

COVID-19 and Parent-Child Psychological Well-being

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abstract

BACKGROUND AND OBJECTIVES: The outbreak of coronavirus disease 2019 has changed American society in ways that are difficult to capture in a timely manner. With this study, we take advantage of daily survey data collected before and after the crisis started to investigate the hypothesis that the crisis has worsened parents' and children's psychological well-being. We also examine the extent of crisis-related hardships and evaluate the hypothesis that the accumulation of hardships will be associated with parent and child psychological well-being.

METHODS: Daily survey data were collected between February 20 and April 27, 2020, from hourly service workers with a young child (aged 2–7) in a large US city ($N = 8222$ person-days from 645 individuals). A subsample completed a one-time survey about the effects of the crisis fielded between March 23 and April 26 (subsample $n = 561$).

RESULTS: Ordered probit models revealed that the frequency of parent-reported daily negative mood increased significantly since the start of the crisis. Many families have experienced hardships during the crisis, including job loss, income loss, caregiving burden, and illness. Both parents' and children's well-being in the postcrisis period was strongly associated with the number of crisis-related hardships that the family experienced.

CONCLUSIONS: Consistent with our hypotheses, in families that have experienced multiple hardships related to the coronavirus disease 2019 crisis, both parents' and children's mental health is worse. As the crisis continues to unfold, pediatricians should screen for mental health, with particular attention to children whose families are especially vulnerable to economic and disease aspects of the crisis.

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WHAT'S KNOWN ON THIS SUBJECT: The outbreak of coronavirus disease 2019 has profoundly affected many American families. One major consequence of the crisis has been huge increases in unemployment. However, less is known about the psychological consequences of the crisis for families.

WHAT THIS STUDY ADDS: This study reveals that parent psychological well-being worsened after the restrictions that were put in place in response to the coronavirus outbreak. The more coronavirus disease 2019–related hardships that families experienced, the worse parents' and children's psychological well-being.

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The outbreak of coronavirus disease 2019 (COVID-19) has profoundly affected American families. Most areas of the country have experienced stay-at-home orders,¹ unemployment claims have skyrocketed to unprecedented levels,² and millions of cases of the illness have been confirmed.³ Given the size and scope of both the economic and health effects of the current crisis, it likely has strongly affected the psychological well-being of both parents and children, but there is limited evidence about psychological effects.

We hypothesize that the COVID-19 crisis has affected the psychological well-being of both parents and children through at least 4 mechanisms: parental job loss, income loss, caregiving burden, and illness. Each of these mechanisms individually has been linked to both adults' and children's well-being.⁴⁻⁸ Additionally, these mechanisms can co-occur, such as parental job loss leading to income loss.⁹ The accumulation of risk factors is strongly related to adult and child psychological well-being, including child behavior problems and adult psychological distress.¹⁰⁻¹³ Thus, the ways that the COVID-19 crisis affects adult and child psychological well-being may be additive and accumulate.

Moreover, the COVID-19 crisis, although affecting all Americans, has hit vulnerable populations particularly hard, including hourly workers, who face unstable employment and earnings¹⁴; communities of color, who face high rates of infection and poor clinical outcomes¹⁵; and families with young children, who face dual caregiver and/or breadwinner demands.¹⁶ Identifying the psychological effects of this crisis on vulnerable families is essential for informing pediatric practice.

To understand whether and how the COVID-19 crisis has affected parents'

