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Parenting Young Children During COVID-19: Parenting Stress Trajectories, Parental Mental Health, and Child Problem Behaviors

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Parenting stress reflects a discrepancy between a parent's perception of their resources, the demands of their child's needs, and the caregiving relationship and contexts (Abidin, 1992). Parenting stress can increase the risk of issues in the parent-child relationship, as well as child behavioral and emotional outcomes (Neece et al., 2012; Spinelli et al., 2021). Chronic stressors, such as living through the COVID-19 pandemic, have the potential to increase the demands of parenting and thus parenting stress. Using latent growth curve modeling, we examined parenting stress trajectories of 298 American parents with young children ($M_{age} = 15.02$ months, range = 1–34 months) over the first year of the COVID-19 pandemic. We also examined the effects of parental mental health on parenting stress, and the effects of parental mental health and parenting stress on child problem behaviors using data gathered through the Prolific survey platform. Parental mental health, measured by depressive symptoms Centre for Epidemiological Studies Depression Scale–10, anxiety symptoms Generalized Anxiety Disorder Scale (GAD-7), and overall stress levels 10-item Perceived Stress Scale, was related to higher initial parenting stress index–short form. Changes in parenting stress over time were linked with higher levels of children's problem behaviors (CBCL). Child temperament was also related to initial parenting stress. Lower levels of household income were linked with higher levels of parental mental health symptoms and higher rates of parenting stress increases over time. These results highlight the importance of considering the well-being of all family members in child outcomes, and the ways in which different experiences and resources during the COVID-19 pandemic affect parental and child well-being.


Keywords: COVID-19 pandemic, parenting stress, parent mental health, latent growth curve model, young children

Caregivers experience parenting stress when they perceive an imbalance that is characterized by demands of parenting that outweigh their personal resources (Deater-Deckard, 2008). These resources, which include parental psychological health, caregiving competence, financial assets, and the availability of social and


instrumental support, help parents meet the continuous needs of caregiving (Deater-Deckard, 1998). Chronic contextual stressors, such as the COVID-19 pandemic, reduce parents' available instrumental and psychological resources, increasing parenting stress for caregivers on a large scale (Adams et al., 2021; Calvano


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This study was not preregistered nor disseminated elsewhere. Data and analysis code have been made publicly available at the open science framework repository and can be accessed at <https://osf.io/sg62u/>.

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visualization, and writing—review and editing, a supporting role in data curation, investigation, project administration, and supervision, and an equal role in conceptualization, methodology, and writing—original draft. Sophia K. Betar played a supporting role in data curation, formal analysis, writing—original draft, and writing—review and editing. Sarah M. Cline played a supporting role in conceptualization and writing—original draft. Ziyu Tian played a lead role in data curation and project administration, a supporting role in writing—review and editing, and an equal role in funding acquisition, investigation, and writing—original draft. Deborah B. Jacobvitz played a lead role in funding acquisition, project administration, resources, supervision, and validation and a supporting role in conceptualization, writing—original draft, and writing—review and editing. Jody S. Nicholson played a supporting role in investigation and project administration and an equal role in conceptualization, formal analysis, supervision, writing—original draft, and writing—review and editing.

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et al., 2022). Parenting stress affects the entire family system, increasing the risk of psychopathology in parents as well as problem behaviors in children (Deater-Deckard, 2008). Parenting stress (i.e., stress related to caregiving) can affect children more strongly than other types of parental stress (i.e., stress that parents feel in their lives, but is unrelated to caregiving; Abidin, 1992). Modeling parenting stress longitudinally allows us to understand parenting stress changed over the course of the pandemic, and understand its impacts over time. In this study, we examine the trajectories of parenting stress over the first year of the COVID-19 pandemic, the role of parental mental health, and impacts on child problem behaviors during this time of heightened stress.

Theoretical Framework

This model is rooted in Prime's COVID-19 family disruption conceptual framework, which utilizes family systems theory (Fiese et al., 2019) and family stress theory (Conger et al., 1994), and Bronfenbrenner's bioecological model (Bronfenbrenner & Morris, 2006) to model the theoretical relations among parental mental health, parenting stress, and child outcomes within the context of the COVID-19 pandemic (Prime et al., 2020). As Prime & colleagues aptly noted, "caregiver well-being may serve as a funnel through which social disruptions due to COVID-19 infiltrate family functioning via changes to marital, parent-child, and sibling relations" (p. 632). Family systems theory also highlights that parental well-being has cascading effects on the entire family system and dyadic subsystems (e.g., parent-child; Fiese et al., 2019). Parenting stress may be one mechanism through which parental well-being may affect child well-being; as parenting stress indicates that parental resources (including psychological well-being) are outweighed by the demands of caregiving for a particular child (Abidin, 1992). Additionally, family stress theory describes the toll that economic stress can take on family well-being; economic pressures (which heightened for many after the onset of the COVID-19 pandemic; Abrams et al., 2022) can increase conflict and hostility within the family system (Conger et al., 1994). The bioecological model of child development (Bronfenbrenner & Morris, 2006) highlights how disruptions in the reciprocal relations between the child and the contexts with which they are embedded can be risk factors for their continued development. These contextual factors include their relations at the microsystem level, or their immediate environment (e.g., parents, neighborhoods, and communities), the mesosystem (the interplay among microsystems), the exosystem (e.g., local and federal governments and parental workplaces), and the macrosystem level (the sociocultural context). While a full empirical test of Prime's conceptual model is beyond the scope of this article, within the context of the pandemic, we focus on how caregiver well-being (mental health symptoms and parenting stress) affects later child behavioral functioning. We also acknowledge the effects of preexisting family vulnerabilities and characteristics (e.g., family income and child temperament) on the processes described here (Prime et al., 2020).

