

Article

Children's Stress in the Time of COVID-19: Relationships with School, Social and Recreational Experiences

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Abstract: Introduction: In response to the public health threats during the pandemic, many schools shifted to online instructional delivery, and many children experienced changes to their social and recreational activities. While an emerging body of literature is documenting these changes or how these experiences may be related to parents' and children's functioning, no known study has examined all of these constructs. We investigated the degree to which schooling, social, and recreational experiences during the COVID-19 pandemic influenced the stress levels of school-age children. Further, recognizing the interconnectedness of parents' and children's lives, we examined whether parental stress mediated the relations between children's experiences and child stress. Method: Parents of school-age children ($N = 701$) completed an online questionnaire with items focused on school modality (i.e., fully online or not), sufficiency of school resources, change in relationships, change in social/recreational activities, parental stress, and child stress. Results: The findings indicated that fully online school was not associated with child stress. Lower sufficiency of school resources, greater change in relationships, and greater change in social/recreational activities predicted higher child stress. Parental stress fully or partially mediated these relations. Discussion: Implications for educators are provided.

Keywords: COVID-19; children; parents; school; stress; relationships; recreation

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1. Introduction

As extensively reported in the recent literature, parents and youth experienced heightened levels of stress during the COVID-19 pandemic [1–4]. Furthermore, some research indicates that parents experienced higher levels of stress than non-parents [5,6], which is likely due to increased parental demands associated with school closures and other familial life changes (e.g., cancellation of youth recreational activities). High levels of stress during the COVID-19 pandemic were shown to be related to youth's diminished mental health outcomes, including increased anxiety, fatigue, and lower life satisfaction [2,4], as well as increases in externalizing behaviors [7,8]. For parents, high levels of stress during this time were associated with lower quality of parent–child interactions and harsher parenting [9], which aligns with the extant literature on the relation between parent stress and parenting quality [10,11]. In general, parents who are experiencing more stress are less responsive to children's needs and may display harsher parenting. Chronic stress is also related to poor health outcomes [12]. Because of stress's association with the functioning of families, it is important to investigate how key experiences during the COVID-19 pandemic were related to children's and parents' stress levels.

Because parents and children's lives are so tightly interconnected, it is not surprising that parents' and children's stress and functioning are related. For instance, researchers have found statistically significant correlations between parents' and children's negative coping strategies during the pandemic [7]. Additionally, during the pandemic, parental stress

was a strong predictor of child stress [2,3] and other negative outcomes for children, such as more externalizing behaviors and decreased emotion regulation [8,13]. As such, both parents' and children's stress should be considered when examining families' experiences during the pandemic.

Stress about health and financial concerns, changes in routines, and social isolation were commonly noted by individuals during the pandemic [1,14–16]. Specifically, considering the context of families with school-age youth, changes in school, social relationships, and recreational activities were particularly salient. Extant research has examined these different elements of children's lives during the pandemic, such as descriptions of families' experiences [4,17–20] and how one or more of these contexts related to youth's stress, functioning, or mental states [4,8,21] and parent stress [22,23]. However, no known research has examined how all of these contexts—school, social, and recreational experiences—impacted children's and parents' stress. As such, the aim of this study was to investigate the degree to which school modality and school resources, as well as changes in relationships and social/recreational activities, influenced children's stress. Further, we examined whether parental stress mediated the relations between children's experiences and their stress. Investigating the degree to which children's COVID-19 experiences, a salient historical context, were associated with both parent and child stress provides an important lens on how children are influenced by proximal influences in their ecological microsystem.

1.1. Theoretical Framework

Our study was guided by two theoretical frameworks, namely, bio-ecological theory and life course theory, which jointly conceptualized the child in a larger ecological context during a specific historical event. According to Bronfenbrenner's (2001) bio-ecological theory [24], children's development and functioning are influenced by both proximal processes, such as direct interactions with parents, educators, and peers, and distal processes, such as societal influences. In this study, we examined how changes to a youth's microsystem, specifically their schooling, social, and recreational activities, influenced their level of stress. We further sought to examine the functioning of the microsystem by investigating the degree to which parental stress mediated the relations between children's experiences and their stress. Similar to bio-ecological theory, life course theory [25] also recognizes that the lives of individuals, such as parents and children, are linked. Yet, life course theory pays particular attention to how large-scale historical events, such as the COVID-19 pandemic, in an individual's life influence their development and how individuals may respond differently to events based on their own stage of development. Specific to this study, this may mean that youth and parents have differing levels of stress in reaction to youth's changes in schooling or social and recreational activities. As such, both theoretical perspectives provide an important foundation for understanding how altered proximal experiences during the COVID-19 pandemic relate to youth's stress levels and whether parents' stress levels mediate those relations.

1.2. School Experiences

During the pandemic, over 90% of students experienced the physical closing of their schools and attended school fully online for a period of time [26]. Numerous studies have shown that COVID-19 school disruptions were associated with negative outcomes for children and parents. School closures and engaging in fully online school were related to higher levels of behavioral and emotional disorders in students [8,27], which may be due to a loss of social connectedness. Social isolation negatively impacts children's stress levels and mental health [14,15]. Furthermore, pivoting to online school decreased students' academic motivation [18]. However, Xiao and colleagues (2023) did not find any significant association between school disruptions during the pandemic and child stress [16].

Parental stress also increased with online schooling; this association was often attributed to the challenges of managing school, work, and family responsibilities as well as a self-reported lack of preparation in how to help their children succeed in online

school [18,22,23]. When parents believed that they had the appropriate resources to help their children succeed, they were more satisfied with online schooling [17,18].