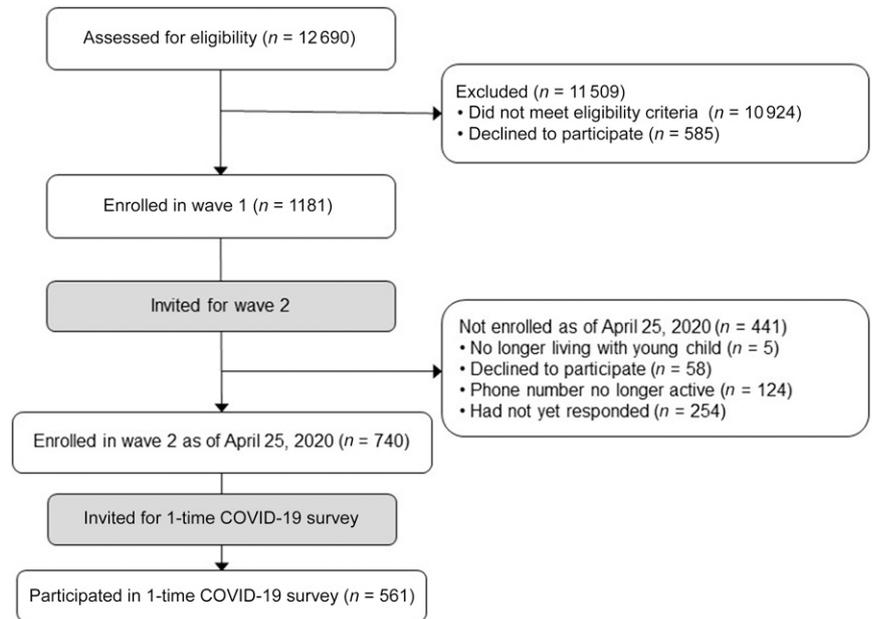


FIGURE 1
Study eligibility and enrollment.

and children's psychological well-being, we examined 3 research questions in a vulnerable sample (hourly service workers with young children) that is majority families of color:

1. What has been the effect of the COVID-19 crisis on parents' and children's psychological well-being?
2. How frequently have these families experienced COVID-19-related hardships including unemployment, income loss, caregiving burden, and illness?
3. How are COVID-19-related hardships related to parents' and children's psychological well-being, both individually and cumulatively?

METHOD

Sample Recruitment

Individuals were eligible if they worked in an hourly service industry position in a retail, food service, or hotel business in a large US city, had a child aged 2 to 7, and had a mobile phone that could send and receive

basic SMS text messages (see Fig 1). The sample was originally recruited for a study examining parents' work schedule unpredictability and family well-being. Recruitment occurred between August and November 2019 by using a venue-based sampling approach, a commonly used technique for producing generalizable samples of hard-to-reach, unrostered populations.¹⁷ The key to successfully using this technique is generating a complete list of venues, which in this case were food service, retail, and hospitality businesses in the city, provided by the Columbia University Earth Institute. We then constructed a sampling frame of venue (business) day-time units (VDTs), randomly selected VDTs, and systematically identified and recruited eligible individuals present in those VDTs.¹⁸ To do so, at the time that study staff visited each business, they aimed to identify all workers who met sampling criteria who were at work at that time by approaching workers at each business, determining their eligibility, and asking those workers to direct them to any other employee with a young child who was currently at the venue. This strategy differs

from snowball sampling in that study staff only followed-up with potentially eligible workers who were present at that time to preserve random sampling.

Procedure

Initial Procedure

When first recruited, for the original study purpose of estimating effects of work schedules on family well-being, all participants were asked to complete 30 days of daily surveys and a one-time survey about demographic and household characteristics. All aspects of this study received human subjects approval from the Duke University Institutional Review Board.

Daily Survey Data Collection Procedure

Beginning on February 20, 2020, each participant from the original sample was contacted about participating in an additional 14-day wave of daily data collection. To continue participating, individuals had to be still residing with a young child but could have experienced a job change or unemployment. Our analysis sample was limited to parents who had begun participation in this wave of data collection by April 25, 2020, by using daily survey responses through April 27 ($N = 645$ individuals; 8222 person-days for analysis).

At this wave's outset, respondents were asked where they worked for up to 3 jobs. Respondents were then prompted to report on each day's work experiences and their own and their child's well-being via SMS text message for 14 consecutive days. All survey materials used for this study were available in both English and Spanish.

The daily text surveys were programmed and automated by a third-party vendor. On the day of enrollment in this wave, participants received a text welcoming them to the start of wave 2. The next day, the 14-day data collection period began.

During that period, the first survey question was sent out each evening at 7:00 PM. As soon as respondents sent back their answer to the first survey question, the second question was sent. This sequence was repeated until all questions and answers had been sent and received. A "thank you" text sent at the end of the sequence let individuals know they had completed all the day's survey questions. If a respondent failed to reply to the first survey question, a reminder text was sent at 8:00 PM. Additionally, if an individual started the survey but did not complete all questions, a reminder text was sent after 2 hours of inactivity (with the question on which the individual left off resent as part of the reminder) and then again after 14 hours of inactivity. Additional details about the text message survey protocol are available in Ananat and Gassman-Pines.¹⁹

