

RESEARCH ARTICLE

Parenting under pressure: Parental transmission and buffering of child fear during the COVID-19 pandemic

Jessica P. Uy¹  | Chloe Schwartz¹ | Kristen A. Chu¹ | Emily Towner³ |
Alejandra Lemus² | Natalie H. Brito²  | Bridget L. Callaghan¹ 

¹ Department of Psychology, University of California, Los Angeles, Los Angeles, California, USA

² Department of Applied Psychology, New York University, New York, New York, USA

³ Department of Psychology, University of Cambridge, Cambridge, UK

Correspondence

Jessica P. Uy, Department of Psychology, University of California, Los Angeles, 1285 Psychology Building, Box 951563, Los Angeles, CA 90095, USA.

Email: jessicaphuong@ucla.edu

Abstract

The current study investigated the impacts of parental behaviors (threat communication and comforting) on children's COVID-19 fears and whether effects differed by age. Caregivers of 283 children (5.5–17 years, $M = 10.17$, $SD = 3.25$) from 186 families completed online measures assessing children's and parents' COVID-19-related fears, children's sources of COVID-19 threat information, and parents' engagement in behaviors to reduce child distress (i.e., comfort behaviors). Higher COVID-19 fear in parents was associated with greater communication of COVID-19 threat information, which was associated with higher COVID-19 fear in younger, but not older, children. Over and above parental fear and threat communication, greater exposure to COVID-19 threat information from community sources (e.g., media, school, friends) was associated with greater COVID-19 fear in children, regardless of age. Greater engagement of parental comfort behaviors buffered the association between community sources of COVID-19 threat information and COVID-19 fears in older, but not younger, children. These findings suggest that younger children might be more vulnerable to developing heightened COVID-19 fears as a result of increasing sources of COVID-19 threat information in their lives. This study highlights the importance of supporting the socioemotional well-being of children and families through the COVID-19 pandemic and beyond.

KEYWORDS

adolescents, children, COVID-19, fear transmission, pandemic, parental buffering

1 | INTRODUCTION

Although the restrictions issued in response to the COVID-19 pandemic focused on immediate physical health concerns, the ramifications of limiting the social sphere of family life to the home on children's emotional health have yet to be realized. Although genetic contribution of mental health risk plays a modest role in parent-to-child pathways of psychopathology (e.g., 30%–40% heritability for anxiety disorders), the shared family environment is particularly salient in the context of mass fear resulting from widespread health crises (Lebowitz et al., 2016). Parental behaviors, including the transfer of threat information, direct modeling of fear-based responses, and

overcontrolling parenting styles, have been identified as crucial pathways linking parent distress with child distress (Lebowitz et al., 2016). The goal of the current study was to identify ways by which parents might transmit and/or buffer children's fears related to COVID-19.

Studies on fear of illnesses in children have found that parents' fear of the Swine Flu (Remmerswaal & Muris, 2011) and COVID-19 (Radanović et al., 2021) was positively associated with children's disease-related fear. Increases in threat information from parents were found to partially mediate this association, over and above threat information from community sources (e.g., school, media, friends) (Radanović et al., 2021; Remmerswaal & Muris, 2011). That is, parents who reported greater disease-related fear transmitted more threat

information (both verbally and through behavior) regarding the disease to their children, which was associated with increases in children's disease-related fear. Fearful parents may be more inclined to relay threatening information to children as a means of protection or crisis management. However, if parents consistently model fear reactions, children may evidence a heightened interpretative bias of events as more threatening (Lester et al., 2009), resulting in elevated child fear. Moreover, Radanović et al. (2021) found that, over and above parental influence, greater COVID-19 threat information from community sources also related to children's COVID-19 fears, highlighting the importance of examining both family and community sources of child fear. Further suggesting a need to explore the linkage between parental response to COVID-19 and immediate child emotional health outcomes, Cohodes et al. (2021) found that the association between family COVID-19-related stress and children's internalizing symptomatology was stronger among parents with high levels of parenting stress and anxiety.

As children typically look to their parents to interpret frightening information in order to assess personal level of safety (Gewirtz et al., 2008), in the current study, we built upon previous work (Radanović et al., 2021; Remmerswaal & Muris, 2011; Spinelli et al., 2020) to examine parent-inducing and parent-buffering pathways of child fear within the context of COVID-19. Given the pervasive media coverage of COVID-19 and a shift in the global climate to one of fear about rising rates of infection, we measured parents' level of adverse emotional reactions to the crisis as well as the frequency with which they transmitted threatening information about COVID-19 to their children. We also examined the degree to which positive parenting aimed at decreasing child distress through stress regulation and emotional availability (i.e., comfort behaviors) buffered children's reactions to COVID-19 threat information from the community (e.g., schools, friends, media). Parent comfort behaviors have been found to attenuate fear-potentiated startle in children with prior trauma exposure (van Rooij et al., 2017) as well as promote positive child adjustment following early life adversity (Callaghan et al., 2019). During the COVID-19 pandemic, high parental emotion coaching and maintenance of routines buffered the association between family COVID-19-related stress and children's internalizing symptomatology (Cohodes et al., 2021), highlighting the influence that caregivers and families have in moderating stress outcomes in children.

In a preregistered analysis plan (<https://osf.io/c3epj>), we detailed, as part of a larger study, an examination of parent and child outcomes in response to COVID-19. The current study focused on examining the impacts of parents' behaviors (threat information transmission and comforting/stress-buffering) on child virus-related fears. Based on findings from Radanović et al. (2021) and Remmerswaal and Muris (2011), we hypothesized that parent's virus-related fears would be associated with greater communication of threat information to their children, which would be related to greater child virus-related fears. We also hypothesized that parent comfort behaviors would buffer the association between COVID-19-related threat information from the community and child virus-related fears. Given the extension of children's social relationships beyond the family as well as evidence sug-

gesting that parental buffering of stress might diminish during the transition into adolescence (Doom et al., 2015; Gunnar, 2017; Hostinar et al., 2015), we also explored whether there were developmental and/or sex differences in these associations.