Schools provide copious resources to youth and their families. They provide resources to help students succeed academically, such as tutoring and communication with parents. Additionally, they provide meals as well as mental health services. No study has explicitly examined how the resources that schools provided during the pandemic related to child and parent stress. However, Carpenter and Dunn (2020) surveyed over 1700 U.S. parents who reported that schools provided helpful resources to support student learning, such as mental health resources, access to learning opportunities, and communication with the teachers [17]. Notably, both Carpenter and Dunn (2020) and Hamaidi et al. (2021) found that during the pandemic, parents whose children attended typical public schools were less satisfied with the resources and school experiences than parents whose children attended private or charter schools [17,19]. It is important to investigate whether the resources that schools provided during the COVID-19 pandemic are related to parent and child stress.

1.3. Social and Recreational Experiences

During the pandemic, youth experienced changes in their social relationships with peers and recreational activities. Youth often reported missing their friends and extracurricular activities [7,21]. Further, their participation in organized sports or other exercise time dramatically decreased during the pandemic [4,20,28].

Changes to their social and recreational experiences were associated with negative outcomes for youth and parents. Youth who ceased participating in organized sports or other physical activities were moderately or severely depressed and anxious [29]. Also, youth experienced significant stress due to changes in social relationships with friends and recreational activities [4]. Social and recreational changes for children had residual impacts on parenting. Parents also reported that youth's dissatisfaction with the changes in their social activities impacted their parenting [1]. Given the salience of youth's social and recreational experiences in their lives, it is important to further understand how changes to these experiences during the COVID-19 pandemic were associated with their stress levels as well as how parental stress may mediate these relations.

1.4. Study Purpose

The aim of this study was to further the field's understanding of how schooling, social, and recreational experiences during the COVID-19 pandemic influenced youth's stress levels as well as to determine the degree to which these relations were mediated by parents' stress. While extant research has provided some preliminary information on how these experiences have been associated with youth or parental stress or related functioning, no study has yet examined these variables together to provide a fuller picture of families' experiences during the pandemic.

Specifically, this study addressed two research questions:

1. To what degree do youth's schooling, social, and recreational experiences during the COVID-19 pandemic predict child stress?

We hypothesized that youth would experience higher levels of stress if they were in fully online school, had fewer school resources available to them, and had greater levels of change in their social and recreational activities and social relationships.

2. Does parental stress mediate the relation between youth's schooling, social, and recreational experiences and children's stress?

Grounded in bio-ecological and life course theories, which highlight the interconnected experiences of parents and children, we hypothesized that parental stress would at least partially mediate the relations between youth's experiences and their stress. In other words, we hypothesized that higher levels of change in children's experiences would be associated with greater parental stress, which in turn would be associated with greater child stress.

2. Materials and Methods

This study utilized data from a larger survey study of parents ($n = 1000$) about their household experiences during the COVID-19 pandemic. In the larger study, respondents were parents of children aged 0–17 years. In the current study, we limited our focus to parents of school-age children and changes in youth's schooling, social, and recreational experiences.

2.1. Participants

Approximately 700 ($n = 701$) parents participated in the current study. Eligibility criteria for participation in the study included being a parent or guardian of at least one child who was school-age (kindergarten to 12th grade) between the ages of 5–17, residing in the United States, and being 18 years of age or older.

As shown in Table 1, the sample predominantly comprised respondents identifying as White (76%), followed by African American (9%), and Multiracial (7%). The majority of respondents had annual household incomes of USD 50,000–USD 74,999 (23%), USD 75,000–USD 99,999 (18%), and USD 100,000–USD 149,999 (20%). Most (88%) respondents had completed at least some college, with 23% reporting having a master's degree or higher. In terms of gender identity, 62% of the sample identified as cisgender female, 31% as cisgender male, and 2% as other gender identity. Roughly 71% of the sample reported being married, 10% as not married but in a cohabiting relationship, 8% as divorced, and 6% as single/never married. The mean parental age was 38.5 years ($SD = 7.6$). Respondents had a range of 1–5 school-age children, with an average of 1.54 ($SD = 0.94$) school-age children per respondent; 58% ($n = 409$) respondents had only 1 school-age child. The average age of the children in the study was 10.3 years ($SD = 3.8$).

Table 1. Sociodemographic characteristics of the sample.

	<i>n</i>	%
Total $N = 701$		
Race/ethnicity		
Asian	14	2.0
Black or African American	64	9.1
Hispanic, Latino, or Spanish origin	31	4.4
Multiracial	51	7.3
White	534	76.2
Annual household income		
Less than USD 25,000	53	7.6
USD 25,000 to USD 34,999	61	8.7
USD 35,000 to USD 49,999	83	11.8
USD 50,000 to USD 74,999	159	22.7
USD 75,000 to USD 99,999	128	18.3
USD 100,000 to USD 149,999	137	19.5
USD 150,000 or more	74	10.6
Education		
High diploma or less	84	12.0
Some college	232	33.1
Bachelor's degree/postgraduate work	227	32.4
Master's degree or higher	158	22.5
Gender identity		
Cisgender female	434	61.9
Cisgender male	220	31.4
Other gender identity	14	2.0
Marital status		
Divorced	55	7.8
Married	500	71.3
Not married, but in a relationship and living together	71	10.1
Not married, but in a relationship and not living together	9	1.3
Separated	17	2.4
Single/never married	43	6.1
Widowed	6	0.9
	<i>M</i>	<i>SD</i>
Age	38.5	7.6

2.2. Procedures

Participants completed a 20 min online survey on Prolific, a web-based survey recruitment platform, in September 2021. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the (name of institution masked) Institutional Review Board. Informed consent was obtained from all respondents before they participated in the study.

2.3. Measures

This study utilized data from a larger survey study of household experiences during the COVID-19 pandemic. The portions of the survey that were the foci for this study included children's schooling, social and recreational experiences, and parental and child stress. When parents were asked about their children, they were asked to consider all school-age children in the home. The following variables were extracted from the survey for the analyses.