Parenting Stress

Parenting young children is rewarding, but also stressful and resource-intensive (Deater-Deckard & Panneton, 2017). The high demands of caregiving can lead to feelings of parenting stress:

aversive psychological and physiological reactions that arise when parents feel that the demands of caregiving are overwhelming their abilities and resources. Three domains contribute to the intensity and duration of parenting stress: (a) parental resources, (b) the needs and characteristics of a child, and the nature of the (c) parent-child relationship (Abidin, 1992). As mentioned previously, *parental resources* encompass general psychological well-being and mental health (Deater-Deckard, 2008), their perceived self-efficacy and competence as a caregiver (Crnic & Ross, 2017), and financial (Carroll et al., 2020), social, and instrumental support (Deater-Deckard, 1998). *Individual-level child characteristics* (e.g., temperament, age) also impact parenting stress; the demands of caregiving differ among children, and throughout a child's life. Children with more reactive temperaments and children with chronic physical or mental health conditions may require more from their caregivers (Deater-Deckard, 2008). Early childhood is a vulnerable stage of parenting, as parents with young children adapt to shifting family dynamics and new demands (Crnic et al., 1984). While parenting stress is generally relatively stable across childhood, parenting stress levels are higher, on average, for parents during early childhood compared with other age groups (Crnic et al., 2005; Williford et al., 2007). Last, the coregulation, attachment, and the extent to which parents and children can enjoy each other and communicate effectively all contribute to the *parent-child interaction* domain of parenting stress (Deater-Deckard, 2008).

Parenting Stress and COVID-19

The COVID-19 pandemic has increased the likelihood of parenting stress across all three of its domains: parental resources (Adams et al., 2021), child needs and characteristics, and the nature of the parent-child relationship (Prime et al., 2020). In addition to the physical health risks of COVID-19, parents have faced sudden loss of child care, financial uncertainty, additional responsibilities regarding their child's education and social needs, unpredictable conditions, disruptions to routines, the loss of social support, and increased challenges to their own mental health (Hussong et al., 2022; Prime et al., 2020; Spinelli et al., 2021). Much of the previous research about parenting stress has focused on individual-level child needs and conditions that increase parenting stress, such as serious chronic physical conditions (e.g., cancer and spina bifida; see Pinquart, 2018, for a recent meta-analysis). Research on pandemic parenting stress complement the existing knowledge by highlighting the effects of macrosystem-level contextual factors that reduced parenting resources on a large scale.

Acute and Chronic Stressors. The types of pandemic-related stressors have varied across the duration of the pandemic. Families have experienced varying degrees of acute physical and mental health-related stressors, such as illnesses, deaths, and isolation, as well as financial stress. Although there is wide interpersonal variation, at the population level, the COVID-19 pandemic has transitioned from an acute stressor to a more chronic source of stress. In spring of 2020, many believed that the pandemic, while dangerous and disruptive, was a time-limited, acute stressor that would dissipate (Steehuysen & Kelland, 2021). Acute stressors can negatively impact parenting stress (Deater-Deckard & Scarr, 1996), and even if the pandemic had been a time-delimited event, the magnitude of the disruption of families would have had impacts on familial well-being.

However, over time the COVID-19 pandemic has become a chronic source of stress for parents, depleting coping resources (Bridgland et al., 2021). Many families faced long-term financial instability, and a consistent lack of resources and safe childcare (Carroll et al., 2020), especially in the United States, where families did not receive as much financial assistance as those in other countries (Kaplan, 2020). Chronic stressors wear on the body and mind (Schulz & Sherwood, 2008), and daily hassles and cumulative stress negatively impact parent-child relationships and functioning (Crnic et al., 2005). This accumulation of stressors experienced by parents throughout the COVID-19 pandemic across psychological, physiological, familial, and societal levels may lead to allostatic overload (Prime et al., 2020), in which wear and tear of stressors accumulate at a rate exceeding the individuals' capacity to manage stress (McEwen, 1998). Most research examining parenting stress utilizes a cross-sectional perspective of parenting stress, with some notable exceptions (e.g., Adams et al., 2021), who found that parenting stress in parents of school-age children was elevated after the onset of the pandemic compared with pre-COVID-19, and that the parents were more stressed in May 2020 than in September 2020. Given the differing impacts of acute and chronic stress (Crnic et al., 2005), additional research that consists of repeated measures over multiple time points are needed to better understand the impacts of enduring parenting stress, as well as the effects of *changes* in parenting stress during the COVID-19 pandemic.