2 | METHODS

2.1 | Participants

A total of 255 families/parents with 389 children (5.5–17 years, $M = 10.18$ years, $SD = 3.29$ years, 166 females) started the online survey in the study. However, only 186 families/parents with 283 children (5.5–17 years, $M = 10.17$, $SD = 3.25$, 125 females) completed at least one of the measures examined in the current study. Families/parents were able to enroll up to four children in the study ($M = 1.52$ children). Of the 283 children, 111 children were the only child enrolled in the study; 114 children had one sibling in the study (i.e., 57 families with two children enrolled); 42 children had two siblings in the study (i.e., 14 families with three children enrolled); and 16 children had three siblings in the study (i.e., four families with four children enrolled). Of the 283 participants, a majority of the parent respondents were mothers ($N = 277$; 97.9%). To capture the global experience of parents and children during the COVID-19 pandemic, no geographical limitations were set, though a majority of participants resided in the United States ($N = 230$). Race and ethnicity were reported for 147 children (51.9%). Although the true representativeness of our sample is unknown because race and ethnicity were not reported in 48% of the sample, the racial/ethnic breakdown of those who reported is representative of that of the United States (U.S. Census). Additionally, 124 (52.1%) participants indicated that they personally knew someone (e.g., self, family, friend) who was diagnosed with COVID-19. Additional demographic information is presented in Table 1.

An anonymous survey link was distributed through postings on community-based social networking sites (e.g., Craigslist, Next Door, Patch), summer camp websites, and social media outreach (e.g., Facebook, Instagram). We also contacted parenting groups, children's activity organizations (e.g., Girl Scouts), advocates for parent and child mental health, and research collaborators within the field of child development to advertise the study opportunity.

Data were collected from April 2020 to July 2020, during which worldwide lockdown measures were implemented. Participants provided consent in accordance with the UCLA Institutional Review Board and were provided the opportunity to enroll in a raffle to win one of twenty \$100 gift cards; however, inclusion in the raffle was not dependent on study enrollment or survey completion. No identifiable personal information was collected. Participants could progress to the next page of the survey even if items were incomplete, which may have contributed to the substantial percentage of missingness identified for parent and child demographic variables. Whether or not families reported the race/ethnicity of their children was not associated with key variables: parent COVID-19 fear ($p = 1$), child COVID-19 fear ($p = .178$), COVID-19 threat information from parent ($p = .121$),

TABLE 1 Demographic information

Demographic	N (%)
Child race/ethnicity	N = 147 (51.9%) reported
White (Non-Hispanic)	98 (66.7% of reported)
Hispanic or Latinx	18 (12.2%)
African-American/Black	4 (2.7%)
Asian American	7 (4.8%)
Native Hawaiian or Pacific Islander	1 (0.7%)
Multiracial	18 (12.2%)
Parent education level	N = 197 (69.6%) reported
Elementary school	4 (2.0% of reported)
High school or equivalent	6 (3.0%)
Vocational/technical school	9 (4.6%)
Some college	17 (8.6%)
Bachelor's degree	71 (36.0%)
Master's degree	52 (26.4%)
Professional degree	9 (4.6%)
Doctorate degree	29 (14.7%)
Country of residence	N = 279 (98.6%) reported
United States	230 (82.44% of reported)
Australia	25 (8.96%)
United Kingdom	7 (2.51%)
Canada	3 (1.08%)
Dominican Republic	2 (0.72%)
Ireland	2 (0.72%)
Netherlands	2 (0.72%)
Philippines	2 (0.72%)
Qatar	2 (0.72%)
Georgia	1 (0.36%)
Portugal	1 (0.36%)
Singapore	1 (0.36%)
Switzerland	1 (0.36%)

COVID-19 threat information from community ($p = .576$), and parent comfort behavior ($p = .364$). Whether or not families reported their parental education level was not associated with parent COVID-19 fear ($p = .714$), child COVID-19 fear ($p = .760$), COVID-19 threat information from parent ($p = .600$), or parent comfort behavior ($p = .967$). However, parents who did report their education level also reported lower threat information from community ($b = -.4778$, $SE = 0.1858$, $t(164) = -2.571$, $p = .010$).

2.2 | Deviations from preregistered analysis plan

In our preregistered analysis plan (<https://osf.io/c3epj>), we detailed analyses to examine the emotional and behavioral impacts of COVID-19 on caregivers and children. To narrow the scope of the current

paper, we focused only on predictors and moderators of children's fears about illness and contamination (denoted as Theme 1c and 1d in the preregistered analysis plan).

Additionally, because the measures used in the current study were either adapted from other measures (e.g., parent comforting behaviors, sources of COVID-19 threat information) or created specifically for use during the COVID-19 pandemic (e.g., fear of illness and virus evaluation) and thus have yet to be psychometrically evaluated, we conducted exploratory factor analyses (EFA) to determine the appropriate structure and reliability of these scales for use in the current study. EFA was not conducted on the parent-child relationship quality scale because we utilized this measure as a covariate and thus were not interested in evaluating the dimensions of parent-child relationship quality. Statistical analyses and results of the EFAs are reported in Supporting Information.

For the parental comforting questionnaire described below ("parental buffering questionnaire" in preregistered report), because we were primarily interested in assessing comfort behaviors, we did not include items that assessed parents' access to information regarding supporting children's mental health and their beliefs about their buffering ability. Furthermore, rather than summing across all variables (both frequency and helpfulness of the same items) as indicated in the preregistration plan, which would have resulted in a meaningless composite, we decided to multiply the frequency of each comforting behavior endorsed with its perceived helpfulness to create a comfort score for each behavior.

2.3 | Measures

2.3.1 | Fear of Illness and Virus Evaluation

The Fear of Illness and Virus Evaluation (FIVE) is a questionnaire developed in response to the COVID-19 pandemic (Ehrenreich-May, 2020). Both parent (self-report; FIVE-Parent) and child (parent proxy report; FIVE-Child) versions were included in this study. The FIVE assesses COVID-19-specific fears related to contamination, illness, and social distancing (e.g., afraid I will get very sick, afraid a family member might get sick, afraid to be sad and lonely because of illness) as well as the frequency of behavioral modifications in response to fears about COVID-19 (e.g., using sanitizer, wearing masks) and the impact of these fears (e.g., being afraid of an illness has caused me to experience strong emotions) in the past week. Both versions of the FIVE contain 35 items, which were rated on a Likert scale ranging from 0 (*I am not afraid of this at all or I have not done this [engaged in modified behaviors]*) to 3 (*I am afraid of this all of the time or I did this [engaged in modified behaviors] all the time last week*). Because items on the behavioral modification scale do not explicitly assess feelings of fear, these items were not examined. One-factor solutions were retained for both parent-self and parent-proxy (child) reports. Items that loaded saliently on the factors were averaged to create a "parent virus-related fear" composite ($M = 0.92$, $SD = 0.48$) and a "child virus-related fear" composite ($M = 0.86$, $SD = 0.60$), respectively. The internal consistency

reliabilities of these composites were 0.89 (95% confidence interval [CI]: [0.87, 0.90]) for parent fear and 0.93 (95% CI: [0.92, 0.94]) for child fear.

