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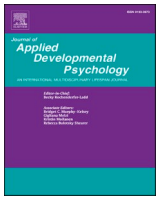

Child behavior problems during COVID-19: Associations with parent distress and child social-emotional skills

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ABSTRACT

The COVID-19 pandemic and associated government-mandated shutdowns disrupted schooling, socialization, and family life for school-aged children during spring 2020. These disruptions may have contributed to increased child behavior problems. Thus, we examined behavior problems in 247 children aged 7 to 9 years during Ohio's shutdown period. We investigated whether differences in parent-reported child behavior problems were associated with concurrent parent distress during spring 2020 and/or children's social-emotional skills measured via teacher-reports from the previous year (spring 2019). Parent distress significantly predicted behavior problems, such that more distressed parents also reported more child behavior problems. Child pre-pandemic peer social skills also significantly predicted behavior problems, such that more skilled children exhibited fewer behavior problems. There were no interaction effects between parent distress and children's social-emotional skills on child behavior problems. Further research is needed to understand how children's social-emotional skills impact their ability to cope during times of epidemiological crisis.

Introduction

The outbreak of COVID-19 has affected the lives of millions of children and their families around the world. Concurrent studies in various countries suggest that parent and children's well-being and behaviors were negatively affected by the pandemic and related measures designed to mitigate the pandemic spread including in-person school closure (e.g., Christner et al., 2021; Hanetz-Gamliel et al., 2021). In many locations within the United States, early stay-at-home orders created significant socioemotional stress for children and their parents (Phelps & Sperry, 2020). For example, a U.S. national survey using a sample of 1011 families with children under 18 years old found 14% of parents reported worsening child behavior problems and 27% reported worsening personal mental health since March 2020 (Patrick et al., 2020). Thus, understanding how the COVID-19 pandemic shaped children's behavior problems, and how this varied across children and family context is critical to understanding the potential lasting developmental ramifications of this public health crisis.

A growing body of research suggests that developmental trajectories resulting in increased odds of behavior problems in middle childhood are established early in life and are predicted by maternal and child individual factors (e.g., Cabaj et al., 2014; Conway & McDonough, 2006; Göbel et al., 2016). For instance, previous referral for developmental and behavioral concerns at age 3 was one of the independent risk factors for externalizing behavior problems at age 8, and concurrent maternal mental health was one of the observed risk factors for internalizing behavior problems at age 8 (Cabaj et al., 2014). As young children's development is largely influenced by their day-to-day interactions with a stable and nurturing network of caregivers and peers both within and outside their home (Bronfenbrenner & Morris, 2006), children in this age range may be particularly at risk to experiencing negative impacts from pandemic-related social changes caused by state-mandated shutdowns.

To better understand child behavior problems in early middle childhood during the unprecedented pandemic from a contextual and developmental perspective, this study examines the relations between

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child behavior problems, concurrent parent distress, and children's pre-pandemic social-emotional skills among a group of seven- to nine-year-old children during the COVID-19 shutdown period in Ohio state in the U.S. In this study, the *shutdown period* refers to the early months of the COVID-19 pandemic, from approximately March 15, 2020 through summer 2020, during which a state-mandated shutdown was instituted by Governor DeWine in Ohio, resulting in childcare and K-12 school closures, non-essential business closures, and general disruptions to family routines (Camera, 2020; Office of Governor DeWine, 2020a, 2020b, 2020c, 2020d, 2020e).

Child Behavior Problems and Development

Child behavior problems are often conceptualized as those involving externalizing and/or internalizing behaviors (Lilienfeld, 2003; Oland & Shaw, 2005; Stone et al., 2015). Externalizing behavior problems are manifested in acting out behaviors, including aggression and hyperactivity (Liu, 2004), whereas internalizing behavior problems are characterized by symptoms of anxiety and depression, fearfulness, social withdrawal, and somatic complaints (Göbel et al., 2016). Early behavior problems are associated with the occurrence of later problems, such that longitudinal studies suggest a high degree of stability of behavior problems from early childhood through adolescence (e.g., Bornstein et al., 2010; Farmer et al., 2015; Flouri et al., 2019). Children who show behavior problems during early elementary grades are susceptible for longitudinal behavior problems as well as other negative repercussions, such as school dropout, delinquency, and academic underachievement (e.g., Breslau et al., 2009; Darney et al., 2013; Hinshaw, 1992; Lahey et al., 2006).

In the context of COVID-19 crisis, researchers worldwide have observed alarming behavior problems among young children since the pandemic outbreak and subsequent lockdowns (e.g., Romero et al., 2020; Xie et al., 2020) and a worsening trend compared to pre-pandemic time (e.g., Gassman-Pines et al., 2020; Giannotti et al., 2021). For example, a study using a sample of 645 U.S. parents with children between the ages of 2 and 7 years found increasing frequency of child behavior problems after COVID-19 related restrictions began (Gassman-Pines et al., 2020). Additionally, a study using a sample of 841 Italian parents of children aged 3 to 11 years reported a significant increase in children's externalizing behaviors during local home confinement (Giannotti et al., 2021).