Parenting Stress and Child Problem Behaviors

Parenting stress impacts not only caregivers' mental health, but also affects children's well-being. Parents experiencing higher levels of stress are more likely to parent more harshly, less sensitively, and less consistently (Haapsamo et al., 2013). In cross-sectional studies during the early pandemic, parents' parental stress was associated with higher levels of behavior problems in young children (Dillmann et al., 2022; Giannotti et al., 2022), increased conduct problems and hyperactivity (Spinelli et al., 2020), and lower levels of emotion regulation in children (Spinelli et al., 2021).

Analyzing parenting stress over time gives a more complete understanding of the effects of changing and cumulative parenting stress. Parenting stress trajectories before the onset of the COVID-19 pandemic have shown both initial parenting stress and changes in parenting stress over time are linked with children's problem behaviors (Han & Lee, 2018). Transactional models of parenting stress and child behavior problems also show significant links between parenting stress and later child problem behaviors (Neece et al., 2012). Similarly, Liu and Wang (2015) found a relation between maternal parenting stress and internalizing and externalizing behaviors in preschoolers, mediated by parenting (e.g., psychological aggression). To the authors' knowledge, there has been limited longitudinal research examining the effects of parenting stress during the COVID-19 pandemic, especially in parents with young children.

Parental Mental Health and Parenting Stress in the Context of COVID-19

Parental well-being and mental health impacts the functioning of the family system, as outlined in the Prime et al.'s (2020) theoretical

model of familial risk and resilience during the pandemic. Financial and social changes associated with the first year of the pandemic, such as job insecurity and increased isolation, increased the likelihood of mental health issues in parents. Parents have reported increased levels of depressive and anxiety symptoms since the onset of the pandemic (Calvano et al., 2022), as well as a link between perceived overall stress and parenting stress (Sahithya et al., 2020) and between parental depressive and anxiety symptoms and parenting stress (Brown et al., 2020). These stressors can increase the perception of difficulties and reduce instrumental and psychological resources for parents, increasing parenting stress (Prime et al., 2020). A recent meta-analysis of mostly prepandemic samples found a link between parental depressive symptoms and parenting stress, as well as mixed evidence for an association between anxiety and parenting stress (Fang et al., 2022).

In addition to effects on parents, parental mental health and stress also impact child well-being and behavior (Prime et al., 2020). This link has been demonstrated in pre-COVID-19 samples (see Goodman et al., 2011, for a meta-analysis on the effects of maternal depression on children). This relation has also been found in the few longitudinal post-COVID-19 onset samples to date that examine parental well-being and child behaviors. One recent study found that maternal depressive symptoms trajectories negatively impacted young children's behavior in Israel after the start of the pandemic (Gordon-Hacker et al., 2023). Additionally, found that parental strain negatively impacted changes in child problem behaviors in a German sample of children aged 3-10 (Essler et al., 2023).

The Present Study

Previous theoretical and empirical research highlights how large-scale stressful events, such as the COVID-19 pandemic, can have cascading effects on parental well-being, parenting stress, and child behaviors. To date, little is known regarding pandemic parenting stress in families with young children, nor the trajectories of pandemic-era parenting stress. This is especially important, as young children need more time-intensive caregiving than older children, increasing demands on parents. The use of a latent growth curve model allows us to look at how parenting stress changed over the first year of the pandemic, how both initial levels and the rate of change in parenting stress affects child problem behaviors, and how parental mental health affects both parenting stress and child behaviors. The findings can help to develop resources that can support parental well-being and caregiving during the stressful period.

We hypothesized that (1) on average, parenting stress increased over the first year of the COVID-19 pandemic. We also hypothesized that more parental mental health symptoms would be related to (2a) higher initial parenting stress, as well as (2b) more positive changes in parenting stress over time. We expected that both (3a) parental mental health symptoms and (3b) parenting stress at the start of the pandemic and (3c) parenting stress over time would be linked with higher levels of later child problem behaviors. Last, we predicted that (4a) initial parenting stress and (4b) parenting stress over time would have an indirect effect on the link between parental mental health symptoms and child problem behaviors.

Method

Participants

As part of a larger longitudinal project examining family functioning during the COVID-19 pandemic, we followed 298 American families with a young child ($M_{\text{age}} = 15.02$ months, $SD = 6.86$ months; range = 1–34 months) over the first 2 years of the pandemic. Parents' ages ranged from 19 to 46 years old ($M = 32.19$ years, $SD = 5.17$ years). Nearly all parents were married or cohabitating with their partner (95%), 3% were married or in a long-term relationship and living apart, and 5% were single or divorced. Thirteen percent of participants reported household incomes of \$25,000 or less, 24% reported \$25,000–\$50,000, 45% between \$50,000–\$100,000, and 17% reported incomes over \$100,000. At the start of the study, 108 (37%) worked part-time, 49 (16%) worked full-time, 47 (16%) were not employed but looking for work, 88 (30%) were not in the labor force, and 4 (1%) were unable to work due to disability. Thirty participants earned a high school diploma or equivalent (10%), 40 earned associates' or trade degree (13%), 70 completed at least some college (24%), 100 earned a bachelor's degree (34%), and 58 received postsecondary education (20%). Approximately 4% of parents identified as Asian, 7% as African American/Black, 5% as Hispanic/Latino/a/x, 76% as White, and 8% as multiethnic, biracial, or another race/ethnicity. Two parents identified as nonbinary, and 296 identified as women. One child was assigned intersex at birth, 144 were assigned male at birth, and 153 were assigned female at birth. At Wave 1, 115 (39%) of families had one child, 105 (35%) had two children, 42 (14%) had three children, and five (1.7%) had five children. Participants resided in 42 of the 50 United States.