2.3.2 | Sources of COVID-19 Information Questionnaire

The Sources of COVID-19 Information Questionnaire (SOI) was adapted from the Sources of Information about Swine Flu Questionnaire (Remmerswaal & Muris, 2011) for use in the current study. The SOI is a nine-item questionnaire used to assess the sources of child exposure to COVID-19 threat information (e.g., from parents, media, school, friends, direct experience). Parents rated each item on a Likert scale ranging from 1 (*Almost Never or Never True*) to 5 (*Almost Always or Always True*). EFA results indicated a one-factor solution. Given our interest in examining parent-specific threat compared to other sources of threat information, we created a parent-threat composite ($M = 3.70$, $SD = 0.84$, $\alpha = .75$ [.72, .79]) and a community-threat composite ($M = 2.22$, $SD = 0.92$, $\alpha = .75$ [.71, .78]). Analyses consisting of either parent or community threat were conducted covarying for the other.

2.3.3 | Parental Comforting Questionnaire

The Parental Comforting Questionnaire (PCQ) assessed the frequency in which parents engaged in each of 15 coping behaviors (e.g., used physical touch to regulate my child's stress, organized a fun activity, encouraged them to talk about their feelings with others) in the past 2 weeks and the perceived helpfulness of each behavior in reducing child distress. Items were adapted from the COVID-19 Adolescent Symptom & Psychological Experience Questionnaire-Parent (Ladouceur, 2020) and the Modified KidCOPE (Child Coping Orientation to Problems Experienced) checklist (Pfeifer & Lewis, 2020). Frequency and helpfulness were rated on a Likert scale ranging from 0 (*Never or Not at All*) to 5 (*Almost Constantly or Extremely*). For each item, the frequency score was multiplied by the helpfulness score to create a comfort score whereby higher scores represented greater engagement of comforting behaviors. EFA results indicated a one-factor solution. Items that loaded saliently onto this factor were averaged to create a "parent comforting behaviors" composite ($M = 10.67$, $SD = 4.29$, $\alpha = .99$).

2.3.4 | Parent-Child Relationship Quality

The Parent-Child Relationship Quality (PCRQ) scale is a 26-item questionnaire in which parents reported on the quality of the parent-child relationship for each child included in the study. Items assessed dimensions of child attachment security, parent reflective functioning, and parent emotion regulation, and were adapted from the Emotional Availability Self-Report Scale (Biringen et al., 1998), Parental Reflec-

tive Functioning Questionnaire (Luyten et al., 2017), and the Child-Parent Relationship Scale (Driscoll & Pianta, 2011). Items were rated on a Likert scale, ranging from 1 (*Definitely does not apply*) to 5 (*Definitely applies*). Scores were averaged across the items to create a "parent-child relationship quality" index ($M = 3.97$, $SD = 0.46$), with higher scores indicating greater overall quality of the parent-child relationship. Internal consistency reliability for this measure was 0.85 (95% CI: [0.83, 0.86]).

2.4 | Preregistered and exploratory analyses

2.4.1 | Parental fear transmission

Given the multilevel structure of our data (i.e., children nested within families), multilevel modeling analyses with random intercepts were conducted using the *lmerTest* package in R. Random slopes were not included because parent fear and threat information from parent and community sources did not vary within families in our data (i.e., no level 1 predictors). Linear mixed effects analyses (degrees of freedom estimated using Satterthwaite's method) were conducted to test the mediation model described in the preregistered report whereby the association between parent's COVID-19-related fear and child COVID-19-related fear would be mediated by parental communication of COVID-19-related threat information. We want to note that, as these data were cross-sectional, mediation analyses were used here to explain statistical variance rather than infer causality or directionality of effects. Exploratory analyses tested for moderated mediation of the fear transmission model either by age, sex (0 = male, 1 = female), or age $\times$ sex. First, we tested whether parent fear was associated with child fear (total effect, path c) and whether this effect depended on age, sex, or their interaction. Next, we tested whether parent fear was associated with parent threat transmission (path a) and whether this effect depended on age, sex, or their interaction. Finally, we tested whether parent threat transmission was related to child fear over and above parent fear (path b) and whether this effect depended on age, sex, or their interaction. If the three-way interaction of predictor $\times$ age $\times$ sex was not statistically significant, analyses were subsequently conducted with two-way interactions of either predictor $\times$ age or predictor $\times$ sex while covarying for the other variable. If no significant two-way interactions emerged, then analyses were conducted without any interactions. Indirect effects were tested using the *mediation* package in R with 1000 simulations. All analyses additionally covaried for threat information from the community, COVID-19 diagnosis (0 = does not personally know anyone with a COVID-19 diagnosis, 1 = personally knows at least one person with a COVID-19 diagnosis), country of residence (0 = Outside United States, 1 = United States), timing of survey (0 = earlier half [April 27, 2020 to May 20, 2020], 1 = later half [May 24, 2020 to July 31, 2020]), and parent-child relationship quality. Variance inflation factor (VIF) values produced from the *performance* package in R were assessed for multicollinearity of variables. VIF values <5 suggest low correlations among variables and that multicollinearity is not a concern.

TABLE 2 Bivariate pairwise correlations between key variables and covariates in the study

	Age	Parent fear	Child fear	Threat from parent	Threat from community	Parent comfort behaviors
Age		.06	.12*	.04	.32**	-.17*
Parent fear			.53***	.26***	.16*	.22***
Child fear				.28***	.27***	.05
Threat from parent					.36***	.19**
Threat from community						.04
Sex	.04	.06	.11	.11	.16*	0
Region	-.04	-.09	.09	-.09	-.29***	-.12
COVID-19 diagnosis	-.08	.01	.03	.14*	-.02	.05
Timing of survey	-.13**	.11	.09	.09	-.02	.17*
Parent-child relationship	-.1	-.19**	-.17**	.07	.01	.3***

Note: Covariates include sex (0 = male, 1 = female), region (0 = Outside United States, 1 = United States), COVID-19 diagnosis (0 = does not personally know anyone with a COVID-19 diagnosis, 1 = personally knows at least one person with a COVID-10 diagnosis), timing of survey (0 = earlier half [April 27, 2020 to May 20, 2020], 1 = later half [May 24, 2020 to July 31, 2020]), and parent-child relationship.