Parent Distress and Child Behavior Problems

The home environment is one of the primary ecological contexts for children's physical, emotional, behavioral, and cognitive development during early childhood (Bronfenbrenner & Morris, 2006). Importantly, parent distress is well-documented as contributing to child behavior problems (e.g., Cummings & Davies, 1994; Downey & Coyne, 1990 for review). For example, children of distressed parents are at increased risk for poor psychological functioning (Downey & Coyne, 1990). This may occur because distressed parents tend to demonstrate verbally harsh parenting styles, emotional insensitivity, and unresponsiveness to child bids for attention; in turn, these parenting behaviors lead to the occurrence of child behavior problems like acting out, withdrawal, and anxiety (Cummings & Davies, 1994; Flouri et al., 2019). Stone et al. (2015) studied Dutch children aged 4 to 7 years and found that parenting stress is strongly related to child behavior problems, which over time also shape maternal distress and parenting incompetence. In a more recent study of children aged 2.5 to 5 years with developmental disabilities, parent distress had significant direct effect on child behavior problems (Sanner & Neece, 2018).

The predicative effect of parent distress on child behavior problems became more pronounced during the COVID-19 lockdown period (Giannotti et al., 2021; Hanetz-Gamliel et al., 2021; Romero et al., 2020). Parent distress was a significant predictor for externalizing behavior problems in 3- to 11-year-old children during the home confinement in Italy (Giannotti et al., 2021). Another study with 940 Italian parents of children between the ages of 3 and 12 found that both anxiety and depression were directly and positively related with parent distress, and parents' resilience exerted a negative effect on perceived parent distress which, in turn, positively affected parent anxiety and depression (Romero et al., 2020). Additionally, a study with 141 Israeli mothers of children between the ages of 3 and 12 found that maternal anxiety was positively and significantly associated with their sense of lack of social support, and with externalizing and internalizing behavior problems in their children (Hanetz-Gamliel et al., 2021).

Social-emotional Skills and Child Behavior Problems

In addition to parent distress and parenting behaviors, child behavior problems also manifest themselves as a function of children's own individual difficulties with social-emotional skills such as behavior control and social competence (Conway & McDonough, 2006; Twum-Antwi et al., 2020). Behavior control describes children's ability to manage their behaviors in a challenging situation by controlling their attention, emotions, and behaviors (Shelleby et al., 2012). Behavior control is strongly associated with children's levels of expression and trajectory of development of externalizing and internalizing behavior problems during early childhood (Calkins et al., 2007; Shelleby et al., 2012). For instance, a study of toddlers with early difficulty in behavior control found that better behavioral control at age 3 years was associated with reduced behavior problems at age 4 years as compared to toddlers with worse behavioral control (Shelleby et al., 2012). In another study of school-aged male children from low socioeconomic status families, children who exhibited more versatility in effective regulatory strategies at the age of 3.5 years exhibited lower levels of externalizing problems, higher levels of cooperation, and higher levels of appropriate assertiveness at the age of 6 (Gilliom et al., 2002).

Peer social skills represent broadly adaptive individual characteristics related to emotional regulation, social cognition and intelligence, positive attitude, communication, and prosocial relationships with family members, peers, and other adults in the environment (Bornstein et al., 2010; Hukkelberg et al., 2019). Developmental research show that children's early peer social skills are negatively associated with later behavior problems. For instance, lower levels of previously measured social competence are associated with higher levels of current behavior problems (Hukkelberg et al., 2019), which in turn predict later behavior problems in early adolescence, as well as children's ability to cope with distress (e.g., Bornstein et al., 2010; Gazelle & Ladd, 2003; Göbel et al., 2016).

Children's social-emotional skills are not only linked to immediate and future well-being (Eisenberg et al., 2001), but may also serve as potential protective factors for behavioral functioning during challenging life events (Sharp et al., 2012). For instance, a longitudinal study in Spain found that child emotion regulation skills were associated with behavioral adjustments such as routine maintenance during the COVID-19 pandemic (Domínguez et al., 2020). However, the determinants of children's *antecedent* social-emotional skills in their behavioral adjustment during the pandemic have been rarely examined. In addition, although much research has been conducted on concurrent parent-child relationship during the lockdown period, the interaction effects between children's equipped social-emotional skills and parent distress in response to the crisis is quite scarce. In this regard, identifying the risk and protective factors associated with child behavior problems during and prior to the pandemic, and examining potential ameliorative effects is of importance to helping children adapt to difficult crisis situations during the critical developmental stage of early middle childhood.

The Current Study

Given the unique social disruptions brought about by the COVID-19

pandemic and the contextual changes, our study juxtaposed concurrent parent distress with children's pre-pandemic social-emotional skills (namely, behavior control and peer social skills) in the examination of their relations to children's externalizing and internalizing behaviors during the COVID-19 shutdown. This study addressed three research questions: (1) Whether and to what extent concurrent parent distress was associated with child behavior problems during Ohio's COVID-19 shutdown of 2020; (2) Whether and to what extent children's pre-pandemic social-emotional skills were associated with child behavior problems during this period; and (3) Whether and to what extent children's pre-pandemic social-emotional skills moderated the relations between concurrent parent distress and child behavior problems. Regarding the first research question, we hypothesized that parent distress significantly affected the expression of child behavior problems during the COVID-19 shutdown period above and beyond child age, sex and other parent and family characteristics. In terms of the second research question, we hypothesized that children's behavior control and peer social skills were significant predictors for child behavior problems during the COVID-19 shutdown. In relation to the third research question, we hypothesized that the children's pre-pandemic social-emotional skills would buffer the negative influence of parent distress on child behavior problems.