This method of data collection has several benefits. First, all text messages were date and time stamped, allowing the research team to know for certain that questions were answered on a given day. This is an important issue in this type of data collection and analysis in general²⁰; in the context of the current study, it is a crucial innovation because the date- and time-stamped data provide certainty about which questions were answered before the COVID-19 crisis and which were answered postcrisis. Using daily surveys also has other methodologic strengths, including reducing recall bias and lessening the need for mental aggregation.²¹⁻²³

Single Point-in-Time Survey Data Collection Procedure

Beginning on March 23, all participants who had already received their 2 weeks of daily survey prompts were asked to complete a one-time survey that asked questions about how the family was faring during the COVID-19 crisis. All

survey questions and answers were sent and received via SMS text message. In subsequent days, respondents who finished receiving 2 weeks of daily survey prompts were sent the one-time survey the next day through April 26, 2020. Response rates were immediate and high, with more than three-fourths of respondents completing the survey despite limited ability of the survey team to complete follow-up in real time.

Measures

Daily Survey Measures: Parent and Child Psychological Well-being

Daily parental negative mood was measured with a single item asking, "How much of the time today did you feel fretful, angry, irritable, anxious, or depressed?" Answers were on a 3-point scale: none of the time, some of the time, and all of the time. This question was modified from a question with a 4-week recall period from the Health Utilities Index^{24,25} (During the past 4 weeks how often did you feel fretful, angry, irritable, anxious or depressed?). The single item has been validated as a daily measure of negative mood because it is positively correlated with daily stressors, including daily food insecurity²⁶ and daily work schedule disruptions.¹⁹

Daily perceived negative sleep quality was measured with a single item also used in other daily survey studies,²⁷ asking, "How well did you sleep last night?" Answers were on a 10-point scale from really badly to really well. We treat self-reported sleep quality as a measure of daily well-being because perceived sleep quality is associated with daily affect.²⁸ The sleep quality measure was reverse coded so that higher numbers indicated worse perceived sleep quality. This measure has been validated because it is correlated in expected directions with negative and positive daily mood, daily self-

esteem,²⁷ and daily work schedule disruptions, a daily stressor.¹⁹

Daily child uncooperative behavior was measured with a single item asking, "How much was your child uncooperative today?" Answers were on a 4-point scale: not at all, just a little, some, and a lot. This question was modified from an item in the Inattention/Overactivity with Aggression Conners Rating Scale,²⁹ which asks parents to rate how much the adjective describes their child "at this time."

Daily child worry was measured with a single item asking, "How much did your child appear to be sad or worried today?" Answer choices were on a 4-point scale: not at all, just a little, some, and a lot. This question was modified from an item in the Preschool Behavior Questionnaire,³⁰ which asks parents to rate how much the child exhibits each behavior.

For both child behaviors, previous research has demonstrated the reliability and validity of multi-item scale versions adapted for measuring daily externalizing and internalizing behavior problems.³¹ In the current study, single items were used to reduce respondent burden and attrition.

Daily Survey Measures: Parent Work

In the daily survey, we asked questions about jobs (up to 3 per respondent) on the basis of the number of jobs reported at wave 2 enrollment. For each job, respondents were asked whether they worked that day and if so when they started and stopped working and whether their hours worked were their originally scheduled hours. In addition, if respondents did not work at a given job on a given day, they were asked if they were originally scheduled to work at that job that day. We used the answers to those questions to create 2 dichotomous indicator variables: the first was equal to 1 if respondents reported working at any job that day

and 0 otherwise. The second indicated a work disruption that day and was equal to 1 if the parent reported that they (1) did not work at a job that day but had originally been scheduled to work or (2) worked different hours at a job than originally scheduled; the indicator was set to 0 otherwise.

Single Point-in-Time Survey Measures of COVID-19 Hardships: Household Job Loss

Parents were asked the following questions about their own job loss: "Since the crisis hit, have you lost a job/been laid off permanently?"; and "Since the crisis hit, have you been furloughed/laid off temporarily?" Those with another adult in the household were also asked, "Has another adult in your household lost a job/been laid off permanently?"; and "Has another adult in your household been furloughed/laid off temporarily?" An indicator variable representing household layoff was set equal to 1 if the respondent indicated a temporary or permanent layoff for him- or herself or another adult and was set to 0 otherwise.

Single Point-in-Time Survey Measures of COVID-19 Hardships: Income Loss

Respondents were asked, "How has your household's income changed since the crisis hit?" Answers were as follows: stayed the same, fallen by less than half, fallen by more than half, and increased. An income loss indicator variable was set equal to 1 if income had fallen by less than half or by more than half and was set to 0 otherwise.