2.3.1. Schooling Experiences

Schooling experiences that were examined as independent variables included children experiencing fully online instruction during the pandemic as well as school resources. Fully online instruction was a dichotomous variable (i.e., 1 = yes; 0 = no). School resources was operationalized as an index comprising parents' extent of agreement (0 = strongly disagree; 4 = strongly agree) that the child's school provided sufficient (a) emotional and mental health support resources; (b) academic support resources; and (c) healthcare resources during the pandemic. The school resources index ranged from 0–12. The school resources index had good internal consistency ($\alpha = 0.85$; $\omega = 0.86$) in the sample (Table 2).

Table 2. Reliability and correlations between study measures.

	Cronbach's Alpha	1	2	3	4	5
1. Change in children's social and recreational activities	N/A	1.00	0.46 ***	−0.11 **	0.12 **	0.17 ***
2. Change in children's relationships	N/A		1.00	−0.14 ***	0.20 ***	0.27 ***
3. School resources	0.85			1.00	−0.22 ***	−0.17 ***
4. Parental stress	0.92				1.00	0.50 ***
5. Child stress	0.87					1.00

Note. ** $p < 0.01$; *** $p < 0.001$.

2.3.2. Social and Recreational Experiences

The social and recreational experiences, including the change in children's social and recreational activities and the change in children's relationships during the pandemic, served as independent variables in our study. The change in social and recreational activities measure comprised two variables: change in social activities (i.e., How much has/have your child(ren)'s access to recreational activities (sports, arts, and volunteering) changed during COVID-19?) and change in recreational activities (i.e., How much has/have your child(ren)'s activities with friends (play dates and sleepovers) changed during COVID-19?). For each variable, respondents were asked the degree to which their child's activities changed during the pandemic on a scale of 0–2, with 0 = activities did not change at all, 1 = somewhat changed, or 2 = completely changed. The change in social and recreational measure was then created as a sum of these two variables and ranged from 0–4.

The change in relationships measure was operationalized as one variable (i.e., How much has/have your child(ren)'s relationships with friends changed during COVID-19?). Responses again ranged from “not changed at all” to “completely changed” (range of 0–2).

2.3.3. Child Stress

Child stress was the main dependent variable in the analysis. It was measured using the NIH Toolbox Parent-Rated Stress Scale, which assesses parental perceptions of their child's stress [30] and employs the same items as the validated 10-item Perceived Stress Scale [31]. Parents were asked, on a scale of 0–4 (0 = never; 4 = very often), how often their children experienced the thoughts or emotions expressed in each item (e.g., “felt that they were unable to control the important things in their life”, “could not cope with the all the things they had to do”) in the past month. After reverse coding applicable items and summing the 10 items, the child stress scale ranged from 0–40 (with higher values indicating more stress) and had good internal consistency ($\alpha = 0.87$; $\omega = 0.91$) in the sample.

2.3.4. Parental Stress

Parental stress, which was investigated as a potential mediator in the analysis, was operationalized as the same 10-item Perceived Stress Scale [31] used in the child stress measure. Parents were asked how often they experienced certain feelings and thoughts (e.g., “been upset because of something that happened unexpectedly”, “felt nervous and stressed”) in the past month. Similar to the child stress measure, the parental stress measure ranged from 0–40 and had excellent internal consistency ($\alpha = 0.92$; $\omega = 0.94$) in the sample.

2.3.5. Control Variables

As specified in the analytical approach, we controlled for numerous parental sociodemographic variables, namely race/ethnicity, gender identity, education, annual household income, age, and marital status. Control variables were selected based on extant literature that shows a relation with stress.

Parents' race/ethnicity was categorized as Asian; Black or African American; Hispanic, Latino or Spanish origin; White; and other race/ethnicity. Due to low sample size for the discrete categories, other race/ethnicity included American Indian or Alaska Native, Middle Eastern or North African, Native Hawaiian or other Pacific Islander, self-identified other race/ethnicity, and prefer not to say. During the COVID-19 pandemic, adults of color have reported more stressors, higher stress, and other negative mental health outcomes than White adults [22,32]. Parents' gender identity was categorized as cisgender male, cisgender female, other gender identity, and prefer not to say; other gender identities included transgender male, transgender female, non-binary/gender non-conforming individuals, and non-gender identifying individuals. Blackwell et al. (2022) found that females reported higher stress during COVID-19 than men [2]; Giannotti et al. (2022) reported a similar finding specific to parents, with mothers reporting higher stress than fathers [8]. Parents' highest level of educational attainment was categorized as high diploma or less; some college (i.e., some college, associate degree, and vocational training); bachelor's degree; and master's degree or higher; no respondents indicated “other” or “prefer not to answer” for education. Annual household income was categorized as less than USD 25,000, USD 25,000–USD 34,999, USD 35,000–USD 49,999, USD 50,000–USD 74,999, USD 75,000–USD 99,999, USD 100,000–USD 149,999, greater than USD 150,000, and prefer not to say. Other researchers found differences in parenting stress based on families' SES (i.e., education and income) and decision-making during COVID-19 [7,13,20]. Parental age was a continuous variable that was provided as an open-ended response (no parents reported “prefer not to answer”). No known research has demonstrated a relation between parental age and COVID-19 stress. Findings by Giannotti et al. (2020) showed a relation between child age and parental stress during COVID-19, with parents of younger children reporting higher levels of stress than parents of older children, as parents of younger children were likely younger in age themselves compared to parents of older children; parental age may have confounded the relationship between child age and parental stress. Relevant marital status categories included single/never married, married, not married, but in a cohabiting relationship and living with your partner, and separated/divorced (no parents reported “prefer not to answer”). Although no known research has shown a relation between marital

status and COVID-19 stress, Giannotti et al. (2020) found a negative relation between parental stress during COVID-19 and a related concept quality of coparenting [8].