* $p < .05$, ** $p < .01$, *** $p < .001$.

2.4.2 | Parental buffering of child fear

To determine whether parental comforting behaviors buffered the association between community sources of COVID-19 threat information and child fear, linear mixed effects models with random intercepts were conducted to test whether parent comforting behaviors moderated the association between community sources of threat and child fear, over and above parent threat information. Although parental comforting behaviors did vary within families who reported on more than one child, not all levels of comforting behaviors were observed in all families (i.e., data are imbalanced), therefore including random slopes in our models would not be justified and would lead to estimation and convergence issues (Brown, 2021). Exploratory analyses were conducted to determine whether parental buffering of fear depended on age, sex, or age $\times$ sex interaction. If the four-way interaction was not statistically significant, the higher order variable was removed from the model and analyses were conducted with respective three-way interactions, covarying for the other variable. If buffering effects did not depend on age or sex, then higher order interaction terms were removed from the final model. All analyses additionally covaried for COVID-19 diagnosis, country of residence, timing of survey, and parent-child relationship quality.

3 | RESULTS

There were no significant age $\times$ sex or sex interactions for all analyses, therefore only interactions with age are reported.

Bivariate pairwise correlations of key variables and covariates are shown in Table 2. Age was associated with greater child fear, greater community sources of threat, and fewer parent comforting behaviors. Parent fear was positively associated with child fear, parental and community sources of threat information, and comforting behaviors. Child fear was positively associated with parental and community sources of

threat information. Parental threat information was positively associated with community sources of threat and comforting behaviors.

3.1 | Parental communication of threat information partially mediated the association between parent and child virus-related fears in younger, but not older, children

Parent fear was positively associated with child fear (total effect: $b = .552$, $SE = 0.081$, $t(157) = 5.947$, $p < .001$, 95% CI: [0.395, 0.709]). This effect did not depend on age ($b = -.029$, $SE = 0.017$, $t(142) = -1.692$, $p = .093$, 95% CI: [-0.062, 0.005]). Parent fear was also positively associated with parental communication of COVID-19 threat information (path a: $b = .440$, $SE = 0.130$, $t(154) = 3.391$, $p < .001$, 95% CI: [0.188, 0.693]). This effect also did not differ by age ($b = -.00030$, $SE = 0.0024$, $t(77) = -.124$, $p = .901$, 95% CI: [-0.0050, 0.0043]). There was a parent threat $\times$ age interaction on child fear ($b = -.019$, $SE = 0.009$, $t(184) = -2.061$, $p = .041$, 95% CI: [-0.036, -0.001]) such that among younger children (1 SD below $M = 6.89$ years), greater parental threat communication was associated with greater child fear, over and above parent fear (path b: $b = .152$, $SE = 0.056$, $t(192) = 2.711$, $p = .007$, 95% CI: [0.044, 0.260]). In contrast, parent threat transmission was not related to child fear among older children (1 SD above $M = 13.47$ years), over and above parent fear ($b = .029$, $SE = 0.056$, $t(210) = 0.483$, $p = .630$, 95% CI: [-0.086, 0.144]). The direct effect relating parent fear and child fear remained significant, but the effect was reduced (direct effect: $b = .521$, $SE = 0.082$, $t(156) = 6.354$, $p < .001$, 95% CI: [0.364, 0.679]) after controlling for parental threat communication. Examination of VIF values indicated that multicollinearity was not a concern (parent fear VIF = 1.14, parent threat VIF = 1.33, community threat VIF = 1.37, age VIF = 1.15, parent threat $\times$ age VIF = 1.04, sex VIF = 1.04, COVID diagnosis VIF = 1.08, region VIF = 1.11, timing of survey VIF = 1.04, parent-child

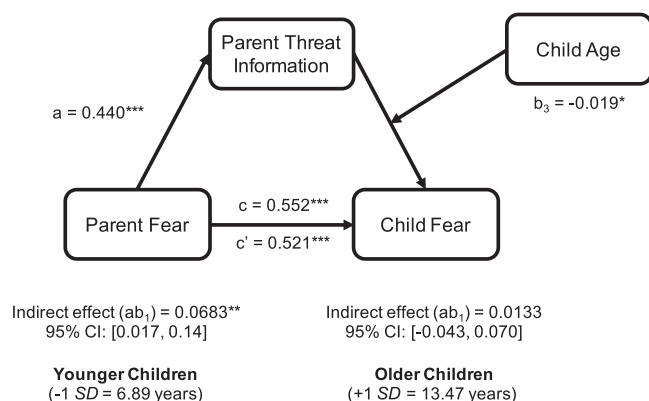


FIGURE 1 Parent COVID-19-related fear was associated with increases in COVID-19-related threat information by parents, which was associated with child COVID-19-related fear in younger, but not older, children. Covariates included child sex, country of residence, whether participants knew anyone with a COVID-19 diagnosis, timing of survey, and parent–child relationship quality. * $p < .05$, ** $p < .01$, *** $p < .001$

relationship quality $VIF = 1.10$). Tests of indirect effects suggest a moderated partial mediation by age such that the partial mediation was significant for younger children (indirect effect estimate = 0.0683, $p = .006$, 95% CI: [0.0169, 0.14]), but not older children (1 SD above $M = 13.47$ years) (indirect effect estimate = 0.0133, $p = .61$, 95% CI: [-0.043, 0.070]) (Figure 1). Exploratory mediation analyses were conducted to determine the approximate age at which parental transmission of threat became nonsignificant. At the mean age (10.17 years), the mediation was marginally significant (indirect effect estimate = 0.0387, $p = .078$, 95% CI: [-0.00388, 0.09]). At 9 years of age, the mediation was significant (indirect effect estimate = 0.0501, $p = .024$, 95% CI: [0.00602, 0.11]). These results indicate that between 9 and 10 years of age, parental transmission of fear through parental verbal threat communication begins to weaken.