Single Point-in-Time Survey Measures of COVID-19 Hardships: Caregiving Burden

Respondents were asked whether they had quit a job or reduced work hours to handle increased child care demands. Those who had responsibility for a disabled or elderly person who usually also got care from someone else were asked whether that care was still available. A dichotomous variable for increased

caregiver burden was set equal to 1 if the respondent quit or reduced work hours because of increased child care responsibilities or had lost the elder and/or disabled adult care they usually relied on; it was set to 0 otherwise.

Single Point-in-Time Survey Measures of COVID-19 Hardships: Household Illness

Respondents were asked, "Has anyone in your household felt sick since the crisis started?" An indicator variable was set equal to 1 if they answered yes and 0 otherwise.

Cumulative COVID-19 Hardship Index

A cumulative hardship index ranging from 0 to 4 was created by summing the 4 indicator variables described above, and represents the number of COVID-19 hardships experienced.

Other Analysis Variable: Postrestriction Period

Because the first major restrictions in response to COVID-19 were announced on March 13, we define dates from March 14 on as the postrestriction period. An indicator variable equals 1 for all dates from March 14 on and equals 0 for all dates before.

Analytic Plan

To answer research question 1, we ran regression models predicting daily parent and child psychological well-being on the basis of whether the day in question was in the pre- or postrestriction period, controlling for whether the day in question was a weekend day, and adjusted SEs to account for the fact that repeated daily observations are potentially correlated within families (as opposed to each observation being independent, the default assumption in regression analysis). We used ordinary least squares (OLS) regression when examining perceived negative sleep quality. Because parent mood, child uncooperative behavior, and child worry were reported by using ranked categories, we used

ordered probit regressions for these outcomes. Ordered probits are similar to OLS regressions but model true underlying well-being as normally distributed, with the lowest-ranked reported category corresponding to values in the lower tail of the normal distribution, the next ranked category corresponding to values in the next portion of the distribution, etc.

To answer question 2, we used logistic regression, the standard technique used when an outcome is yes or no, to predict how the frequency of work and work disruptions changed postcrisis, using the same model described above. We also used basic descriptive statistics for the hardships measured in the single point-in-time survey.

Finally, to answer question 3, for each respondent, we averaged all well-being measures across all reports provided postcrisis and ran a series of OLS regressions predicting each outcome from either COVID-19-related hardships individually or a set of indicator variables representing the number of hardships. All regressions were weighted by the number of days' surveys completed by each person postcrisis.

RESULTS

Sample Characteristics

Analysis sample characteristics appear in Table 1. Our sample is majority female, consistent with working in the service industry and with having custody of a young child.¹⁹ Approximately half are African American and approximately one-fifth are Hispanic, consistent with being central-city hourly workers.³² The mean age is 31, consistent with being the parent of a young child,¹⁹ and the modal education is 12 years, consistent with hourly service employment.³³ Approximately half of focal children are girls; focal children are, on average, 4.9 years of age.

TABLE 1 Sample Characteristics

	Mean	SD
Parent characteristics		
Race and ethnicity, %		
African American (non-Hispanic)	49.5	—
White (non-Hispanic)	18.2	—
Asian American (non-Hispanic)	3.3	—
American Indian (non-Hispanic)	0.2	—
Multiracial (non-Hispanic)	2.3	—
Hispanic (of any race)	22.5	—
Age, y	31.0	7.0
Female sex, %	83.1	—
Education, %		
Less than a high school education	26.3	—
Exactly a high school education	44.3	—
More than a high school education	29.4	—
Monthly household income, \$	2239	1672
Child characteristics		
Age, y	4.9	2.6
Female sex, %	50.0	—

N = 645 families in daily survey sample. —, not applicable.

Approximately two-thirds live with another adult in the household. The mean income is \$2239 per month.