2.4. Analytical Approach

The analyses were conducted using RStudio, version 4.1.2. Prior to conducting the analyses to address the research questions, preliminary analyses were conducted. Descriptive statistics were calculated for each of our measures, including schooling (i.e., fully online instruction and school resources index), social and recreational experiences (i.e., change in children's social and recreational activities and change in children's relationships), child stress, and parent stress measures (Table 3). As these measures had non-normal distributions in our sample, Kruskal–Wallis tests were then conducted to compare the means of continuous measures by sociodemographic characteristics; similarly, Chi-square tests were used for categorical measures (Table 3). The correlations (i.e., Spearman rank correlation coefficients) between the key measures were calculated (Table 2).

Table 3. Differences in social, educational, and stress measures by sociodemographic characteristics.

	Change in Children's Social and Recreational Activities (Range 0–4)		Change in Children's Relationships (Range 0–2)		School Resources (Range 0–12)		Fully Online Instruction ^a		Parental Stress (Range 0–40)		Child Stress (Range 0–40)	
	Mean (SD)	<i>p</i>	Mean (SD)	<i>p</i>	Mean (SD)	<i>p</i>	%	<i>p</i>	Mean (SD)	<i>p</i>	Mean (SD)	<i>p</i>
Total N = 701	2.65 (1.16)		0.98 (0.67)		5.84 (3.40)		41.08		18.38 (9.08)		16.16 (7.38)	
Race/ethnicity		0.18		0.10		<0.001		0.03		<0.001		0.23
Annual household income		0.36		0.27		0.31		0.09		<0.001		0.13
Education		0.31		0.58		0.16		0.24		<0.001		0.24
Gender identity		0.52		0.55		<0.001		0.57		<0.001		<0.01
Marital status		0.17		0.85		0.37		0.08		<0.001		<0.05
Age		0.28		0.07		0.93		0.14		<0.001		0.70

Note. Bolded *p*-values are statistically significant. ^a Dichotomous variable (0 = no, 1 = yes).

Hierarchical linear regression analyses were then conducted to examine the relationships between child stress and each schooling measure and social and recreational measure, adjusting for sociodemographic variables, and testing for the effects of parent stress on these relationships. The following covariates were included in the three models, with separate analyses for each independent variable of school modality, school resources, change in social/recreational activities, or change in relationships. For instance, the regression analysis for school modality was as follows: (1) model 1: fully online instruction; (2) model 2: fully online instruction and control variables; (3) model 3: fully online instruction, control variables and parent stress (Table 4). Additionally, the analyses that examined school resources, changes in social and recreational activities, and changes in children's relationships as independent variables also controlled for fully online instruction as a potential confounder, since children who enrolled in fully online instruction were very likely to have other aspects of their COVID-19 experiences change (e.g., a child whose school shifted to fully online would also likely curtail recreational activities). The number of missing values (i.e., four in total) in the data were minimal and were imputed using the averages of existing responses.

Table 4. Relationships between educational, social, and recreational factors and stress measures.

Covariate	Model 1		Model 2		Model 3	
	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>
Fully online instruction						
Fully online instruction	0.74 (0.57)	0.195	0.61 (0.57)	0.291	0.19 (0.50)	0.711
Asian			−2.94 (2.02)	0.146	−0.31 (1.78)	0.863
Black or African American			−0.99 (1.00)	0.324	0.36 (0.88)	0.679
Hispanic, Latino, or Spanish origin			1.25 (1.44)	0.386	1.70 (1.26)	0.177
Multiracial			0.76 (1.10)	0.491	1.13 (0.96)	0.239
Other/prefer not to say race/ethnicity			4.67 (2.83)	0.100	2.57 (2.48)	0.301
Income less than USD 25,000			2.38 (1.48)	0.109	1.19 (1.30)	0.358
Income of USD 25,000 to USD 34,999			1.12 (1.39)	0.422	1.30 (1.22)	0.285
Income of USD 35,000 to USD 49,999			1.35 (1.25)	0.279	1.69 (1.09)	0.123
Income of USD 50,000 to USD 74,999			0.37 (1.06)	0.727	0.28 (0.93)	0.762
Income of USD 75,000 to USD 99,999			−0.21 (1.07)	0.848	0.87 (0.94)	0.356
Income of USD 100,000 to USD 149,999			−0.82 (1.05)	0.437	0.36 (0.92)	0.699
Prefer not to say income			0.81 (3.14)	0.796	−1.22 (2.75)	0.657
High diploma or less			−1.99 (1.10)	0.070	−1.87 (0.96)	0.052
Some college			−0.28 (0.83)	0.736	−0.72 (0.73)	0.324
Bachelor's degree/postgraduate work			−0.27 (0.77)	0.722	−0.07 (0.67)	0.917
Cisgender female			2.15 (0.63)	<0.001	0.52 (0.56)	0.352
Other gender identity			3.55 (2.03)	0.080	(1.78)	0.571
Prefer not to say gender			1.13 (1.42)	0.427	0.91 (1.24)	0.463
Divorced			2.64 (1.08)	0.014	1.35 (0.95)	0.154
Not married, but in a relationship and living together			−0.63 (1.00)	0.529	−1.40 (0.87)	0.108
Not married, but in a relationship and not living together			−2.93 (2.48)	0.238	−0.78 (2.18)	0.722
Separated			−0.30 (1.82)	0.869	−0.17 (1.59)	0.914
Single/never married			−1.66 (1.27)	0.192	−1.63 (1.11)	0.144
Widowed			3.55 (3.02)	0.240	3.34 (2.64)	0.207
Age			0.02 (0.04)	0.585	0.10 (0.03)	0.005
Parental stress					0.42 (0.03)	<0.001
School resources						
School resources	−0.37 (0.08)	<0.001	−0.29 (0.08)	<0.001	−0.11 (0.07)	0.138
Fully online instruction			0.53 (0.57)	0.352	0.17 (0.50)	0.743
Asian			−2.75 (2.01)	0.171	−0.28 (1.78)	0.876
Black or African American			−0.51 (1.00)	0.608	0.52 (0.88)	0.556
Hispanic, Latino, or Spanish origin			1.13 (1.43)	0.430	1.65 (1.26)	0.191
Multiracial			0.55 (1.09)	0.613	1.05 (0.96)	0.276
Other/prefer not to say race/ethnicity			4.47 (2.81)	0.112	2.53 (2.48)	0.308
Income less than USD 25,000			2.35 (1.47)	0.110	1.20 (1.30)	0.353
Income of USD 25,000 to USD 34,999			1.04 (1.38)	0.450	1.27 (1.22)	0.296
Income of USD 35,000 to USD 49,999			1.23 (1.24)	0.322	1.63 (1.09)	0.135
Income of USD 50,000 to USD 74,999			0.45 (1.05)	0.671	0.31 (0.93)	0.737
Income of USD 75,000 to USD 99,999			−0.16 (1.06)	0.878	0.87 (0.94)	0.357
Income of USD 100,000 to USD 149,999			−0.66 (1.04)	0.527	0.40 (0.92)	0.668
Prefer not to say income			0.25 (3.12)	0.936	−1.40 (2.75)	0.611
High diploma or less			−1.89 (1.09)	0.083	−1.83 (0.96)	0.056
Some college			−0.34 (0.83)	0.683	−0.73 (0.73)	0.315
Bachelor's degree/postgraduate work			−0.40 (0.76)	0.599	−0.12 (0.67)	0.855
Cisgender female			1.92 (0.63)	0.002	0.47 (0.56)	0.406
Other gender identity			3.25 (2.01)	0.107	0.94 (1.78)	0.597
Prefer not to say gender			1.43 (1.41)	0.310	1.03 (1.24)	0.407
Divorced			2.55 (1.07)	0.017	1.34 (0.94)	0.157
Not married, but in a relationship and living together			−0.65 (0.99)	0.514	−1.40 (0.87)	0.110