Method

This study used data from Early Learning Ohio (ELO), a large longitudinal project designed to understand children's academic and social-behavioral trajectories from preschool through third grade in the state of Ohio. Recruitment activities for ELO were conducted in 2016 within participating school districts according to protocols to protect human subjects as approved by the university's Institutional Review Board. At the beginning of this longitudinal project, the research team recruited teachers from preschool and kindergarten classrooms by holding informational sessions and providing written materials about the study. All students attending preschool and kindergarten classrooms with participating teachers were eligible to participate in the study. Consent packets were sent home via backpack mail for primary caregivers to review and sign. Following recruitment, 801 preschool and kindergarten children (and their primary caregivers) enrolled in ELO. After providing consent, participating children completed direct assessments and child interviews at various timepoints of the study, administered by trained research staff within participating classrooms. Teachers and parents completed background questionnaires and indirect measures administered by trained research staff on the participating children while in class, including children's social-emotional skills in the spring of 2019.

In spring 2020, when participating ELO children were aged 7 to 9 years old, pandemic-related data were collected from a sub-sample of the ELO participants using the COVID & Family Study survey (a comprehensive cross-project survey crafted to collect data during Ohio's COVID-19 shutdown period, as described in Schmeer et al., 2020). As of March 2020, 652 ELO children were still active in the sample. Of those, we sent the COVID & Family Study survey to 319 ELO families that had previously provided a valid email address. By the end of the study period, 255 primary ELO caregivers completed the full survey instrument, representing a response rate of 79.9% in the ELO sample. Eight responses were excluded from the final analytical sample due to missing data for child behavior problems (i.e., dependent variables) during the pandemic shutdown period. Therefore, the final analytical sample included 247 children and their primary caregivers.

Participants

Among the 247 sampled children, 47% were female with an average age of 8.13 years ($SD = 0.46$ years, range = 7.00–9.83 years) at the time of the pandemic shutdown. Responding caregivers were mostly mothers (91.9%) or fathers (4.5%) and are therefore referred to as "parents" hereafter. Approximately 89.3% of parents identified as White and 3.7% as Black. In terms of educational attainment, 43.5% of parents had a four-year college degree or higher. The sample was predominantly composed of two-parent households (82.8%), while 17.1% were single-parent households. Overall, 67% of participating families had an annual income above $60,000 in 2019, which is above the median household income of $68,703 in the United States in 2019 (U.S. Census Bureau, 2019). At the time of the pandemic survey, 71% of participating parents reported having a job both before and during the COVID-19 shutdown, while 11.8% reported losing a job since March 15, 2020, and 17.1% reported being unemployed both before and during the shutdown. About 68% of parents reported experiencing a decrease in monthly income since the COVID-19 shutdown went into effect (approx. March 15, 2020), while 24% reported that their income stayed the same, and 8% reported that their income increased during the same period. Details of the sample demographics and those of the full sample of 801 children in the longitudinal project are reported in Table 1.

Measures

The current study used data collected when most participating children were in first grade (prior to the pandemic, during spring 2019)

Table 1
Descriptive statistics of the analytical sample (N = 247) and the full sample (N = 801).

	Analytical sample (N = 247)	Full sample (N = 801)
Child characteristics	*M* (*SD*) / %	*M* (*SD*) / %
Age (in years)	8.13 (0.46)	5.60 (0.37)
Sex (female)	46.6%	48.6%
Caregiver characteristics	%	%
Relationship to child		
Mother	91.9%	86.4%
Father	4.5%	8.2%
Other	3.6%	5.4%
Race		
White	89.3%	79.9%
Black	3.7%	6.0%
Other[a]	7.0%	14.1%
Education		
High school or less	17.1%	26.9%
Some college but no degree	24.8%	23.8%
AA/AS 2-year degree	14.6%	31.1%
Bachelor's degree	23.6%	10.8%
Some graduate school or higher	19.9%	7.3%
Marital status		
Married	71.0%	63.9%
Cohabiting	11.8%	11.0%
Single	17.1%	25.1%
Annual income in 2019		
$0–$40,000	22%	36.9%
$40,001–$60,000	11%	12.5%
$60,001–$100,000	34.4%	26.4%
$100,001 and above	32.8%	23.8%
Monthly income change since		
March 15, 2020		NA
Decreased	68.1%	
Stay the same	23.9%	
Increased	8.0%	
Employment change since March		
15, 2020		NA
Currently working	71.0%	
Constantly not working	17.1%	
Lost work since COVID-19		
shutdown	11.8%	

Note. Means (*M*) and standard deviations (*SD*) are reported for continuous variables and percentages are reported for categorical variables. Percentages may not sum to 100% due to rounding. Data for the full sample was collected in fall 2017 and spring 2018 when children were in kindergarten. [a]Other includes the following categories: Asian, American Indian, Alaska Native, Native Hawaiian, Pacific Islander, and other (specified by participant in writing).

and second grade (during the pandemic, during spring 2020). The dependent outcome variables included parent-rated measures of child behavior problems, including acting out, fearfulness, and anxious withdrawal. Independent variables included parent distress and children's pre-pandemic social-emotional skills. Parent distress was represented by parent-reported measures of depression, anxiety, loneliness, and lack of resilience from Ohio's COVID-19 shutdown (2020). Child measures of pre-pandemic social-emotional skills, including children's behavior control and peer social skills, were rated by children's teachers during the previous school year (2019).