Moreover, over and above parent's COVID-19-related fear and threat communication, threat information from the community was uniquely positively associated with child fear ($b = .147$, $SE = 0.048$, $t(171) = 3.016$, $p = .003$, 95% CI: [0.052, 0.243]). This effect did not differ by age ($b = -.0066$, $SE = 0.008$, $t(176) = -0.793$, $p = .429$, 95% CI: [-0.023, 0.010]).

3.2 | Parent comfort behaviors buffered the association between threat information from community sources and child fear in older, but not younger, children

There was a significant interaction between community sources of threat, parent comforting behaviors, and age on children's virus-related fears ($b = -.0051$, $SE = 0.0023$, $t(133) = -2.188$, $p = .030$, 95% CI: [-0.0096, -0.0006], all VIF values < 1.47). Among older children, there was a significant community sources of threat $\times$ parent comforting behaviors interaction on child fear ($b = -.029$,

$SE = 0.012$, $t(167) = -2.388$, $p = .018$, 95% CI: [-0.053, -0.0054]): although greater community sources of threat were associated with greater fear in children whose parents reported low levels (1 SD below $M = 6.33$) of comforting behaviors ($b = .188$, $SE = 0.069$, $t(193) = 2.699$, $p = .0078$, 95% CI: [0.055, 0.320]), community sources of threat were not significantly associated with fear in children whose parents reported high levels (1 SD above $M = 15.12$) of comforting behaviors ($b = -.069$, $SE = 0.099$, $t(195) = -0.700$, $p = .415$, 95% CI: [-0.264, 0.127]). Among younger children, the interaction between community sources of threat and parent comforting behaviors was not statistically significant ($b = .0004$, $SE = 0.0013$, $t(187) = 0.318$, $p = .75$) (Figure 2). Exploratory moderation analyses were conducted to determine the approximate age at which parental buffering became significant. At the mean age (10.17 years), parental buffering was not significant ($b = -.013$, $SE = 0.001$, $t(195) = -1.258$, $p = .21$, 95% CI: [-0.032, 0.007]). At 11 years, parental buffering was marginally significant ($b = -.01675$, $SE = 0.010$, $t(192) = -1.664$, $p = .098$, 95% CI: [-0.0362, 0.00267]). At 12 years of age, parental buffering was significant ($b = -.0218$, $SE = 0.0106$, $t(184) = -2.051$, $p = .042$, 95% CI: [-0.0424, -0.0012]). These results indicate that between 11 and 12 years of age, parental buffering of children's COVID-19 fears from community sources of threat begins to emerge.

3.3 | Differential buffering effects by age

Exploratory follow-up analyses were conducted to determine whether parents engaged in different types of comfort behaviors based on child age and whether different comfort behaviors evinced differential buffering effects by age. Bivariate pairwise correlation analyses for each comfort behavior endorsed (parents could endorse multiple behaviors) indicated that age was negatively associated with parent's (1) use of physical touch to regulate child's stress, (2) limitation of child's media usage, (3) establishment of daily routines for child, (4) suggestion of activities child enjoys doing at home, and (5) attempt to help child get more sleep (Table S7).

Linear mixed effects models were conducted separately for each comfort behavior to determine which comfort behavior(s) buffered community-related fears in children and whether the buffering effect differed by age, over and above parent threat information, sex, country of residence, whether participants knew someone with a COVID-19 diagnosis, timing of survey, and parent–child relationship quality.

Analyses revealed three behaviors that significantly buffered child fears that did not differ by age: (1) used physical touch to regulate my child's stress (other threat $\times$ comfort behavior: $b = -.0013$, $SE = 0.0054$, $t(127) = -2.432$, $p = .0164$, 95% CI: [-0.023, -0.0029]; other threat $\times$ comfort behavior $\times$ age: $b = .0021$, $SE = 0.00128$, $t(78) = 1.609$, $p = .111$) (Figure S1), (2) had conversations about COVID-19 at home (other threat $\times$ comfort behavior: $b = -.022$, $SE = 0.0097$, $t(170) = -2.250$, $p = .026$, 95% CI: [-0.040, -0.0034]; other threat $\times$ comfort behavior $\times$ age: $b = -.0016$, $SE = 0.0019$, $t(104) = -0.827$, $p = .410$) (Figure S2), and (3) tried to explain COVID-19 in a way he/she will understand (other threat $\times$ comfort behavior:

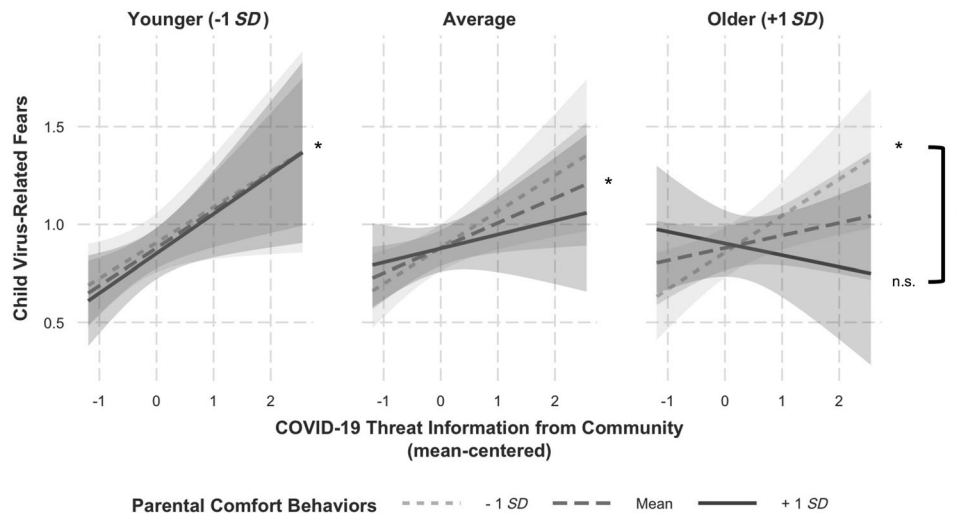


FIGURE 2 Predicted values of child COVID-19-related fear as a function of COVID-19-related threat information from the community at varying levels of parental comfort behaviors (lines) across younger (left panel), average (middle panel), and older (right panel) children. Covariates included: parent threat information, child sex, country of residence, whether participant knew anyone with a COVID-19 diagnosis, timing of survey, and parent–child relationship quality. n.s., not significant; SD, standard deviation; * $p < .05$

$b = -.0174$, $SE = 0.0076$, $t(128) = -2.302$, $p = .023$, 95% CI: $[-0.032, -0.0028]$; other threat $\times$ comfort behavior $\times$ age: $b = -.00140$, $SE = 0.00188$, $t(113) = 0.747$, $p = .457$ (Figure S3).