Table 4. Cont.

Covariate	Model 1		Model 2		Model 3	
	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>
Not married, but in a relationship and not living together			−2.51 (2.46)	0.308	−0.66 (2.17)	0.763
Separated			−0.09 (1.81)	0.961	−0.09 (1.59)	0.953
Single/never married			−1.48 (1.26)	0.243	−1.56 (1.11)	0.162
Widowed			3.58 (2.99)	0.232	3.36 (2.64)	0.204
Age			0.02 (0.04)	0.589	0.10 (0.03)	0.006
Parental stress					0.42 (0.03)	<0.001
Change in children's social and recreational activities						
Change in children's social and recreational activities	1.08 (0.24)	<0.001	0.97 (0.24)	<0.001	0.67 (0.21)	0.002
Fully online instruction			0.18 (0.58)	0.755	−0.10 (0.51)	0.845
Asian			−2.85 (2.00)	0.155	−0.30 (1.77)	0.866
Black or African American			−0.97 (0.99)	0.324	0.34 (0.87)	0.694
Hispanic, Latino, or Spanish origin			1.16 (1.42)	0.414	1.63 (1.25)	0.192
Multiracial			0.46 (1.09)	0.673	0.92 (0.96)	0.337
Other/prefer not to say race/ethnicity			5.59 (2.81)	0.047	3.25 (2.47)	0.189
Income less than USD 25,000			2.10 (1.47)	0.153	1.03 (1.29)	0.427
Income of USD 25,000 to USD 34,999			1.30 (1.38)	0.347	1.42 (1.21)	0.240
Income of USD 35,000 to USD 49,999			1.27 (1.23)	0.305	1.62 (1.08)	0.136
Income of USD 50,000 to USD 74,999			0.16 (1.05)	0.876	0.14 (0.92)	0.880
Income of USD 75,000 to USD 99,999			−0.22 (1.06)	0.835	0.84 (0.94)	0.372
Income of USD 100,000 to USD 149,999			−0.89 (1.04)	0.392	0.28 (0.92)	0.760
Prefer not to say income			0.02 (3.11)	0.994	−1.72 (2.74)	0.529
High diploma or less			−1.99 (1.08)	0.067	−1.87 (0.95)	0.050
Some college			−0.37 (0.83)	0.654	−0.77 (0.73)	0.287
Bachelor's degree/postgraduate work			−0.33 (0.76)	0.666	−0.11 (0.67)	0.867
Cisgender female			2.06 (0.62)	0.001	0.50 (0.56)	0.373
Other gender identity			3.44 (2.01)	0.086	0.99 (1.77)	0.577
Prefer not to say gender			1.38 (1.41)	0.328	1.09 (1.24)	0.379
Divorced			2.50 (1.06)	0.019	1.28 (0.94)	0.175
Not married, but in a relationship and living together			−0.67 (0.98)	0.496	−1.42 (0.87)	0.103
Not married, but in a relationship and not living together			−2.59 (2.45)	0.292	−0.59 (2.16)	0.785
Separated			−0.84 (1.80)	0.640	−0.55 (1.59)	0.728
Single/never married			−1.46 (1.26)	0.245	−1.49 (1.11)	0.178
Widowed			3.27 (2.99)	0.274	3.15 (2.62)	0.230
Age			0.02 (0.04)	0.662	0.09 (0.03)	0.008
Parental stress					0.41 (0.03)	<0.001
Change in children's relationships						
Change in children's relationships	2.92 (0.40)	<0.001	2.91 (0.40)	<0.001	1.95 (0.36)	<0.001
Fully online instruction			0.17 (0.56)	0.757	−0.07 (0.50)	0.880
Asian			−3.99 (1.95)	0.042	1.20 (1.75)	0.493
Black or African American			−1.09 (0.96)	0.260	0.20 (0.86)	0.818
Hispanic, Latino, or Spanish origin			1.07 (1.39)	0.439	1.55 (1.23)	0.209
Multiracial			0.61 (1.06)	0.563	1.01 (0.94)	0.285
Other/prefer not to say race/ethnicity			5.97 (2.73)	0.029	3.60 (2.44)	0.141
Income less than USD 25,000			1.92 (1.43)	0.179	0.97 (1.27)	0.444
Income of USD 25,000 to USD 34,999			1.39 (1.34)	0.300	1.48 (1.19)	0.217
Income of USD 35,000 to USD 49,999			1.34 (1.20)	0.265	1.65 (1.07)	0.122
Income of USD 50,000 to USD 74,999			0.31 (1.02)	0.762	0.25 (0.91)	0.787
Income of USD 75,000 to USD 99,999			−0.01 (1.04)	0.996	0.93 (0.92)	0.316
Income of USD 100,000 to USD 149,999			−0.53 (1.01)	0.600	0.46 (0.91)	0.609
Prefer not to say income			0.47 (3.03)	0.876	−1.30 (2.70)	0.630
High diploma or less			−1.63 (1.06)	0.124	−1.64 (0.94)	0.082