Dependent Variables: Child Behavior Problems

Child behavior problems were measured through the COVID & Families Study survey (2020) using 17 items across three subscales of the Pediatric Emotional Distress Scale (PEDS; Saylor, 2002; Saylor et al., 1999). Parents were asked to rate each statement using a 4-point scale, choosing from *almost never* (score = 0) to *very often* (score = 3) to describe how frequently their child exhibited each behavior since March 15, 2020 (i.e., when the Ohio stay-at-home order went into effect). Examples of acting out behaviors included: temper tantrums, hyperactivity, and aggression. Examples of fearful behaviors included: refusing to sleep alone and being fearful without reason. Examples of anxious withdrawal behaviors included: seeming worried, sad, and/or withdrawn, and somatic complaints. The acting out (six items: Cronbach's alpha = 0.84, n = 244 non-imputed cases subscales), fearful (five items: Cronbach's alpha = 0.80, n = 240 non-imputed cases), and anxious withdrawal (six items: Cronbach's alpha = 0.70, n = 241 non-imputed cases) subscales each had acceptable internal consistency within our analytic sample. Average scores were calculated for each of the three PEDS subscales when parents provided answers to at least 75% of the respective subscale items: acting out (five out of six items), fearful (four out of five items), and anxious withdrawal (five out of six items). For each subscale, higher scores indicated higher frequency of distress-related behavior problems. The subscale of acting out represented externalizing behavior problems, while the subscales of fearfulness and anxious withdrawal represented internalizing behavior problems.

Independent Variable: Parent Distress

The following four parent distress indices were collected using the COVID & Families Study survey: depression, anxiety, loneliness, and lack of resilience. Depression was measured using the Center for the Epidemiological Studies of Depression Short Form (CESDR-10; Björgvinsson et al., 2013). Parents were asked to rate 10 statements using a 4-point scale from *rarely or none of the time (less than 1 day)* (score = 0) to *all of the time (5–7 days)* (score = 3), based on how frequently they felt that way during the last week. Example statements include: "I was bothered by things that usually don't bother me," "I felt that everything I did was an effort," and "I could not 'get going'." This scale had acceptable internal consistency within our analytic sample (Cronbach's alpha = 0.87, n = 208 non-imputed cases). An average score was calculated for parents who provided answers to at least eight of these statements, with higher levels of depression represented by higher average CESDR-10 scores.

Anxiety was measured using the Generalized Anxiety Disorder 7-Item Scale (GAD-7; Löwe et al., 2008; Spitzer et al., 2006). Parents were asked to rate seven statements using a 4-point scale from *not at all* (score = 0) to *nearly every day* (score = 3), based on how often they felt that way during the last two weeks. Example statements include: "I have been feeling nervous, anxious, or on edge," "I have not been able to stop or control worrying," and "I have trouble relaxing." This scale had acceptable internal consistency within our analytic sample (Cronbach's alpha = 0.92, n = 215 non-imputed cases). An average score was calculated for parents who provided answers to at least six of these statements, with higher levels of anxiety represented by higher average GAD-7 scores.

Loneliness was measured using the UCLA Loneliness Scale version 3 (Russell, 1996). Parents were asked to rate 20 statements on a 4-point scale from *strongly disagree* (score = 1) to *strongly agree* (score = 4), based on how often they felt that way since March 15, 2020. Example statements include: "I feel that I lack companionship," "I feel that there is no one I can turn to," and "I feel isolated from others." This scale had acceptable internal consistency within our analytic sample (Cronbach's alpha = 0.95, n = 191 non-imputed cases). An average score was calculated for parents who provided answers to at least 16 of these statements, with higher loneliness represented by higher average UCLA Loneliness Scale scores.

Lack of resilience was measured using the Brief Resilience Scale (Smith et al., 2008). Parents were asked to rate six statements on a 5-point scale from *strongly disagree* (score = 1) to *strongly agree* (score = 5), based on how they handle stressful events in general. Example statements include: "I tend to bounce back quickly after hard times," and "I usually come through difficult times with little trouble." When necessary, statements were reverse coded such that a higher score for that item represented less overall resilience. This scale had acceptable internal consistency within our analytic sample (Cronbach's alpha = 0.90, n = 238 non-imputed cases). An average score was calculated for parents who provided answers to a least five of these statements, with less resilience represented by higher average Brief Resilience Scale scores.

As symptoms of distress frequently co-occur (e.g., Kaufman & Charney, 2000), we investigated the relationship between these four indices for our sample to determine how best to include this data within our analyses. Factor analysis on the four parent distress indices indicated that these indices converged on a single dimension. Therefore, we performed data reduction for the purpose of parsimony. Instead of using the individual average scores for each of the four subscales, we used a regression factor score for *parent distress*, as it uses an underlying model to predict an "optimal" factor score and maximizes validity of estimates (DiStefano et al., 2009).

Independent Variables: Children's Pre-Pandemic Social-Emotional Skills

Children's social-emotional skills prior to the pandemic were measured in spring 2019 with the Teacher-Child Rating Scale (TCRS, Perkins & Hightower, 2002). The TCRS is a brief objective rating scale designed for teachers to assess students' social skills and behavioral competencies on a total of 32 statements using a 5-point Likert scale. While the TCRS has four subscales, we chose to use two subscales to measure children's social-emotional skills for this analysis: children's behavior control and peer social skills. Each subscale contained eight items, four of which measured positive competency (e.g., this student "accepts imposed limits" or "makes friends easily") and four of which measured negative behaviors (e.g., this student "disturbs others while they are working" or "lacks social skills with peers"). Teachers rated these items on a five-point Likert scale (*strongly disagree* = 0, *strongly agree* = 4) based on the extent to which they agreed that the statements described each child. Negative items were then reverse coded. Both subscales had acceptable internal consistency within our sample (Cronbach's alpha = 0.95 for behavior control subscale and 0.90 for peer social skills subscale, n = 160 non-imputed cases). Scores were summed for each subscale, with higher scores representing higher levels of social skills and behavior control respectively.