Effects of the COVID-19 Crisis on Parent and Child Psychological Well-being

Our results reveal that parent psychological well-being decreased during the post-COVID-19 restrictions period (Table 2). Daily parent negative mood was

significantly more frequent postrestrictions than prerestrictions ($P < .05$). Regression-adjusted means highlight the change: prerestrictions, parents reported negative mood some of the time on 30% of days and all day on 7% of days. Postrestrictions, the share reporting negative mood some of the time rose by 10% to 33% of days, and the share reporting negative mood all day rose by 29% to 9% of days. Parents' negative

TABLE 2 Regression-Adjusted Daily Family Psychological Well-being, Work, and Work Disruptions Pre- and Post-COVID-19 Restrictions

	Pre-COVID-19 Restrictions	Post-COVID-19 Restrictions
Parental daily negative mood, ^a %		
Some of the time	29.8	32.6
All of the time	6.8	8.6
Parental daily negative sleep quality (range: 1–10)	2.98	2.97
Child daily uncooperative behavior, %		
Just a little	27.1	28.4
Some	10.3	11.5
A lot	4.3	5.2
Child daily sad or worried, %		
Just a little	15.9	16.8
Some	5.2	5.7
A lot	1.4	1.6
Parent worked today, ^b %	67.9	43.8
Parent work disruption today, ^b %	9.3	19.9

N = 8222 person-days. Regression-adjusted means for each outcome are shown. The categories for parental negative mood, child uncooperative behavior, and child worried were modeled by using ordered probit models; parental negative sleep quality was modeled by using OLS regression; worked and work disruption were modeled by using logistic regression models. All models controlled for whether that day was a weekend. SEs were estimated allowing for correlation between observations within a family and for unequal variance across observations.

^a Pre- and post-COVID-19 restrictions significantly different at $P < .05$.

^b Pre- and post-COVID-19 restrictions significantly different at $P < .001$.

TABLE 3 Descriptive Statistics of COVID-19–Related Hardships

	%
COVID-19 hardships	
Job loss	59.8
Income loss	68.6
Caregiving burden	44.5
Household illness	11.6
No. COVID-19 hardships	
0	14.1
1	20.8
2	34.9
3	26.8
4	3.4

n = 561 families.

sleep quality did not change postrestrictions. Although the frequency of child uncooperative behavior and worry each day did not change significantly from pre- to postrestrictions, the pattern was consistent with increasing frequency of both uncooperative behavior and worry.

Effects of the COVID-19 Crisis on Hardships

Our results using the daily survey data reveal that parental work dropped substantially at the onset of the COVID-19 crisis (Table 2). Additionally, work disruptions increased significantly in the postrestrictions period. The regression-adjusted percentage of respondents working each day fell from 67.9% prerestrictions to only 43.8% postrestrictions ($P < .001$), a 35% decrease. The regression-adjusted percentage of workers experiencing a work disruption on a given day rose from 9.3% prerestrictions to 19.9% postrestrictions ($P < .001$).

The point-in-time survey results reveal how frequently the COVID-19–related hardships occurred among sample families (Table 3). The majority of families (60%) experienced job losses. Most of our respondents (69%) reported household income declines. Forty-five percent of families reported increased

caregiving burden and 12% of families had experienced illness.

Finally, Table 3 shows the accumulation of COVID-19–related hardships among sample families. Only 14% of families had no hardships during the crisis, whereas the majority experienced ≥ 2 . A small share of families, 3%, had experienced all 4 hardships.

Associations Between COVID-19–Related Hardships and Family Psychological Well-being

In general, those who had experienced hardships had worse psychological well-being (Table 4). These findings were consistent across both parents and children. Each individual hardship was related to significantly worse parental mood, and both caregiving burden and household illness were significantly related to children’s uncooperative behavior and worry.

As hypothesized, the number of COVID-19–related hardships was strongly associated with all psychological well-being measures (Table 4). Psychological well-being of those with only 1 hardship did not differ from those with 0 hardships. However, those with 2 and 3 hardships had significantly more negative mood, worse sleep quality, and more uncooperative child behavior than those with 0 hardships. Finally, both parent and child psychological well-being was worst among families with all 4 hardships, with large and statistically significant associations with each of the 4 family psychological well-being outcomes.

DISCUSSION

The outbreak of COVID-19 has profoundly affected American families, and hourly service workers with young children are one of the groups most vulnerable to the crisis. The speed with which the pandemic has changed society, however, has made it difficult to capture the impact

of the shock in a timely manner. In this article, we are able to take advantage of real-time data on hourly service workers collected fortuitously both before and after the crisis started. Our results clearly show that the coronavirus crisis has substantially worsened adult and child psychological well-being. These percentage changes over time are substantial, especially given that they occurred over just a few weeks.