Follow-up simple effects tests revealed significant positive associations between COVID-19 threat information from the community and child fear among parents who reported low levels of these comfort behaviors (physical touch: $b = .205$, $SE = 0.071$, $t(172) = 2.857$, $p = .005$, 95% CI: $[0.070, 0.34]$; conversations about COVID-19: $b = .257$, $SE = 0.075$, $t(189) = 3.426$, $p = .0008$, 95% CI: $[0.115, 0.402]$; explanations about COVID-19: $b = .233$, $SE = 0.071$, $t(181) = 3.292$, $p = .001$, 95% CI: $[0.099, 0.368]$). In contrast, COVID-19 threat information from the community was not significantly associated with child fear among parents who reported high levels of these comfort behaviors (physical touch: $b = .024$, $SE = 0.0722$, $t(178) = 0.336$, $p = .737$, 95% CI: $[-0.113, 0.163]$; conversations about COVID-19: $b = .047$, $SE = 0.075$, $t(179) = 0.618$, $p = .537$, 95% CI: $[-0.097, 0.194]$; explanations about COVID-19: $b = .056$, $SE = 0.072$, $t(173) = 0.782$, $p = .435$, 95% CI: $[-0.081, 0.200]$).

Analyses also revealed two other behaviors that significantly buffered child fears that differed by age: (1) suggested activities they enjoy doing at home ($b = -.0055$, $SE = 0.0017$, $t(130) = -3.297$, $p = .0013$, 95% CI: $[-0.009, -0.0023]$) and (2) organized a fun activity with family members ($b = -.00375$, $SE = 0.0015$, $t(127) = -2.444$, $p = .0159$, 95% CI: $[-0.0067, -0.0008]$).

For suggesting activities they enjoy doing at home, there was a significant community threat $\times$ comfort behavior interaction in younger children ($b = .0198$, $SE = 0.0076$, $t(134) = 2.599$, $p = .010$, 95% CI: $[0.0053, 0.034]$), but not in older children ($b = -.0164$, $SE = 0.0088$, $t(144) = -1.845$, $p = .067$, 95% CI: $[-0.0334, 0.0003]$). Follow-up simple effects tests in younger children revealed an unexpected direction of the “buffering” effect: At low levels of parental suggesting, COVID-19 threat information from the community was not associated with

child fear ($b = .047$, $SE = 0.090$, $t(184) = 0.514$, $p = .61$, 95% CI: $[-0.125, 0.219]$). In contrast, at high levels of parental suggesting, COVID-19 threat information from the community was associated with greater fear ($b = .302$, $SE = 0.080$, $t(185) = 3.777$, $p = .0002$, 95% CI: $[0.148, 0.458]$) (Figure S4).

For organizing fun activities, there was a significant threat $\times$ comfort behavior interaction for older children ($b = -.0164$, $SE = 0.0082$, $t(151) = -2.002$, $p = .047$, 95% CI: $[-0.032, -0.0008]$), but not for younger children ($b = .0082$, $SE = 0.0073$, $t(149) = 1.135$, $p = .258$, 95% CI: $[-0.0057, 0.0222]$). Among older children, COVID-19-related threat information from the community was positively associated with child fear for those whose parents organized fun activities less often ($b = .176$, $SE = 0.072$, $t(191) = 2.442$, $p = .016$, 95% CI: $[0.039, 0.313]$). In contrast, among parents who organized fun activities more often, COVID-19 threat information from the community was not associated with child fear ($b = -.058$, $SE = 0.104$, $t(188) = -0.555$, $p = .579$, 95% CI: $[-0.259, 0.145]$) (Figure S5).

4 | DISCUSSION

The goal of the current study was to examine whether and how parents might transmit and buffer COVID-19-related fears in children and whether parental influence depended on age. Regarding fear transmission, we found that greater parental COVID-19-related fear was related to greater transmission of COVID-19 threat information to their children, which was associated with greater COVID-19-related fears in children, over and above threat information from the community (e.g., friends, school, media). Interestingly, we found that this partial mediation was significant for younger children, but not for older children (i.e., adolescents). That is, in adolescents, although greater parental fear also related to greater child fear, parents' communication

of COVID-19-related threats did not statistically explain this association. Additionally, over and above parental fear and threat communication, threat information from the community was positively associated with child fear, regardless of age. These findings suggest that for younger children, threat information from both parents and the community each uniquely contributed to their COVID-19 fears, whereas for older children, threat information from the community appears to have a stronger influence on their fears than threat information from their parents.

These findings are consistent with previous studies demonstrating parental transmission of fear and anxiety to their children in general (Muris & Field, 2010; Muris et al., 2010; Percy et al., 2016), in the context of the COVID-19 pandemic (Radanović et al., 2021), and other health threats (Remmerswaal & Muris, 2011). These findings also extend from previous research to demonstrate that parental transmission of fear appears to weaken as children get older, particularly when sources of threat outside the parent-child relationship are also present.

Regarding fear buffering, we expected that parental buffering of stress would become less effective during the transition into adolescence (Doom et al., 2015; Gunnar, 2017; Hostinar et al., 2015). However, we found that greater engagement of comforting behaviors by parents buffered the effect of threat information from the community on children's fear better in older children relative to younger children, over and above threat information from parents. In our exploratory analyses, we found that the types of comforting behaviors parents engaged in differed by age and that some comforting behaviors were more effective at buffering COVID-19-related fear in older versus younger children. Specifically, we found that physical touch and having conversations about COVID-19 buffered fear in children, regardless of age, but that for older children, parents who organized fun activities for their families more often were better able to buffer their children's COVID-19 fears related to community sources of threat.