Covariates: Child and Family Characteristics

Child and family characteristics were collected via the COVID & Families Study survey, and included child age and sex, parent marital status, race, education level, household income change, and employment status change since the start of Ohio's COVID-19 shutdown (i.e., March 15, 2020). Child sex was coded *Female* = 1 and *Male* = 0. Parent marital status was re-coded as *Single* = 1 or *Married/Co-habitating* = 0. Parent race was re-coded as *White* = 1 or *Other* = 0. Parent education level was re-coded as *Less than BA* = 1 or *BA or higher* = 0. Employment status change was re-coded as *Employed* = 1 or *Unemployed* = 0.

Household income change was re-coded as *Same or increased* = 1 or *Decreased* = 0.

Data Analyses

To examine children's expression of behavior problems during Ohio's COVID-19 shutdown, we used data collected through the COVID & Families Study survey alongside ELO data collected through children's assessments within classrooms from the previous year (spring 2019). We first examined the variability in child behavior problems at home during the shutdown by exploring means (*M*) and standard deviations (*SD*) of the dependent variables (i.e., acting out, fearfulness, anxious withdrawal), examined their correlations, and conducted preliminary analyses on the effects of child characteristics (i.e., age and sex).

To address whether and the extent to which child behavior problems during the shutdown period were associated with concurrent parent distress and/or children's pre-pandemic social-emotional skills, we conducted a series of hierarchical regression models. The variables were entered into the model in the following order: (1) Parent distress and the covariates, including child age and sex; parent marital status, race, and education level; household monthly income change; and parent employment status change during the COVID-19 shutdown period (hereafter: step 1); (2) children's pre-pandemic social-emotional skills, including behavior control and peer social skills (hereafter: step 2); and (3) interaction terms, including parent distress × child behavior control and parent distress × child peer social skills (hereafter: step 3). In the models, we also standardized children's pre-pandemic social-emotional skill variables (i.e., behavior control and peer social skills) to be consistent with the scale of regression factor score for parent distress variable, and for better interpretation of the moderation results (Aiken & West, 1991).

Missing Data

In the analytical sample ($N = 247$), only one of the dependent variables (i.e., acting out) had no missing data, while the other two dependent variables (i.e., fearfulness and anxious withdrawal) had a low amount of missing data (0.81% - 1.21%). Child age and sex had no missing data, while the other parent and household covariates had 0.40% to 3.64% of missing data. The four parent distress predictors were missing between 0.81% - 5.67% data, and the two pre-pandemic child social-emotional skill predictors had 33.2% missing data on each of the variables. Considering the high proportion of missing data in the predictor variables, we used multiple imputation to treat missing data (Little & Rubin, 1987), because listwise deletion has been shown to produce biased results and low power (Graham, 2012). Using Blimp (v. 1.1.4, Enders et al., 2020), 20 datasets were imputed and analyzed to generate the final estimates for the regression models.

Results

Child Behavior Problems during Ohio's COVID-19 Shutdown

Univariate analyses on the behavior problems variables showed that parent-rated scores for children's acting out behaviors ranged from 0 to 3 ($M = 1.03$, $SD = 0.69$). The scores for acting out had a reasonable spread, suggesting they were quite variable. Parent-rated scores for children's fearful behaviors ranged from 0 to 3 ($M = 0.60$, $SD = 0.65$), and scores for anxious withdrawal behaviors ranged from 0 to 2.17 ($M = 0.38$, $SD = 0.41$). Both fearfulness and anxious withdrawal scores were skewed to the higher end, indicating more parents reported low levels of internalizing behavior problems for their children than high levels. The three behavior problem subscales were significantly correlated with one another ($rs = 0.53$ to 0.57, $ps < 0.01$, Table 2), although the average score for acting out behaviors was higher than that for fearful and anxious withdrawal behaviors. With respect to child characteristics, only child age was positively and significantly correlated with anxious withdrawal behaviors ($r = 0.17$, $p < .01$).

Table 2
Correlations of key study variables (N = 247).

		1	2	3	4	5
Dependent variables						
1	Acting out	–				
2	Fearfulness	0.53**	–			
3	Anxious withdrawn	0.56**	0.57**	–		
Independent variables						
4	Parent distress	0.46**	0.39**	0.43**	–	
5	Child behavior control	−0.23**	−0.16*	−0.04	−0.06	–
6	Child peer social skills	−0.38**	−0.26**	−0.21**	−0.17*	0.74**

Note. Correlations for covariate variables are not presented. *$p < .05$. ** $p < .01$ (2-tailed).

<Table 2. Correlations of all Study Variables ($N = 247$)>.

The Influence of Concurrent Parent Distress

As shown in Table 2, parent distress was positively and significantly correlated with the three types of child behavior problems, namely, acting out ($r = 0.46$, $p < .01$), fearfulness ($r = 0.39$, $p < .01$), and anxious withdrawal ($r = 0.43$, $p < .01$). As shown in Table 3: Step 1, parent distress had a significant effect on children's acting out ($B = 0.30$, $p < .001$), fearfulness ($B = 0.24$, $p < .001$), and anxious withdrawal ($B = 0.18$, $p < .001$). Additionally, child age significantly predicted anxious withdrawal behavior ($B = 0.01$, $p < .05$), while none of the other child and family characteristics had significant effects. The optimal linear combination of parent distress and the covariates jointly predicted 15% to 20% of the variation in child behavior problems (adjusted $R^2 = 0.17$ for acting out, 0.15 for fearfulness, and 0.20 for anxious withdrawal).

