(5), 675-680. https://doi.org/10.1016/j.paid.2012.05.022

Chew, Q.H., Wei, K.C., Vasoo, S., Chua, H.C., & Sim, K. (2020). Narrative synthesis of psychological and coping responses towards emerging infectious disease outbreaks in the general population: Practical considerations for the COVID-19 pandemic. *Singapore Medical Journal, 61*(7), 350-356. https://doi.org/10.11622/smedj.2020046

Cicognani, E. (2011). Coping strategies with minor stressors in adolescence: Relationships with social support, self-efficacy, and psychological well-being. *Journal of Applied Social Psychology, 41*(3): 559–578. https://doi.org/10.1111/j.1559-1816.2011.00726.x

Compas, B.E. (1987). Coping with stress during childhood and adolescence. *Psychological Bulletin, 101*(3), 393-403. https://doi.org/10.1037/0033-2909.101.3.393

Curran, P.J., & Bauer, D.J. (2011). The disaggregation of within-person and between-person effects in longitudinal models of change. *Annual Review of Psychology*, *62*, 583-619. https://doi.org/10.1146/annurev.psych.093008.100356

Ehrenberg, M.F., Cox, D.N., & Koopman, R.F. (1991). The relationship between self-efficacy and depression in adolescents. *Adolescence*, *26*(102), 361-374.

Forsythe, C.J., & Compas, B.E. (1987). Interaction of cognitive appraisals of stressful events and coping: Testing the goodness of fit hypothesis. *Cognitive Therapy & Research*, *11*(4), 473–485. https://doi.org/10.1007/bf01175357

Fortuna, L.R., Tolou-Shams, M., Robles-Ramamurthy, B., & Porche, M.V. (2020). Inequity and the disproportionate impact of COVID-19 on communities of color in the United States: The need for a trauma-informed social justice response. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(5), 443-445. https://doi.org/10.1037/tra0000889

Ghosh, R., Dubey, M.J., Chatterjee, S., & Dubey, S. (2020). Impact of COVID-19 on children: Special focus on the psychosocial aspect. *Minerva Pediatrica*, *72*(3), 226-235. https://doi.org/10.23736/S0026-4946.20.05887-9

Golberstein, E., Wen, H., & Miller, B.F. (2020). Coronavirus disease 2019 (COVID-19) and mental health for children and adolescents *JAMA Pediatrics*. Advance online publication. https://doi.org/10.1001/jamapediatrics.2020.1456

Jellinek, M.S., Murphy, J.M., Robinson, J., Feins, A., Lamb, S., & Fenton, T. (1988). Pediatric Symptom Checklist: Screening school-age children for psychosocial dysfunction. *Journal of Pediatrics*, *112*(2), 201-209. https://doi.org/10.1016/s0022-3476(88)80056-8

Liu, J.J., Bao, Y., Huang, X., Shi, J., & Lu, L. (2020). Mental health considerations for children quarantined because of COVID-19. *The Lancet Child & Adolescent Health, 4*(5), 347-349. https://doi.org/10.1016/S2352-4642(20)30096-1

Loades, M.E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., Linney, C., McManus, M.N., Borwick, C., & Crawley, E. (2020). Rapid systematic review: The impact of social isolation and loneliness on the

mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child & Adolescent Psychiatry*. Advance online publication. https://doi.org/10.1016/j.jaac.2020.05.009

Mahajan, C., Kapoor, I., & Prabhakar, H. (2020). Psychological effects of COVID-19 on children of health care workers. *Anesthesia & Analgesia*. Advance online publication. https://doi.org/10.1213/ANE.0000000000005034

Mukherjee, S. (2020). Disparities, desperation, and divisiveness: Coping with COVID-19 in India. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(6), 582-584. https://doi.org/10.1037/tra0000682

Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality & Individual Differences, 32*(2), 337-348. https://doi.org/10.1016/s0191-8869(01)00027-7

Oosterhoff, B., Palmer, C.A., Wilson, J., & Shook, N. (2020). Adolescents' motivations to engage in social distancing during the COVID-19 pandemic: Associations with mental and social health. *Journal of Adolescent Health*, *67*(2), 179-185. https://doi.org/10.1016/j.jadohealth.2020.05.004

Power, E., Hughes, S., Cotter, D., & Cannon, M. (2020). Youth Mental Health in the time of COVID-19. *Irish Journal of Psychological Medicine*. Advance online publication. https://doi.org/10.1017/ipm.2020.84

Prime, H., Wade, M., & Browne, D.T. (2020). Risk and resilience in family well-being during the COVID-19 pandemic. *American Psychologist, 75*(5), 631-643. https://doi.org/10.1037/amp0000660

Saurabh, K., & Ranjan, S. (2020). Compliance and psychological impact of quarantine in children and adolescents due to COVID-19 pandemic. *Indian Journal of Pediatrics*, *87*(7), 532-536. https://doi.org/10.1007/s12098-020-033x47-3

SAS Institute Inc. (2015) *SAS/STAT®* (Version 14.1) SAS Institute Inc.