Of the original 298 families at Wave 1 (April–May 2020), 258 families (87% of the original sample) participated at Wave 2 (August–September 2020), 248 families (83%) at Wave 3 (November 2020–January 2021), and 208 families (70%) at Wave 4 (September–December 2021). Participants were compensated at each wave: \$8, \$12, \$16, and \$25, respectively.

Procedure

Parents reported on their feelings of parenting stress, mental health symptoms (depressive symptoms, anxiety symptoms, and overall stress), their child's temperament, and demographic information (i.e., parent and child race/ethnicity, child sex, and household income) during Wave 1 of the study. Parents again rated their parenting stress during Waves 2 and 3. During Wave 4, parents reported their children's problem behaviors and shared their current household income.

All data were collected via Prolific, an online research platform that connects researchers with verified participants. Prolific primarily recruits participants through word-of-mouth and social media (Who Are the Participants on Prolific?, 2023). Prolific has produced high-quality data and has offered a more geographically and ethnically diverse sample pool than other online survey platforms (Peer et al., 2017). For this study, Prolific sent an invitation to a subset of all Prolific participants who were eligible according to study criteria. Parents were eligible to participate in this study if they had a child under the age of 3, could read and write in English, and were from the United States. Prolific sent out invitations to subsequent eligible subsets every 48 hr until the desired sample

size was met. The University of Texas Institutional Review Board provided oversight over this project (IRB: 2020010077). Participants provided informed consent after receiving information regarding the study and their rights as participants. Participants utilized a deidentified Prolific ID to track responses across waves. Attention check questions were added into the surveys to increase data quality (e.g., True or false: I sleep less than 1 hr per night; Meade & Craig, 2012). Five participants were removed because they answered two or more attention questions incorrectly at Wave 1, and 298 participants were retained.

Measures

Parenting Stress

Parenting stress index–short form (PSI-SF; Abidin, 2012) is a 36-item self-report questionnaire that measures parent-reported stress within the parent–child relationship system. Questions are grouped into one of three subscales: Parental Distress (e.g., “I often have the feeling that I cannot handle things very well”), Parent–Child Dysfunctional Interaction (e.g., “When I do things for my child, I get the feeling that my efforts are not appreciated very much”), and Difficult Child (e.g., “Compared to the average child, my child has a great deal of difficulty in getting used to changes in schedule or changes around the house”). Items are scored on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Answers were summed for all questions to create a raw total score, which, consistent with scoring guidelines, were converted into percentile scores. We conducted mean imputation if participants did not answer one question per scale (2% or fewer participants). In the current sample, reliability for total parenting stress was high at each wave ($\alpha_{\text{Wave 1}} = .94$; $\alpha_{\text{Wave 2}} = .95$, $\alpha_{\text{Wave 3}} = .95$).

Depressive Symptoms

The Centre for Epidemiological Studies Depression Scale–10 (Andresen et al., 1994) is a 10-item self-report questionnaire that measures the prevalence of depressive symptoms in the past week (e.g., “I felt depressed”). Participants rated each statement from 0 (rarely or none of the time) to 3 (all the time). Two statements with a positive valence were reverse-scored, and answers were summed (possible range = 0–30; higher scores reflect higher levels of depressive symptoms). Reliability in the study's population was good ($\alpha = .89$). As recommended by Andresen et al. (1994), mean imputation was conducted for participants who did not provide an answer for one of the 10 statements (<1% of participants).

Anxiety Symptoms

The Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006) assesses self-reported symptoms of anxiety during the previous 2 weeks. Participants indicated their level of endorsement with seven symptoms (e.g., “not being able to stop or control worrying”) on a 4-point scale, which ranged from “not at all” (0) to “nearly every day (3).” Answers to the seven statements were summed, with higher scores indicating higher levels of anxiety symptoms. If participants missed one of seven statements, their score was calculated after conducting mean imputation for the missing item (fewer than 1% of participants). This measure

demonstrated excellent consistency in this study population ($\alpha = .92$).

Perceived Stress

Individuals' perception of stress was assessed using the 10-item Perceived Stress Scale (PSS-10; Cohen et al., 1983). Participants rated their level of agreement with questions such as "In the last month, how often have you felt that you were unable to control the important things in your life?" on a 5-point scale that ranged from "never" (0) to "very often" (4). Positive items were reversed-scored, and answers to all items were summed (possible range = 0–40, higher scores indicate higher levels of stress). We conducted mean imputation if participants were missing one question (fewer than 1% of participants); data from participants missing more than one answer were removed. Reliability in the present study was excellent ($\alpha = .91$).