<Table 3. *Hierarchical Regression Results for Child Behavior Problems*>.

Predictive Power of Children's Pre-Pandemic Social-Emotional Skills

As shown in Table 2, pre-pandemic child behavior control was significantly and negatively correlated with acting out ($r = -0.23$, $p < .01$) and fearfulness behaviors ($r = -0.16$, $p < .05$). Pre-pandemic child peer social skills were significantly and negatively correlated with all three types of behavior problems, namely, acting out ($r = -0.38$, $p < .01$), fearfulness ($r = -0.26$, $p < .01$), and anxious withdrawal ($r = -0.21$, $p < .01$). As shown in Table 3: Step 2, peer social skills were a significant predictor for acting out ($B = -0.24$, $p < .01$) and anxious withdrawal behaviors ($B = -0.11$, $p < .001$), indicating that a higher child's peer social skills score as reported in 2019 was associated with less expression of acting out and anxious withdrawal behaviors during the COVID-19 shutdown period. Peer social skills was marginally significant in predicting fearfulness ($B = -0.13$, $p = .053$). Notably, children's behavior control was not a significant predictor for any of these behavior problems. Additionally, child age significantly predicted anxious withdrawal behavior ($B = 0.01$, $p < .05$), and children whose parents' income remained the same or increased exhibited significantly fewer acting out behaviors compared to those whose parents' income decreased since the start of the COVID-19 shutdown period ($B = -0.18$, $p < .05$). Children's social-emotional skills explained an additional 10% of the variance in acting out, an additional 4% of the variance in fearfulness, and an additional 4% of the variance in anxious withdrawal.

Table 3
Hierarchical regression results for child behavior problems.

Variable	Acting out				Fearfulness				Anxious withdrawal			
	B	*SE*	R^2	ΔR^2	*B*	*SE*	R^2	ΔR^2	*B*	*SE*	R^2	ΔR^2
Step 1			0.17	0.20***			0.15	0.17***			0.20	0.22***
Constant	0.45	0.73			0.75	0.70			−0.72	0.43		
Parent distress	0.30***	0.04			0.24***	0.04			0.18***	0.02		
Child age	0.01	0.01			<−0.01	0.01			0.01*	<−0.01		
Step 2			0.27	0.10***			0.18	0.04*			0.23	0.04*
Constant	0.26	0.71			0.62	0.69			−0.73	0.43		
Parent distress	0.26***	0.04			0.22***	0.04			0.17***	0.02		
Child age	0.01	0.01			<−0.01	0.01			0.01*	<−0.01		
Parent income change	−0.18*	0.09			−0.12	0.09			−0.01	0.05		
Child behavior control	0.02	0.07			<−0.01	0.07			0.07	0.04		
Child peer social skills	−0.24**	0.08			−0.132	0.07			−0.11**	0.04		
Step 3			0.27	0.002			0.19	0.01			0.23	0.01
Constant	0.27	0.72			0.61	0.70			−0.74	0.43		
Parent distress	0.26	0.04			0.23	0.04			0.17	0.02		
Child behavior control	0.03	0.07			<−0.01	0.07			0.07	0.04		
Child peer social skills	−0.25	0.08			−0.124	0.07			−0.11	0.04		
Parent distress × Child behavior control	0.01	0.07			0.07	0.07			0.01	0.05		
Parent distress × Child peer social skills	<0.01	0.08			−0.12	0.07			−0.03	0.05		

Note. Standardized beta is not presented because coefficients were pooled based on 20 imputed datasets. Only coefficients of the covariates with significant effect on at least one of the outcomes are presented. Covariates included child age, child gender, parent marital status, parent race, parent education, parent employment change, and parent income change. *$p < .05$. **$p < .01$. ***$p < .001$.

Moderation of Children's Pre-Pandemic Social-Emotional Skills

As shown in Table 3: Step 3, children's pre-pandemic behavior control and peer social skills did not moderate concurrent parent distress on any of child behavior problems. The interaction term of parent distress × behavioral control was not significant in predicting acting out ($B = 0.01$, $p = .91$), fearfulness ($B = 0.07$, $p = .31$), or anxious withdrawal ($B = 0.01$, $p = .92$) behaviors. Similarly, the interaction term of parent distress × peer social skills was not significant in predicting acting out ($B = 0.004$, $p = .96$), fearfulness ($B = -0.12$, $p = .10$), or anxious withdrawal ($B = -0.03$, $p = .54$) behaviors.

Discussion

The purpose of this study was to examine child behavior problems exhibited at home during the COVID-19 shutdown, and the extent to which they were associated with concurrent parent distress and children's pre-pandemic social-emotional skills. We assessed these key predictors of child behavior problems using data from 247 young children aged 7 to 9 years and their parents in the state of Ohio, U.S. Our results demonstrated that concurrent parent distress and children's pre-pandemic peer social skills were significantly associated with differences in child behavior problems during Ohio's COVID-19 shutdown.