Scheier, M.F., Carver, C.S., & Bridges, M.W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality & Social Psychology*, *67*(6), 1063-1078. https://doi.org/10.1037//0022-3514.67.6.1063

Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs.* (pp. 35-37). Windsor, United Kingdom: NFER-NELSON.

Tahmassian, K., & Moghadam N.J. (2011). Relationship between self-efficacy and symptoms of anxiety, depression, worry and social avoidance in a normal sample of students. *Iranian Journal of Psychiatry & Behavioral Sciences*, *5*(2), 91-98.

Tobin, D.L., Holroyd, K.A., & Reynolds, R.V.C. (1984) User Manual for the Coping strategies inventory. *CSI Manual*.

Tobin, D.L., Holroyd, K.A., Reynolds, R.V.C., & Wigal, J.K. (1989). The hierarchical factor structure of the Coping Strategies Inventory. *Cognitive Therapy & Research*, *13*(4), 343-361. https://doi.org/10.1007/bf01173478

Wade, M., Prime, H., & Browne, D.T. (2020). Why we need longitudinal mental health research with children and youth during (and after) the COVID-19 pandemic. *Psychiatry Research*, *290*, 113-143.

https://doi.org/10.1016/j.psychres.2020.113143

Wang, G., Zhang, Y., Zhao, J., Zhang, J., & Jiang, F. (2020). Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet, 395*(10228), 945-947. https://doi.org/10.1016/S0140-6736(20)30547-X

Weeks, M., Coplan, R.J., & Ooi, L.L. (2017). Cognitive biases among early adolescents with elevated symptoms of anxiety, depression, and co-occurring symptoms of anxiety-depression. *Infant & Child Development*, *26*(5), e2011. https://doi.org/10.1002/icd.2011

Xie, X., Xue, Q., Zhou, Y., Zhu, K., Liu, Q., Zhang, J., & Song, R. (2020). Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei Province, China. *JAMA Pediatrics*. Advance online publication. https://doi.org/10.1001/jamapediatrics.2020.1619

Zhou, S.J., Zhang, L.G., Wang, L.L., Guo, Z.C., Wang, J.Q., Chen, J.C., Liu, M., Chen, X., & Chen, J.X. (2020). Prevalence and socio-demographic correlates of psychological health problems in Chinese adolescents during the outbreak of COVID-19. *European Child & Adolescent Psychiatry*, *29*(6), 749-758. https://doi.org/10.1007/s00787-020-01541-4

Tables

Table 1. Scale Descriptive Statistics Across Waves

Variable		1	2	3	4	5	6	7	8	9	10
1	W1 Total Symptoms	–									
2	W2 Total Symptoms	.73***	–								
3	W3 Total Symptoms	.63***	.64***	–							
4	W4 Total Symptoms	.40***	.43***	.61***	–						
5	General Self-Efficacy	-.01	-02	-.05	-.31*	–					
6	Optimism	-.12	-.11	.03	-.06	.46***	–				
7	Problem-Focused Engaged Coping	-.16	-.04	-.02	-13	.54***	.51***	–			
8	Emotion-Focused Engaged Coping	-.12	-.01	-.08	-.02	.30**	.32**	.66***	–		
9	Problem-Focused Disengaged Coping	-.18	-.03	.05	.02	.30**	.31**	.37**	.32***	–	
10	Emotion-Focused Disengaged Coping	-.15	-.01	-.09	.19	-.15	-.29**	-.03	.08	.36***	–
MEAN		0.44	0.38	0.42	0.57	3.15	3.34	2.91	2.78	2.65	2.18
STD		0.24	0.27	0.24	0.30	0.58	0.70	0.91	0.92	0.63	0.90
Reliability					0.90	0.89	0.81	0.75	0.70	0.70	0.85

Note. In table $P < .05$ *, $P < .01$, **, $P < .001$ ***

Table 2. Fixed-Effect Results for Multilevel Moderating Analyses

	MODEL 1		MODEL 2		MODEL 3	
Fixed-Effect Predictor	Estimate (SD)	T-Value	Estimate (SD)	T-Value	Estimate (SD)	T-Value
Intercept	0.44 (.16)	2.71**	0.56 (.14)	4.11***	0.53 (.14)	3.81***
Child Age	-0.01 (.01)	-1.12	-0.01 (.01)	-1.16	-0.01 (.01)	-1.07
Treatment Control	-.07 (.09)	-0.83	-.07 (.09)	-0.87	-.06 (.09)	-0.71
Pandemic	0.52 (.15)	3.45***	0.24 (.12)	1.97*	0.06 (.13)	0.44
General Self-Efficacy	0.01 (.04)	0.06				
General Self-Efficacy x Pandemic	-0.11 (.05)	-2.28*				
Optimism			-0.03 (.03)	-0.99		
Optimism x Pandemic			-0.02 (.04)	-0.49		
Problem-Focused Engaged Coping					-0.02 (.04)	-0.49
Emotion-Focused Engaged Coping					-0.03 (.03)	-0.73
Problem-Focused Disengaged Coping					0.03 (.04)	0.60
Emotion-Focused Disengaged Coping					-0.02 (.03)	-0.57
Problem-Focused Engaged Coping x Pandemic					-0.06 (.04)	-1.67+
Problem-Focused Engaged Coping x Pandemic					0.08 (.04)	2.23*
Problem-Focused Disengaged Coping x Pandemic					-0.03 (.04)	-0.57