Child Problem Behaviors

Parents reported on their child's problem behaviors using the 100-item Child Behavior Checklist for Age 1.5–5 (CBCL/1.5-5; Achenbach & Rescorla, 2000). This measure, designed for caregivers of children aged 1.5 to 5 years old, lists 99 behaviors, such as "aches or pains (without medical cause)" and "withdrawn, doesn't get involved with others," as well as a final open-response question. Parents rated items on a 3-point scale: *not true* (0), *somewhat or sometimes true* (1), or *very true or often true* (2). Responses to the 99 behavioral statements were summed to create a raw total score, with higher scores indicating higher levels of problem behaviors. Raw scores were converted to T-scores for analysis using the ASEBA-PC 2020 program. This program only calculates scores if participants are missing eight or fewer responses from the 99 items; we discarded data from one participant who exceeded this threshold. Reliability for the total problems score was high ($\alpha = .96$).

Model Covariates

Also important is the effect of the COVID-19 pandemic on families' finances (Abrams et al., 2022). Many families faced a reduction of income, job loss, and competing demands of childcare and paid work after the onset of the pandemic. Economic stressors increase the likelihood of parental distress and disruptions throughout the family system (Conger et al., 1994). Thus, we controlled for the effects of initial family financial resources on parental mental health and parenting stress. Additionally, child temperament plays an important role in parenting stress (McQuillan & Bates, 2017) and child problem behaviors (Gartstein et al., 2012). Temperament is often conceptualized as three dimensions: extraversion-surgency, negative affect, and effortful control (Putnam et al., 2014); we controlled for these dimensions on parenting stress and children's problem behaviors.

Income. Parents reported their household income at Wave 1 by selecting an answer for the following question: "What is the current combined annual income for everyone living in your household?" "Less than \$25,000," "\$25,000–\$50,000," "\$50,000–\$100,000," "\$100,000–\$200,000," and "More than \$200,000." We recoded Wave 1 income into the following categories: \$0–\$25,000,

\$25,000–\$50,000, \$50,000–\$100,000, and more than \$100,000 due to the small number of parents reporting incomes over \$200,000 ($n = 4$).

Temperament.

Infant Temperament. Parents of children younger than 12 months at the beginning of the study answered questions about their infant's temperament using the Infant Behavior Questionnaire–Revised–Very Short (IBQ-R–Very Short; Putnam et al., 2014). This 37-item questionnaire asks parents about the frequency of different behaviors observed during the previous week. The behaviors queried make up one of three dimensions: positive affectivity/surgency (e.g., "When tossed around playfully how often did the baby laugh?"), negative emotionality (e.g., "When tired, how often did your baby show distress?"), and orienting/regulating capacity (e.g., "How often during the last week did the baby enjoy being read to?"). Parents rated infant behaviors on a 7-point Likert-type scale ranging from 1 (*never*) to 7 (*always*); higher scores indicate more frequent occurrences of the behavior. Parents selected "Does Not Apply" if the parent did not observe the situation described during the last week. Internal consistency was calculated using data from parents who observed behaviors of every item in a dimension: ($\alpha_{\text{positive affectivity/surgency}} = .64$, $\alpha_{\text{negative emotionality}} = .83$, $\alpha_{\text{orienting/regulating capacity}} = .73$).

Toddler Temperament. Parents of children 13 months and older completed the Early Childhood Behavior Questionnaire–Very Short Form (ECBQ–Very Short; Putnam et al., 2010), a 36-item parent-report questionnaire designed to assess temperament in children aged between 18–36 months old. The ECBQ–Very Short is also appropriate for children aged 13–17 months (Putnam, n.d.). Parents reported on the occurrence and frequency of child behaviors over the previous 2 weeks. Questions are grouped into one of three factors that align with the IBQ-R dimensions: surgency (e.g., "When encountering a new activity, how often did your child get involved immediately?"), negative affect (e.g., "While in a public place, how often did your child seem afraid of large, noisy vehicles?"), and effortful control (e.g., "When told 'no,' how often did your child stop the forbidden activity?"). Responses were given on a 7-point scale ranging from "never" (1) to "always" (7). Similarly to the IBQ-R–Very Short, parents could choose "Does Not Apply" when the parent did not observe a behavior in the last 2 weeks. Reliability for the present study population was conducted on the subset of parents who reported they observed all behaviors: ($\alpha_{\text{surgency}} = .72$, $\alpha_{\text{negative affect}} = .79$, $\alpha_{\text{effortful control}} = .78$).

Combined Child Temperament. Since children's ages ranged from 1 month to 34 months at Wave 1, it was necessary to combine temperament responses from the IBQ-R ($n = 109$) and ECBQ ($n = 181$). To do so, we standardized the scored variables from each measure and combined them. *Surgency* represents IBQ-R's positive affectivity/surgency for participants with children 12 months or under of age and the ECBQ's surgency for families with children over 13 months of age or older. Similarly, the IBQ's negative affect and ECBQ's negative emotionality are combined to reflect *negative affect*, and the IBQ's orienting/regulating capacity and ECBQ's effortful control are combined to measure *effortful control*.