Parents reported deterioration in their own psychological well-being since the start of the crisis, in line with findings from studies of previous economic downturns, which reveal that adult mental health worsens when economic conditions deteriorate.^{34–36} In that previous work, however, the authors were able to document that mental health worsens in response to economic downturns over longer periods, such as over many months. In contrast, our daily survey data enable us to demonstrate that psychological distress has increased in response to the current crisis in a matter of days. This is perhaps to be expected because our study is focused on a particularly vulnerable group of families and the current crisis is both severe and multifaceted. Tracing immediate impacts on psychological well-being would not be possible without this type of granular, daily data. These results should raise concern given the strong links between parental psychological well-being and the well-being of children.^{37,38}

Our one-time survey results also reveal how the crisis has increased family hardships. More than half of the families we surveyed have experienced job loss, more than two-thirds have experienced income loss, 45% face increased caregiving burden, and 12% have had a sick family member since the crisis began. All of these burdens were predicted to increase because of the crisis and

TABLE 4 Associations Between Risk Factors and Family Mental Health Outcomes in Post–COVID-19 Period

	Parental Negative Mood	Parental Negative Sleep Quality	Child Uncooperative Behavior	Child Worried
Household adult layoff	0.116** (0.053)	0.127 (0.091)	0.026 (0.079)	0.028 (0.053)
Household income loss	0.173*** (0.055)	0.178* (0.094)	0.158* (0.082)	0.071 (0.055)
Increased caregiving burden	0.117** (0.050)	0.094 (0.085)	0.225*** (0.073)	0.105** (0.049)
Household member felt sick	0.172** (0.078)	0.226* (0.132)	0.461*** (0.113)	0.263*** (0.076)
Cumulative COVID-19 hardship index (reference group = 0 hardships)				
1 hardship	0.12 (0.099)	0.144 (0.167)	0.185 (0.147)	−0.061 (0.099)
2 hardships	0.316*** (0.090)	0.471*** (0.152)	0.295** (0.134)	0.061 (0.090)
3 hardships	0.334*** (0.094)	0.315** (0.159)	0.376*** (0.140)	0.111 (0.094)
4 hardships	0.429*** (0.141)	0.641*** (0.237)	0.789*** (0.209)	0.324** (0.140)

n = 352 families with daily survey reports after the crisis began who also answered the point-in-time survey. Unstandardized coefficients from separate OLS regressions predicting each outcome are shown. All models are weighted by the number of surveys participants completed during the postcrisis period. Data are presented as regression coefficients and (SE).

* *P* < .10.

** *P* < .05.

*** *P* < .01.

**** *P* < .001.

are putative mechanisms linking the crisis to psychological well-being.

As hypothesized, the cumulative number of COVID-19–related hardships was strongly related to both parent and child well-being, with those experiencing all 4 hardships experiencing substantially worse well-being than those without any hardships. These findings are aligned with a cumulative risk perspective,¹³ which suggests that risk factors additively predict worsened mental health.

Although our study demonstrates the impact of COVID-19 on a vulnerable population, the sample population was limited and targeted. Hourly workers in other industries and salaried workers may be affected differently by the pandemic. In addition, our findings are local to a particular major city. The experience of the pandemic may differ from city to city on the basis of infection prevalence and governmental and social response. In this study, we do not provide insight into what policies would best mitigate these effects and support impacted workers. Additional

research on support systems and systemic response to unemployment, uncertainty, and their negative health impacts should be referenced by individuals or institutions looking to take action.

CONCLUSIONS

These results highlight the severe immediate impacts of the COVID-19 crisis on vulnerable families. This crisis has harmed the psychological well-being of these families, suggesting the need for immediate increases in social support and for additional interventions aimed at addressing the economic and mental health needs of families.

As the crisis continues to unfold, pediatricians should screen for mental health problems among the children in their practices, with particular attention to children whose families are vulnerable to economic as well as disease aspects of the crisis. Our results reinforce the importance of considering both internalizing and externalizing behaviors as manifestations of mental health in young children. When parents

present with a complaint about uncooperative behavior, they may not be seeking mental health guidance. Pediatricians, however, should consider helping parents understand that uncooperativeness may be a sign that children are being stressed by the pandemic. All adults providing services to young children may be more effective in supporting children's mental health during this pandemic if they focus on understanding and empathy.

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ABBREVIATIONS

COVID-19: coronavirus disease 2019
 OLS: ordinary least squares
 VDT: venue (business) day-time unit

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