Table 4. Cont.

Covariate	Model 1		Model 2		Model 3	
	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>
Some college			−0.28 (0.80)	0.726	−0.69 (0.72)	0.336
Bachelor's degree/postgraduate work			−0.26 (0.74)	0.723	−0.08 (0.66)	0.907
Cisgender female			2.13 (0.61)	<0.001	0.63 (0.55)	0.252
Other gender identity			3.12 (1.96)	0.111	0.90 (1.75)	0.605
Prefer not to say gender			0.91 (1.37)	0.507	0.78 (1.22)	0.521
Divorced			2.67 (1.04)	0.010	1.46 (0.93)	0.116
Not married, but in a relationship and living together			−0.90 (0.96)	0.348	−1.53 (0.86)	0.074
Not married, but in a relationship and not living together			−2.70 (2.39)	0.260	−0.78 (2.13)	0.715
Separated			−0.17 (1.75)	0.921	−0.10 (1.56)	0.950
Single/never married			−1.46 (1.23)	0.233	−1.50 (1.09)	0.170
Widowed			2.94 (2.91)	0.313	2.95 (2.59)	0.256
Age			0.04 (0.04)	0.292	0.10 (0.03)	0.002
Parental stress					0.39 (0.03)	<0.001

Note. Bolded *p*-values are statistically significant.

3. Results

3.1. Descriptive Statistics

Before addressing the primary research questions, we first present descriptive statistics of the variables. As shown in Table 2, all correlations between the variables were found to be statistically significant. Changes in social and recreational activities and changes in children's relationships were moderately positively correlated ($0.45, p < 0.001$). Both of these outcomes had weak, positive correlations with parental stress and child stress and weak, negative associations with school resources. School resources weakly and negatively correlated with parental stress and child stress. Notably, parental stress and child stress were moderately associated ($r = 0.48, p < 0.001$).

Further, there were no unadjusted significant differences in changes in social and recreational activities and changes in children's relationships by any sociodemographic characteristics (Table 3). However, there were significant racial and ethnic disparities in school resources, the use of fully online instruction, and experiences of parental stress (Table 3), in that Asian and African American parents reported more positive perceptions of school resources, higher percentages of Asian and Latinx parents reported that their children attended school fully online during the pandemic, and parents who identified as Latinx, White, multiracial or other/prefer not to say reported the highest parental stress (Supplementary Table S1). Additionally, parental stress generally decreased as income increased, with an uptick in parental stress for individuals with incomes greater than USD 150,000. Along these lines, parents with lower levels of education (i.e., high school diploma or less and those with some college) reported higher stress. In terms of gender identity, cisgender female and "other gender identity" parents reported the most negative perceptions of school resources and the highest levels of parental and child stress. Further, divorced, not married and cohabiting, and single/never married parents reported the highest levels of parental stress, whereas divorced and widowed parents reported the highest levels of child stress. Lastly, parental stress had a significant negative association with parental age.

3.2. RQ1: Relation between Schooling, Social, and Recreational Experiences during COVID-19 and Child Stress

To address the first research question—the degree to which schooling, social, and recreational experiences during COVID-19 predicted child stress—we conducted a multivariate analysis that adjusted for parental demographic variables and parental stress (see Table 4).

In regard to schooling, fully online instruction was not significantly associated with child stress in any of the models. School resources were initially associated with child stress (model 1), even after controlling for parent demographic variables (model 2). However,

after also adjusting for parental stress in the final model (model 3), school resources no longer predicted child stress. In the final models for both fully online schooling and school resources, parental age and stress were both positively associated with child stress.

In regard to social and recreational experiences, changes in social and recreational activities ($b = 0.67$, $SE = 0.21$; $p = 0.002$) and changes in children's relationships ($b = 1.95$, $SE = 0.36$; $p < 0.001$) were significantly related to child stress after controlling for parent demographic variables and parent stress. Similar to the final models for the relationship between schooling and child stress, parental age and stress were both positively associated with child stress in all final models for social and recreational experiences.

3.3. RQ2: Parental Stress as Mediator

We conducted mediation analysis to examine whether parental stress mediated the relation between youth's schooling, social, and recreational experiences and children's stress. No mediation analysis was conducted for fully online schooling since this variable did not predict child stress. Parental stress fully mediated the relationship between school resources and child stress, with a decrease in the beta coefficient from -0.29 ($SE = 0.08$; $p < 0.001$) to -0.11 ($SE = 0.07$; $p = 0.14$). Parental stress partially mediated the relationships between (a) changes in social and recreational activities and child stress, with a reduction in the beta coefficient from 0.97 ($SE = 0.24$; $p < 0.001$) to 0.67 ($SE = 0.21$; $p = 0.002$) (Figure 1A), and (b) changes in children's relationships and child stress, with a reduction in the beta coefficient from 2.91 ($SE = 0.40$; $p < 0.001$) to 1.95 ($SE = 0.36$; $p < 0.001$) (Figure 1B). That is, parental stress is likely a mechanism that helps explain the positive association between changes in activities or relationships and child stress. When parents' stress was lower, changes in activities or relationships were less strongly related to child stress. Sobel tests further confirmed the mediating role of parental stress in these associations.