Transparency and Openness

Data were analyzed using SPSS. 27.0 (IBM Corporation, 2020) and Mplus 7.4 (Muthén & Muthén, 1998–2015). We followed

Journal Article Reporting Standards best practices for quantitative studies, structural equation modeling, and longitudinal studies, and we implemented Transparency and Openness Promotion Guidelines (Appelbaum et al., 2018; Nosek et al., 2015). Data and syntax have been made publicly available at the open science framework repository and can be accessed at <https://osf.io/sg62u>. A list of measures in this longitudinal study (including measures not utilized in this study) are available at the above link. This study was not preregistered. We report how we determined our sample size, all data exclusions, if any, all manipulations, and all measures in the study.

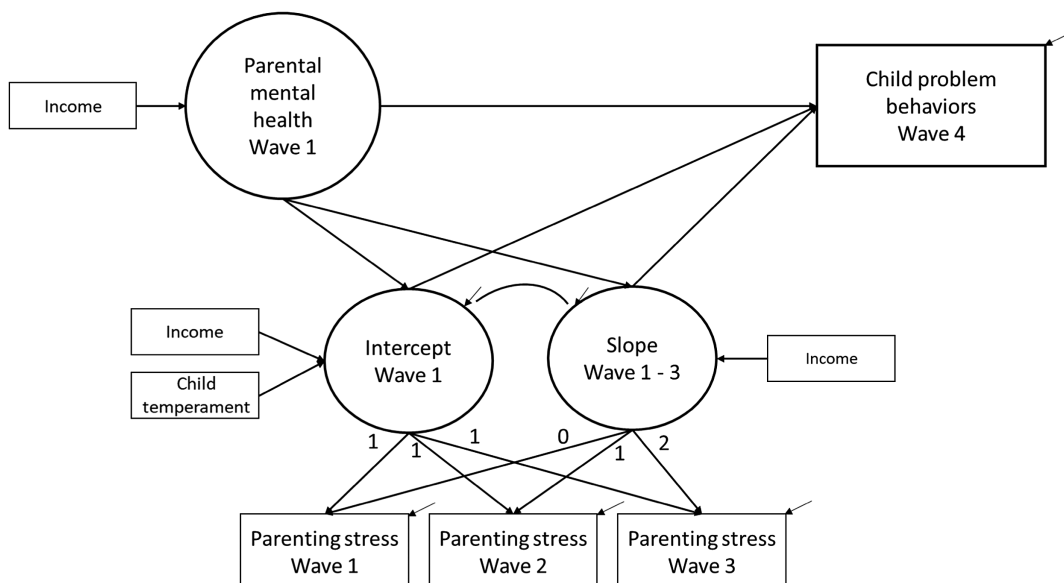
Analytic Strategy

To test our hypothesis that parenting stress increased for parents of young children during the first year of the pandemic (Hypothesis 1), we first conducted a repeated-measures analysis of variance (ANOVA) of levels of total parenting stress across time to test if parenting stress increased across the first year of the pandemic using SPSS 27.0 (IBM Corporation, 2020). Next, we examined changes in parenting stress over time using an unconditional latent growth curve model of parenting stress during Waves 1, 2, and 3 using Mplus 7.4 (Muthén & Muthén, 1998–2015). In a separate measurement model, we created a latent variable of parental mental health symptoms, using Wave 1 depressive symptoms, anxiety symptoms, and overall stress as indicators. Latent variables allow us to use the relations between related observed variables to model constructs such as overall mental health (Bollen, 2002). Model fit statistics were unavailable given that with three indicators, the model was just-identified; however, the loadings of depressive symptoms ($\beta = .89, p < .001$), anxiety symptoms ($\beta = .92, p < .001$), and stress ($\beta = .85, p < .001$) were high. This gives some evidence that the creation of a latent variable of parental mental health is appropriate.

The full model tested the effects of parental mental health symptoms at the beginning of the pandemic on initial parenting stress and parenting stress changes over time (Hypotheses 2 A and 2B; see Figure 1, for a conceptual model). To test our third set of hypotheses, the effects of parental mental health symptoms and parenting stress trajectories were tested on total child problem behaviors simultaneously. Finally, we tested the indirect effect of parenting stress trajectories on the relation between parental mental health symptoms and child problem behaviors (Hypothesis 4). We controlled for the effects of Wave 1 income on parental mental health symptoms and parenting stress trajectories. Additionally, we controlled for the effects of child temperament on parenting stress trajectories and child problem behaviors. We used maximum likelihood estimation for this model as all variables were sufficiently normally distributed (all variables in the model had skew and kurtosis values between -1 and $+1$). We used full information maximum likelihood to address missing data; this method uses all available information to contribute to parameter estimation and produces less biased estimates than other methods (Enders, 2001, 2010). Demographic variables (i.e., parental age, race, income, and education) and predictor variables (i.e., depressive symptoms, anxiety symptoms, perceived stress, and parenting stress at Wave 1) were not significantly related to attrition, as ascertained through independent sample t tests, providing some evidence that the missing at random assumption is plausible for this study (Nicholson et al., 2017).