Together with the parental fear transmission results, these findings indicate that younger children might be more fear sensitive than older children to verbal threat information from parents. Combined with the diminished capacity for parents to buffer their younger children's fears from other sources of COVID-19 threat information, young children might be more vulnerable to developing heightened COVID-19 fears as a result of increasing sources of COVID-19 threat information in their lives. Although older children typically have greater emotion regulation capacity and may have additional sources of support (e.g., from teachers, friends, etc.) as their social networks expand, younger children tend to depend more heavily on their caregivers for emotional support. These results highlight the importance for parents and caregivers to tend to their own emotional well-being and to reduce their own levels of fear and stress whenever possible. However, we acknowledge that managing stress might be more challenging for some families than others, and that families with younger children may have different needs from families with older children. Thus, we also emphasize the importance of community investments and efforts to support children and their families throughout the COVID-19 pandemic and beyond. Indeed, numerous efforts have been implemented across

the nation to provide support for children and their families during the pandemic. For example, at the federal level, the American Rescue Plan and the American Families Plan aim to provide relief for families by providing financial support for childcare and nutrition assistance, improving paid family and medical leave programs, extending tax cuts, and investing in affordable education (United States Office of the Press Secretary, 2021). The goal of these relief efforts is to reduce stress and strain related to the pandemic, thereby improving mental health outcomes in families. At the community level, several efforts have focused on prioritizing public health and advancing equity. For example, the Robert Wood Johnson Foundation's Sentinel Communities project found that the Houston Independent School District monitored virus case counts and waited until October 2020 to start in-person instruction to control the spread of COVID-19, even though state guidance allowed in-person instruction earlier (Robert Wood Johnson Foundation, 2021). Additionally, although much of our daily activities have shifted online during the pandemic, many communities have worked to ensure that people have access to reliable internet during the pandemic and to bridge the digital divide for families. For instance, in Finney County, Kansas, where one fifth of households lacked internet access prepandemic, a local grant program provided up to \$10,000 per household to cover basic expenses, including internet. In Tampa, Florida, through a local education foundation, students were even provided with tablets and hotspots, and families were sent bilingual teams to their homes to teach them how to use their new technology (Robert Wood Johnson Foundation, 2021). Efforts like these have the potential to reduce fears that families may have regarding illnesses and social distancing measures as well as provide the means for families of all backgrounds to cope during the pandemic.

The results of the current study should be interpreted in the context of its limitations. First, to reduce parents' burden of completing the survey, we opted for parent proxy-reported (rather than child self-reported) child outcomes. Although this is not an uncommon approach (particularly in COVID-19 research studies [Loades et al., 2020; Orgilés et al., 2020]), it is possible that parent proxy-reported levels of child anxiety and virus-related fears may not accurately reflect the child's own experience. However, that we conceptually replicated the parental transmission of virus-related fears reported in past research using child self-report (Radanović et al., 2021; Remmerswaal & Muris, 2011) bolsters our confidence that the results of this study are robust to differences in survey respondent. Future research that obtains children's reports of their own fears and the types of parental comfort behaviors that they perceived as helpful to them would be an important addition to the current findings. Second, although the current survey was distributed internationally, the respondents were predominately U.S. American. Additionally, as the majority of parent respondents in this study (48.1%) did not answer questions regarding race and ethnicity, the demographic makeup of participating families is unknown. Moreover, because the survey was administered online, the current study may not have represented families that have limited access to technological resources. Based on available demographic information, care should be taken in generalizing the results of the current study beyond White (non-Hispanic), middle to higher socioeconomic status

groups residing in the United States. As COVID-19 disproportionately impacts families living in poverty and marginalized groups (Tai et al., 2021), the need for enhanced parent supports will likely be greater outside of the communities included in the current study and should be directly examined. Finally, data were collected from families at only one time point during the pandemic. The trajectory of COVID-19 fears in children across the course of the pandemic and how these fears relate to trajectories of socioemotional well-being are unknown. It will be important in future research to examine the long-term progression of these effects as the psychological and socioemotional impacts of the COVID-19 pandemic may persist long after the imminent physical threat of the virus is alleviated.

Evidence of parent and child distress in response to COVID-19 suggests a need for dyadically focused supports and interventions for families during this crisis, with priority given to managing parents' anxiety and fears to mitigate parenting stress and limit the transmission of COVID-19-related threat information to children. Within such dyadic interventions, engagement in parent comfort behaviors should be explored, as they were shown here to alleviate the adverse effect of COVID-19 threat information from the general community on child virus-related fears. Such positive parenting behavior may help to protect against fear reactions in children and by extension, alleviate parenting burden surrounding children's emotional health.

ACKNOWLEDGMENTS

The authors would like to thank Danielle Ladensack, Aileen Gozali, Nicole Fonacier, and Reese Wix for their assistance in the study setup and recruitment and Daisy Ramirez, Grant Grech, and Ananya Eervani for translating the original English version of the survey into Spanish.

FUNDING INFORMATION

This research did not receive any funding from organizations in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Jessica P. Uy  <https://orcid.org/0000-0001-7316-3562>