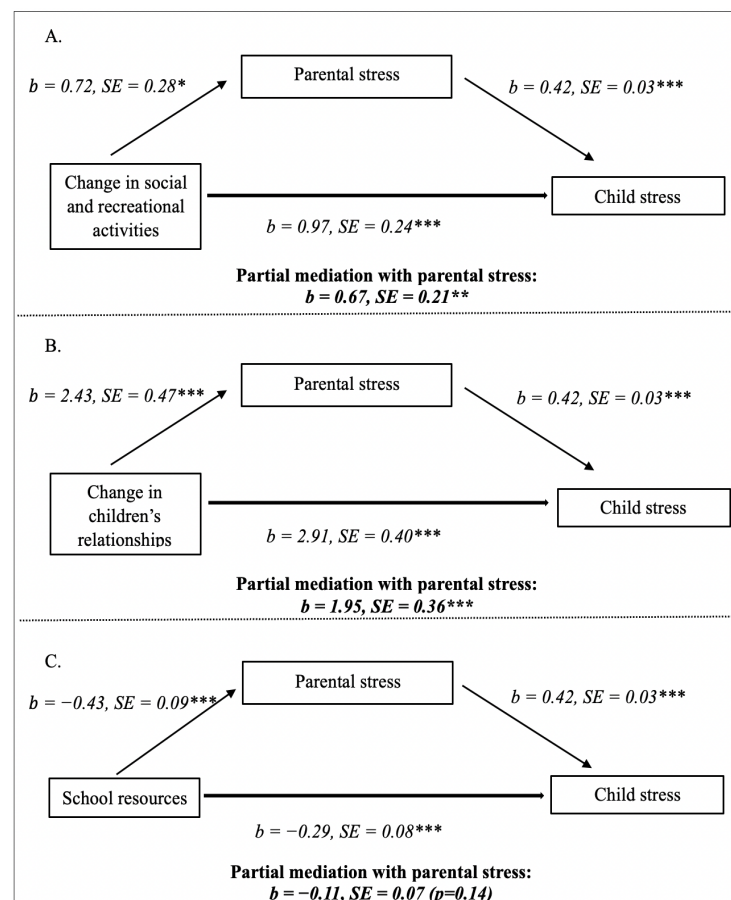


Figure 1. Mediation models relating social, recreational, and educational measures, parental stress, and child stress. *Note.* (A) demonstrates that parental stress partially mediates the relationship between

the change in social and recreational activities and child stress during the pandemic. (B) shows that parental stress partially mediates the relationship between the change in children's relationships and child stress. (C) illustrates that parental stress fully mediates the relationship between school resources and child stress during the pandemic. Standardized coefficients and standard errors are shown. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4. Discussion

This study adds to an emerging and important body of research about the impacts of the COVID-19 pandemic on family functioning. In particular, this study examined how schooling and social/recreational experiences influenced both child and parental stress. Three key findings emerged from this study. First, schooling experiences had a mixed association with child stress. Second, social and recreational experiences were consistently related to child stress. Third, demonstrating the interconnectedness of parents' and children's lives, parental stress mediated the relations between schooling and social/recreational experiences and child stress.

4.1. Schooling Experiences

Our hypotheses that fully online schooling and fewer school resources would predict higher child stress were partially supported. Contrary to expectations, fully online schooling did not predict child stress. While many researchers have found that online school was associated with more challenging behaviors and lower academic motivation [8,18,27], Xiao et al. (2023) also found that school disruptions during the COVID-19 pandemic were not associated with child stress [16]. Several reasons may explain why we did not find this relationship. First, children may have been sufficiently comfortable with the technology and been provided adequate resources to feel successful with online schooling. Second, if children's motivation decreased, as has been shown in other studies [8,18], then they may have been less likely to experience stress. However, this rationale is speculative since we did not measure motivation. Third, a limitation of this study is that parents reported on their children's stress. It may be that child stress did increase but was subtle enough to not have been noticed by parents.

Parents are more satisfied with online schooling when they report having appropriate resources to help their children succeed [17,18], which comports well with our supported hypothesis that more school resources predicted lower stress for both children and parents. In our study, we operationalized services as emotional and mental health support, academic support, and healthcare. Parental stress was lower when more school resources were provided to children, which, in turn, was related to lower child stress. However, it is interesting that parents only reported neutral agreement ($M = 2.39$; $SD = 1.24$ with a potential range of 1 (strong disagreement) to 4 (strong agreement)) that schools were providing sufficient academic resources. As such, it seems that only a moderate amount of educational support was sufficient to alleviate parent stress. Future research should explore which types of academic resources parents found to be most helpful in supporting their children's success during the pandemic.

4.2. Social and Recreational Experiences

As hypothesized, greater levels of change in children's social and recreational activities and social relationships predicted higher levels of child stress. Prior studies have also found that changes to recreational and social activities are related to negative emotions in children, such as stress, depression, and anxiety [4,29,33]. When children's social interactions are curtailed, which widely occurred during the pandemic, children are more likely to experience social isolation. Social isolation is a key factor in stress and other negative mental health outcomes [14,15]. Furthermore, in addition to recreational activities being an opportunity for socialization, they also provide necessary physical activity for children.

Physical exercise is a well-established mechanism to decrease youth's stress and improve emotional wellbeing [34].