During the early pandemic shutdown period, children exhibited more acting out behaviors than fearfulness and anxious withdrawal behaviors. This observation was perhaps not surprising, as internalizing behaviors are more complex than externalizing behaviors (Calkins et al., 2007), and externalizing problems (e.g., acting out) are typically easier to identify and recognize than internalizing problems (Natarajan, 2013). The prevalence of child behavior problems is consistent with other pandemic-related studies worldwide (Gassman-Pines et al., 2020; Giannotti et al., 2021; Romero et al., 2020; Xie et al., 2020). In addition, older children exhibited more anxious withdrawal behaviors than younger children, but age did not significantly predict acting out or fearful behaviors. Although hyperactive behaviors tended to decrease across childhood (Shaw et al., 2005) and school-aged children coped with the crisis better than preschool children (Romero et al., 2020), a consistent age difference in behavior problems during the pandemic was not observed among 7- to 9-year-olds in our sample.

Parent distress was a significant predictor for both externalizing (i.e., acting out) and internalizing (i.e., fearfulness and anxious withdrawal) child behavior problems. This finding was consistent with previous studies regarding the critical role caregiver distress plays in the development of behavior problems (Anastopoulos et al., 1992; Cummings, 1995; Cummings & Davies, 1994; Downey & Coyne, 1990). It is important to note that parental distress during this pandemic may have been due to more short-term reasons, such as job loss and health worries, but still had similar associations to children's behavior as those found in work completed prior to the pandemic. During the COVID-19 pandemic, the cascading effects of the social interruptions on parents' distress had an emotional impact on child behaviors (Prime et al., 2020). The negative effect of parent distress on child behavior problems observed in our study was also consistent with other pandemic-related studies on parent-child interactions (Giannotti et al., 2021; Hanetz-Gamliel et al., 2021; Romero et al., 2020). This further strengthens our knowledge that parental distress, regardless of cause, is a risk factor for children's behavior problems during adverse situations.

We also documented that children's pre-pandemic peer social skills were a significant predictor for all three child behavior problems, indicating that the higher the child's peer social skills, the fewer acting out, fearfulness, and anxious withdrawal behaviors would be expressed by the child. These findings align with the extant literature regarding the relations between social competence and children's trajectory of behavior problems (e.g., Gazelle & Ladd, 2003; Göbel et al., 2016; Hukkelberg et al., 2019). Based on longitudinal data, our findings added to the scarce literature on the relations between children's individual antecedent social-emotional skills and behavior problems during the COVID-19 shutdown. For school-aged children, individual social skills form a child's experiences of acceptance or rejection within their social network, and in turn evoke emotional, cognitive, and behavioral responses. As children develop from a dependent stage of infancy and toddlerhood to an independent stage through preschool and early elementary grades, their relationships with peers and teachers become increasingly important as they are more reliant on these proximal influences in adjusting and managing their behaviors (Shelleby et al., 2012). Within a peer social network, children shape their own social attitudes and reactions towards certain situations and people around them from constant experiences of acceptance, rejection, judgment, and self-evaluation. Children who are better equipped with social skills are more sensitive to people's feelings and tend to exhibit more inhibition in emotional and behavioral reactions in the situation (Bornstein et al., 2010). During the COVID-19 shutdown, even with reduced social contact and context in the usual classroom environment, children's internal cognitive and emotional ability may serve as an asset in coping with

distress and crises (Domínguez et al., 2020).

Our results also showed that children's pre-pandemic behavior control was not a significant predictor for neither externalizing nor internalizing behavior problems during the pandemic. Although previous research has shown a negative association of children's behavior control and behavior problems, such that low effortful control is strongly associated with high levels of externalizing problems such as aggressive and destructive behaviors (Olson et al., 2005; Valiente et al., 2003), the effect of children's pre-pandemic behavior control might be mitigated when adjusting for peer social skills in our study. Indeed, evidence show that the influence of self-regulation on children's social activities with peers was mediated by children's pragmatic language, a proxy of peer social skills (Lin et al., 2019).

None of the parent or family characteristics had significant effects on child behavior problems, except parent income change predicted acting out behaviors. Children whose parents' income remained the same or increased exhibited significantly fewer acting out behaviors compared to those of parents whose income decreased since the COVID-19 shutdown went into effect. Family socioeconomic status plays an important role in both child and parents' adjustment and behaviors in stressful life situations (Reiss et al., 2019; Romero et al., 2020). Thus, it is possible that financial security assured more quality time parents spent with children during the lockdown, and that with a positive income change, parents had more opportunities to access and utilize external resources to help children in coping with stress during the crisis.

Finally, our results revealed no interaction effects of children's behavior control or peer social skill with parent distress on child behavior problems. One possible explanation for this null interaction may be reporter biases. Specifically, at the beginning of the COVID-19 shutdown (when pandemic data were collected), parents' perception of their distress and child behavior during the pandemic may have changed compared to pre-pandemic times. On the other hand, children's social-emotional skills were reported by teachers one year before the pandemic. However, it is also possible that young children's behavior control or peer social skills are not robust enough to buffer the negative effect of parent distress on their behavior problems, especially within the immediate proximity of a household during a crisis. If this speculation is correct, the influence of parent distress on children during the pandemic would be consistent with both pre-pandemic and pandemic-related findings on the direct and indirect effects of parental distress on child behavior problems (Cummings & Davies, 1994; Downey & Coyne, 1990; Flouri et al., 2019; Romero et al., 2020). Despite the reduction of social contact and interaction with external factors outside the household during the COVID-19 shutdown, perhaps there were additional influences on child behavior problems that contributed more to explaining the variance in these behaviors, such as children' daily routines and nutrition, or their relationships with parents and other family members. For instance, focused parenting practice (i.e., effort of communication with the child about COVID-19) totally mediated the effect of parenting distress on child refection, and structured parenting practice (i.e., attempts to give structure and regularity in child's daily life) partially mediated the effect of parenting distress on child routine maintenance during the pandemic (Romero et al., 2020). Further research to investigate other factors that may potentially buffer the association between parent distress and child behavior problems during the pandemic would be beneficial to clarifying our understanding of these relations.