Natalie H. Brito  <https://orcid.org/0000-0003-1016-0094>

Bridget L. Callaghan  <https://orcid.org/0000-0001-5736-2510>

REFERENCES

- Biringen, Z., Robinson, J., & Emde, R. (1998). *The emotional availability scales* (3rd ed.). Unpublished manuscript. www.emotionalavailability.com
- Brown, V. A. (2021). An introduction to linear mixed-effects modeling in R. *Advances in Methods and Practices in Psychological Science*, 4(1). <https://doi.org/10.1177/2515245920960351>
- Callaghan, B. L., Gee, D. G., Gabard-Durnam, L., Telzer, E. H., Humphreys, K. L., Goff, B., Shapiro, M., Flannery, J., Lumian, D. S., Fareri, D. S., Caldera, C., & Tottenham, N. (2019). Decreased amygdala reactivity to parent cues protects against anxiety following early adversity: An examination across 3 years. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 4(7), 664–671. <https://doi.org/10.1016/j.bpsc.2019.02.001>
- Cohodes, E. M., McCauley, S., & Gee, D. G. (2021). Parental buffering of stress in the time of COVID-19: Family-level factors may moderate the association between pandemic-related stress and youth symptomatology. *Research on Child and Adolescent Psychopathology*, 49(7), 935–948. <https://doi.org/10.1007/s10802-020-00732-6>
- Doom, J. R., Hostinar, C. E., VanZomeren-Dohm, A. A., & Gunnar, M. R. (2015). The roles of puberty and age in explaining the diminished effectiveness of parental buffering of HPA reactivity and recovery in adolescence. *Psychoneuroendocrinology*, 59, 102–111. <https://doi.org/10.1016/j.psyneuen.2015.04.024>
- Driscoll, K., & Pianta, R. C. (2011). Mothers' and fathers' perceptions of conflict and closeness in parent-child relationships during early childhood. *Journal of Early Childhood and Infant Psychology*, 7, 1–24.
- Ehrenreich-May, J. (2020). Fear of Illness and Evaluation (FIVE). [https://adaa.org/sites/default/files/UofMiamiFearofIllnessandVirusEvaluation\(FIVE\)scalesforChild-%2CParent-andAdult-Report.pdf](https://adaa.org/sites/default/files/UofMiamiFearofIllnessandVirusEvaluation(FIVE)scalesforChild-%2CParent-andAdult-Report.pdf)
- Gewirtz, A., Forgatch, M., & Wieling, E. (2008). Parenting practices as potential mechanisms for child adjustment following mass trauma. *Journal of Marital and Family Therapy*, 34(2), 177–192. <https://doi.org/10.1111/j.1752-0606.2008.00063.x>
- Gunnar, M. R. (2017). Social buffering of stress in development: A career perspective. *Perspectives on Psychological Science*, 12(3), 355–373. <https://doi.org/10.1177/1745691616680612>
- Hostinar, C. E., Johnson, A. E., & Gunnar, M. R. (2015). Parent support is less effective in buffering cortisol stress reactivity for adolescents compared to children. *Developmental Science*, 18(2), 281–297. <https://doi.org/10.1111/desc.12195>
- Ladouceur, C. D. (2020). COVID-19 Adolescent Symptom & Psychological Experience Questionnaire. https://www.nlm.nih.gov/dr2/CASPE_AdolSelfReport_Qualtrics.pdf
- Lebowitz, E. R., Leckman, J. F., Silverman, W. K., & Feldman, R. (2016). Cross-generational influences on childhood anxiety disorders: Pathways and mechanisms. *Journal of Neural Transmission*, 123(9), 1053–1067. <https://doi.org/10.1007/s00702-016-1565-y>
- Lester, K. J., Field, A. P., Oliver, S., & Cartwright-Hatton, S. (2009). Do anxious parents interpretive biases towards threat extend into their child's environment? *Behaviour Research and Therapy*, 47(2), 170–174. <https://doi.org/10.1016/j.brat.2008.11.005>
- 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 and Adolescent Psychiatry*, 59(11), 1218.e3–1239.e3. <https://doi.org/10.1016/j.jaac.2020.05.009>
- Luyten, P., Mayes, L. C., Nijssens, L., & Fonagy, P. (2017). The parental reflective functioning questionnaire: Development and preliminary validation. *PLoS ONE*, 12(5), 1–28. <https://doi.org/10.1371/journal.pone.0176218>
- Muris, P., & Field, A. P. (2010). The role of verbal threat information in the development of childhood fear. "Beware the Jabberwock!". *Clinical Child and Family Psychology Review*, 13(2), 129–150. <https://doi.org/10.1007/s10567-010-0064-1>
- Muris, P., van Zwol, L., Huijding, J., & Mayer, B. (2010). Mom told me scary things about this animal: Parents installing fear beliefs in their children via the verbal information pathway. *Behaviour Research and Therapy*, 48(4), 341–346. <https://doi.org/10.1016/j.brat.2009.12.001>
- Orgilés, M., Morales, A., Delvecchio, E., Mazzeschi, C., & Espada, J. P. (2020). Immediate psychological effects of the COVID-19 quarantine in youth from Italy and Spain. *Frontiers in Psychology*, 11(November), 1–10. <https://doi.org/10.3389/fpsyg.2020.579038>
- Percy, R., Creswell, C., Garner, M., O'Brien, D., & Murray, L. (2016). Parents' verbal communication and childhood anxiety: A systematic review.

- Clinical Child and Family Psychology Review*, 19(1), 55–75. <https://doi.org/10.1007/s10567-015-0198-2>
- Pfeifer, J., & Lewis, J. (2020). Modified KidCOPE. <https://osf.io/wcgj8/>
- Radanović, A., Micić, I., Pavlović, S., & Krstić, K. (2021). Don't think that kids aren't noticing: Indirect pathways to children's fear of COVID-19. *Frontiers in Psychology*, 12(March), 1–11. <https://doi.org/10.3389/fpsyg.2021.635952>
- Remmerswaal, D., & Muris, P. (2011). Children's fear reactions to the 2009 Swine Flu pandemic: The role of threat information as provided by parents. *Journal of Anxiety Disorders*, 25(3), 444–449. <https://doi.org/10.1016/j.janxdis.2010.11.008>
- Robert Wood Johnson Foundation. (2021). Sentinel communities insights: COVID-19 one year later synthesis report. <https://www.rwjf.org/content/dam/farm/reports/reports/2021/rwjf465907>
- Spinelli, M., Lionetti, F., Pastore, M., & Fasolo, M. (2020). Parents' stress and children's psychological problems in families facing the COVID-19 outbreak in Italy. *Frontiers in Psychology*, 11(January), 1–7. <https://doi.org/10.3389/fpsyg.2020.01713>
- Tai, D. B. G., Shah, A., Doubeni, C. A., Sia, I. G., & Wieland, M. L. (2021). The Disproportionate impact of COVID-19 on racial and ethnic minorities in the United States. *Clinical Infectious Diseases*, 72(4), 703–706. <https://doi.org/10.1093/cid/ciaa815>
- United States Office of the Press Secretary. (2021, April 28). The American Families Plan [Fact Sheet]. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/28/fact-sheet-the-american-families-plan/>
- van Rooij, S. J. H., Cross, D., Stevens, J. S., Vance, L. A., Kim, Y. J., Bradley, B., Tottenham, N., & Jovanovic, T. (2017). Maternal buffering of fear-potentiated startle in children and adolescents with trauma exposure. *Social Neuroscience*, 12(1), 22–31. <https://doi.org/10.1080/17470919.2016.1164244>

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

How to cite this article: Uy, J. P., Schwartz, C., Chu, K. A., Towner, E., Lemus, A., Brito, N. H., & Callaghan, B. L. (2022). Parenting under pressure: Parental transmission and buffering of child fear during the COVID-19 pandemic. *Developmental Psychobiology*, 64, e22253. <https://doi.org/10.1002/dev.22253>