The relationship between changes in social and recreational experiences and child stress was partially mediated by parental stress. That is, children's stress was related to their own changed experiences but also to how their parents reacted to these changed routines. Adams and colleagues (2021) found that changes in children's activities negatively impacted parents' stress and the perceived quality of their parenting [1]. The disruption of children's social and recreational experiences led to unpredictable daily schedules, and children were more likely to display negative emotions and behaviors, which in turn, creates difficult situations for parents and leads to higher levels of parental stress. Parental stress decreased when they were successfully able to provide other social experiences, such as having family activities at home or connecting with friends virtually [1]. As such, both parents and children benefit when children have their social needs met.

4.3. Implications

The findings from this survey study offer implications for promoting parent and child wellbeing during a public trauma that disrupted engagement in services and activities. In particular, the COVID-19 pandemic resulted in altered social norms and group values about children's engagement in education, social relationships, and recreational activities [35]. Parent and child adaptations to major changes, such as remote learning, peer isolation, and limited involvement in recreational activities, were embedded in a societal shift. Heightened public health concerns foster a collective response and increase societal compliance with recommendations from governing authorities [36]. Further, a shared trauma, such as the COVID-19 pandemic, can increase collective coping among families and the communities in which they reside [37]. Consequently, maintaining social connections among families during a public crisis appears paramount. Establishing mechanisms for parents to connect and communicate with one another can facilitate their coping with mandates, decision-making, and ability to guide their children in adjusting to changes [38]. Technological resources, such as virtual conferencing and social media, can be particularly useful in maintaining social connections when face-to-face interactions are limited [39].

In addition to creating varied means for social connections, providing resources to equip parents for supporting their children's wellbeing and learning is impactful and necessary. Notably, favorable effects coincided with parents' perceptions that resources were provided by schools, even if the amount was not fully sufficient. This important initial step toward strengthening home-school collaboration can become more beneficial to parent and child wellbeing, with expanded partnering between parents and school leadership [40]. In collaboration, parents and educational leaders can identify educational and health resources that are uniquely necessary for their communities and families and the means for accessing them [41,42]. Moreover, in times of public event or crisis, universities can support community-school partnerships to provide expertise and resources to enrich their efforts to promote child wellbeing and academic success [43].

This study demonstrated the mitigating role of parents in children's mental health during a time of significant changes in education, peer relationships, and recreational activities. Therefore, promoting parent wellbeing is beneficial to both children and parents. In addition to clinician-led therapy, parent's wellbeing and stress reduction may be promoted through accessible, self-help approaches. For example, mindfulness training through apps such as Headspace were reported to be feasible, acceptable, and effective during the pandemic by parents who otherwise were at low-risk for depression and anxiety [44]. During the pandemic, parents identified social isolation as a significant threat to their wellbeing, which underscores the value of creating mechanisms that connect parents to their communities and child-serving institutions (schools and recreational programs); this is especially needed for single-parent families [45].

4.4. Limitations and Future Directions

The study design had several important limitations. Two measurement issues warrant mention. First, in an effort to reduce participant fatigue since the larger study survey was of considerable length, the survey was written to gather data on the stress and experiences of all school-age children in a family. In other words, parents of multiple children were not asked to report on each individual child's stress or schooling and social/recreational experiences. For example, parents were asked to consider all of their children when reporting on how much their child(ren)'s activities with friends (play dates and sleepovers) changed during COVID-19. As such, we cannot be certain whether parents of multiple children reported the average experience of their children or responded with one specific child (e.g., child who had the most or least significant changes) in mind. This measurement decision limits our ability to examine how children's stress or their schooling and social/recreational experiences may differentially affect children, and in turn, parents. However, our findings still provide a lens on family experiences and stress levels during the COVID-19 pandemic. In future research, it will be important to examine how changes during the pandemic impacted children within a family differently. Extant research indicates that children's age and gender are important factors in how children experienced the COVID-19 pandemic; a meta-analysis by Ma and colleagues (2021) found that adolescents (ages 13–18) and females experienced more depression and anxiety than children (12 or younger) and males during the pandemic [46]. Understanding the degree to which changes in school, recreational activities, and peers may relate to stress for children based on age, gender, or other sociodemographic factors (e.g., household income) would provide information that could be leveraged for counseling or other intervention development.

Second, parents reported children's stress levels, which may be biased by parents' stress levels and differ from children's own evaluations of their stress. However, researchers commonly utilize parental reports of child stress [2,3] with findings that parents' reports of child stress during the pandemic align well with children's own reporting [3]. In our findings, we only found a moderate correlation between parent stress and child stress ($r = 0.50$), indicating that parents can distinguish between their stress and their children's. Additionally, parents' perceptions are important to consider when examining how they affect their own stress levels.

Additionally, the timing of the data collection may have affected participants' responses. The survey was conducted in September 2021 and inquired about events that occurred since the lockdown in March 2020. As such, responses may have been vulnerable to recall bias. Along these lines, perceived stress during this time may have differed from the original onset of the pandemic and associated widespread closures of schools and other activities.

Further, the sample of the study limits the generalizability of the findings. A potential selection bias could have occurred due to the online administration of the survey. While 93% of U.S. residents have internet access, with 77% having home broadband access [47], online recruitment may have precluded individuals with limited access or knowledge related to computers, smartphones, or internet access from participating in the study. Related to this concern of selection bias, our sample was not representative of U.S. parents. Slightly more than half of our sample was primarily White with college degrees, and 71% were married. As such, it is important in future research to examine how a more racially and culturally diverse group of parents of school-age children experienced the COVID-19 pandemic.

Given that our sample represents one snapshot of time during the pandemic, longitudinal research should be conducted to determine how patterns of child and parental stress change over time. Importantly, longitudinal research is needed to examine the long-term impacts of schooling, social, and recreational disruptions during the pandemic on children's academic and socio-emotional functioning as well as child and parental health and wellbeing.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/educsci13070630/s1>, Table S1: Means of Social, Educational, and Stress Measures by Sociodemographic Characteristics.

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