This study has a few limitations. First, while addressing both concurrent parental influences and pre-pandemic child characteristics and their interactions on children's parent-reported behavior problems, accurately measuring parent distress and child behavior problems during such an unprecedented period was challenging. The relation between child behavior problems and parent distress is bidirectional, as observed in both pre-pandemic and pandemic-related studies (Giannotti et al., 2021; Neece et al., 2012; Romero et al., 2020). According to research using a mediation approach, it is also likely that parent distress impacts parenting behavior, which in turn, contributes to child behavior problems (McIntyre, 2008). Thus, we could not assume that parent distress indices were measured independently of child behavior problems because parenting behavior is usually contingent upon child behavior (Sanner & Neece, 2018), especially under such stressful circumstances.

Second, parent distress and child behavior problem indices collected for this study were self-reported and observational. Thus, we are not able to develop a comprehensive analysis on parent distress within the family context or on child behavior problems as signs of social-behavioral problems or disorders in early childhood development. It also must be emphasized that our conclusions drawn from this data are far from being diagnostic of parent psychopathology or child symptomatology. Rather, the purpose of the present study was to better understand the potential relations between parent distress and individual social-emotional skills and child behavior problems during the unprecedented time of a pandemic shutdown, with a focus on whether a child's own social-emotional skills of behavior control and peer social skills buffer the emotional and behavioral impact of their primary parent's distress within the proximate home environment.

Third, our sample is relatively small, not racially diverse, and geographically restricted. Therefore, the generalizability of these findings is limited. Most of the parents in this study were White (89.3%). This is important to note as other work has shown that the COVID-19 pandemic has disproportionately impacted families of color (Gemelas et al., 2021; Karaca-Mandic et al., 2021). Data for this current work were collected in Ohio, US, where the impact of COVID-19 and shutdown policies may be different compared to other states or countries. Future research should examine these associations in other data sources collected during this time. In addition, most parental reports for this study was from mothers (91.9%). There might be potential differences in parental reports between mothers and fathers, as paternal reported child behavior might yield different results depending on who is the primary caregiver and who spends more time with the child in different familial structures. Lastly, our findings are not causal in nature. However, our use of longitudinal data, multiple reporters, and numerous covariates help isolate our hypothesized pathways to children's behavior problems.

Despite the limitations mentioned above, this study emphasized the concurrent influence of parent distress and pre-pandemic child social-emotional skills on child behavior problems during the pandemic, providing valuable insights into understanding differences in child behaviors at home during a shutdown period. Our results highlight the importance of children's peer social skills. Based on our findings, we encourage parents to promote young children's social-emotional skills as it may reduce the likelihood of expressing behavior problems (Bornstein et al., 2010). As strategies to support social-emotional skill learning, parents spending time to analyze and normalize stressful situations, answer questions, and have discussions about stressors (e.g., the COVID-19 pandemic) can be beneficial for children to cope and respond to similar situations in the future (Romero et al., 2020). In addition, some strategies used to build resilience in young children could also be adapted to fit the confines of shutdown periods (Jiao et al., 2020). For example, building routines and asking children to fulfill responsibilities, such as making their beds, doing house chores, and assisting other routine tasks in the family, are reported as effective strategies to promote self-regulation, independence, and organizational skills (Taket et al., 2014; Romero et al., 2020).

Conclusion

As an effort to advance our understanding of the potential psychological ramifications of the COVID-19 pandemic and subsequent government-mandated shutdowns on child development, the present study juxtaposed children's social-emotional skills evaluated prior to the pandemic with environmental (parents') distress during the shutdown period. Our study found that parent distress was a significant predictor

of children's externalizing acting out and internalizing fearfulness and anxious withdrawal. Children equipped with high peer social skills significantly mitigated their behavior problems during the crisis. However, neither of child pre-pandemic behavior control nor peer social skills had significantly buffering function on the influence of parent distress on child behavior problems.

Our findings suggest that fostering children's peer social skills and behavior control may have a life-time positive effect on children's developing behaviors, especially in dealing with external crises such as the COVID-19 pandemic. Additional research is warranted to expand the scope of children's social-emotional skills beyond peer social skills and behavior control. For example, measures of self-regulation, organizational skills, and other resilience factors might provide further insights into why child behavior problems varied during this tumultuous period surrounding the COVID-19 shutdown.

Data Availability Statement

Research data are not shared.

Authorship Contributions

Jing Sun: Conceptualization, Methodology, Formal analysis, Writing-Original Draft.

Britt Singletary: Conceptualization, Writing-Original Draft.

Hui Jiang: Methodology, Writing-Review & Editing.

Laura Justice: Conceptualization, Writing-Review & Editing, Supervision, Funding acquisition.

Tzu-Jung Lin: Conceptualization, Writing-Review & Editing.

Kelly M. Purtell: Conceptualization, Writing-Review & Editing.

Declarations of Competing Interest

None.

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