Emotion-Focused Engaged Coping x Pandemic	0.07 (.03)	2.36*

Note. In table *P* < .05 *, *P* < .01, **, *P*<.001 ***

Figures

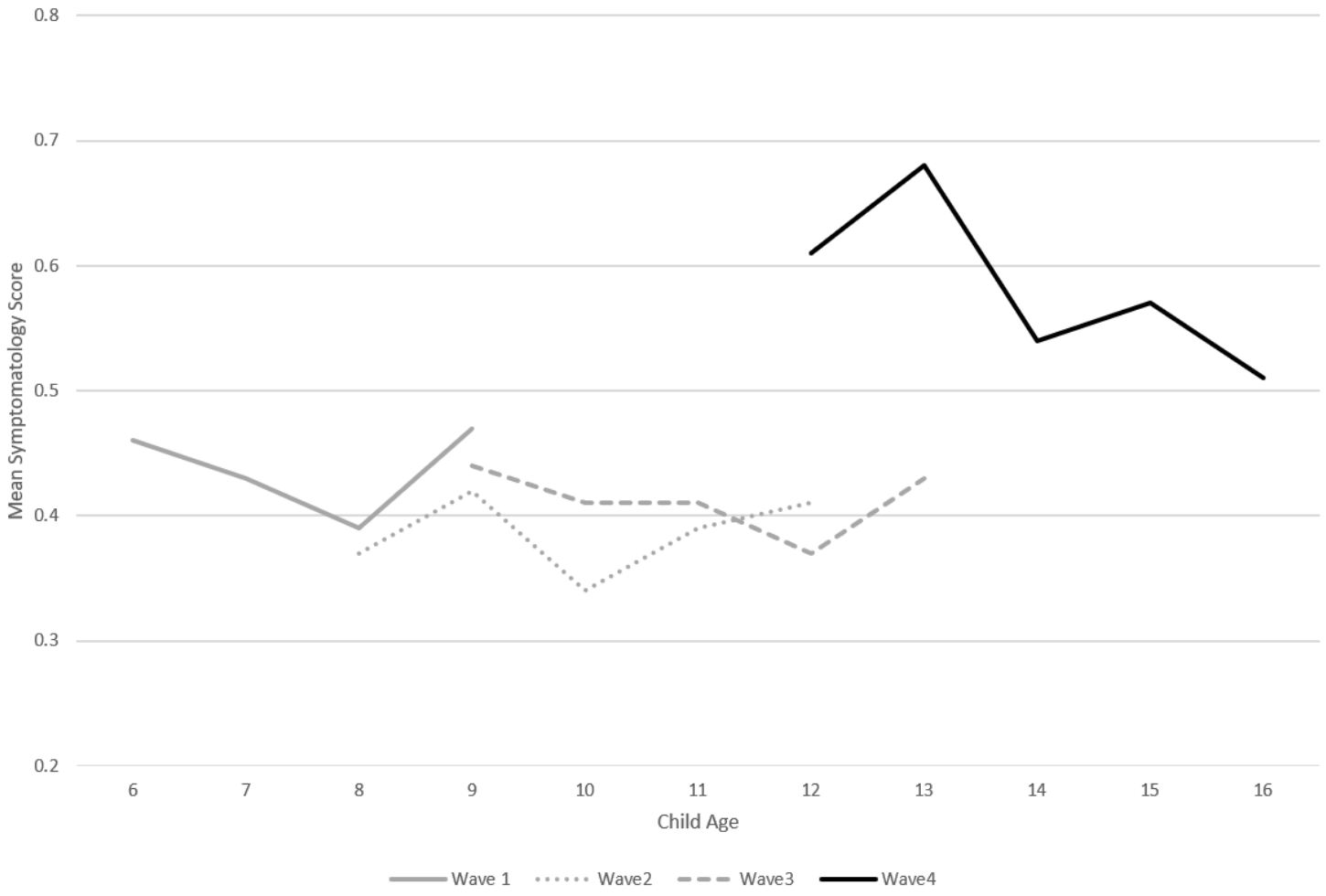

Figure 1

Mean Symptomatology Score by Child Age Across Waves