The overall power of the structural model based on a χ^2 likelihood ratio test (Satorra & Saris, 1985) was calculated. Assuming a sample size of 280, a small effect size (.2), $\alpha = .05$, and $df = 27$ (the degrees of freedom in the hypothesized model), the power to detect model misspecification is .999. Further, a Monte Carlo simulation was conducted to determine the power of detecting specific effects within the latent growth model (Muthén & Muthén,

Figure 1
Conceptual Model of Parental Mental Health Symptoms, Parenting Stress Over Time, and Child Problem Behaviors



2002). Assuming $N = 280$ and a small effect size (.2), the power to detect the hypothesized effects ranged from .800 to .884.

Results

Preliminary Analyses

Descriptive statistics of parenting stress and other variables of interest are provided in Table 1. Parenting stress at the beginning of the COVID-19 pandemic (Wave 1) was strongly correlated with parenting stress during Wave 2 ($r = .73, p < .001$) and Wave 3 ($r = .74, p < .001$). Parental mental health symptoms at the beginning of the pandemic were associated with parenting stress (PSI) at each wave. Wave 1 parental depressive symptoms were associated with parenting stress ($r_{PSI\ W1} = .58, r_{PSI\ W2} = .52, r_{PSI\ W3} = .54$, all $ps < .001$). Similarly, parental anxiety symptoms at Wave 1 were associated with parenting stress ($r_{PSI\ W1} = .54, r_{PSI\ W2} = .48, r_{PSI\ W3} = .49$, all $ps < .001$), as was overall stress ($r_{PSI\ W1} = .61, r_{PSI\ W2} = .57, r_{PSI\ W3} = .59$, all $ps < .001$). Finally, parenting stress at each wave was associated with child behavioral problems at Wave 4 ($r_{PSI\ W1} = .50, r_{PSI\ W2} = .44, r_{PSI\ W3} = .51$, all $ps < .001$).

To test Hypothesis 1, we conducted a repeated-measures ANOVA revealed that parenting stress differed across waves, $F(3, 2758.37) = 7.54, p < .001$. Mauchly's test of sphericity was nonsignificant, indicating no significant differences among variances, $\chi^2(2) = 2.68, p = .262$. Post hoc comparisons with Bonferroni adjustment revealed that average parenting stress increased from Wave 1 ($M_{W1} = 50.48$) to Wave 3 ($M_{W3} = 55.50; M_{\text{difference}} = 5.02, 95\% \text{ CI } [1.83, 8.20], p = .001$).

Parenting Stress Trajectories During the COVID-19 Pandemic

The unconditional model of parenting stress had excellent model fit: $\chi^2(1) = .10, p = .754$; root-mean-square error of approximation (RMSEA): .00 [.00-.11]; comparative fit index (CFI) = 1.00; standardized root-mean-square residual (SRMR) = .00. Total

parenting stress increased over the course of the first year of the pandemic ($\beta_{S2} = .22, p = .006; \beta_{S3} = .47, p = .011$). Changes in parenting stress were not significantly related to initial parenting stress ($\beta = -.24, p = .090$).

In the full model, parental mental health was modeled as a predictor of parenting stress, which was modeled as a precursor of child problem behaviors; covariates were also included (see Figure 2). The model fit was acceptable: $\chi^2(27) = 79.16, p < .001$; RMSEA: .08 [.06-.10]; CFI = .96; SRMR = .10. All effects are presented in Table 2. Parental mental health had a direct effect on initial parenting stress (i.e., the intercept; $\beta = .69, p < .001$); those who reported higher levels of mental health symptoms reported higher levels of initial parenting stress (Hypothesis 2a). However, parental mental health at the beginning of the pandemic did not have a significant effect on changes in parenting stress over time (i.e., the slope; $\beta = -.43, p = .160$; Hypothesis 2b). Parents with higher Wave 1 household incomes reported lower levels of mental health symptoms ($\beta = -.26, p < .001$), though they reported higher levels of initial parenting stress ($\beta = .12, p = .026$). Child temperament affected initial parenting stress; those with children with lower levels of surgency ($\beta = -.12, p = .036$), higher levels of negative affect ($\beta = .24, p < .001$), and lower levels of effortful control ($\beta = -.30, p < .001$) reported higher levels of parenting stress. In contrast to initial parenting stress, those with lower household incomes at the beginning of the pandemic had steeper parenting stress increases over time ($\beta = -.61, p = .047$). Child temperament was not significantly related to changes in parenting stress over time.

We modeled the effects of parental mental health symptoms and parenting stress on parental reports of child behavioral problems. Parental mental health symptoms at the beginning of the pandemic had a direct effect on child problem behaviors ($\beta = .54, p = .003$); those with more mental health symptoms at Wave 1 reported more child problem behaviors at Wave 4 (Hypothesis 3a). Initial levels of parenting stress did not have a direct effect on later child problem behaviors ($\beta = .08, p = .729$; Hypothesis 3b), but changes in parenting stress over time were linked with higher rates of total

Table 1
Descriptive Statistics and Bivariate Correlations of Parenting Stress, Mental Health, and Child Behavior

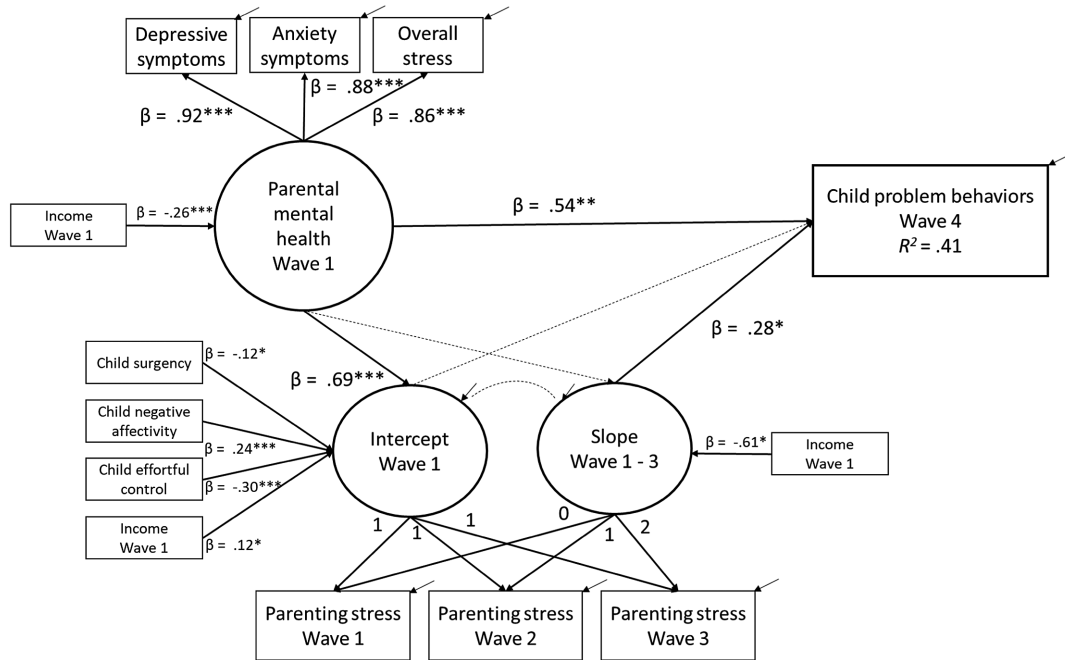
Variable	M	SD	1	2	3	4	5	6	7
Key study variables									
1. Parenting stress, W1	50.66	26.85	—						
2. Parenting stress, W2	52.81	27.60	.73***	—					
3. Parenting stress, W3	55.82	26.09	.74***	.76***	—				
4. Depressive symptoms	11.31	6.71	.58***	.52***	.54***	—			
5. Anxiety symptoms	7.67	5.60	.54***	.48***	.49***	.82***	—		
6. Perceived stress	18.96	7.84	.61***	.57***	.59***	.79***	.76***	—	
7. CBCL: Total, W4	44.73	11.69	.50***	.44***	.51***	.51***	.48***	.50***	—
Covariates									
Family									
Income, W1	2.66	0.92	-.04	-.09	-.15*	-.24**	-.23***	-.23**	-.26**
Children									
Surgency	-.01	1.00	-.12	-.18**	-.12	.03	.03	-.08	.07
Negative affect	-.02	0.96	.42***	.38***	.43***	.28***	.31***	.35***	.35***
Effortful control	-.01	1.00	-.40***	-.43***	-.38**	-.16**	-.19**	-.24**	-.24**

Note. Parenting stress = Parenting stress percentiles. W1 = Wave 1 (April–May 2020); W2 = Wave 2 (August–September 2020); W3 = Wave 3 (November 2020–January 2021), W4 = Wave 4 (September–December 2021); CBCL = Child Behavioral Checklist: Total Problems. Statistics presented in bold are statistically significant.

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

Figure 2

Latent Growth Curve Model of Parenting Stress, Parental Mental Health Symptoms, and Child Problem Behaviors



Note. $N = 298$. $\chi^2(27) = 79.16, p < .001$; RMSEA = .08 [.06–.10]; CFI = .96; SRMR = .10. For parsimony, insignificant betas and insignificant covariates are not presented in the figure. RMSEA = root-mean-square error of approximation; CFI = comparative fit index; SRMR = standardized root-mean-square residual.

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

child problems ($\beta = .28, p = .044$; Hypothesis 3C). Parents whose parental stress levels increased at higher rates were more likely to report higher levels of problem behaviors. When assessed concurrently with all variables in the model, child temperament did not have significant effects on problem behaviors.

We also tested the indirect effects of parenting stress trajectories on the relation between parental mental health and child problem behaviors using bootstrapped sampling with 5,000 draws (Preacher & Hayes, 2008). There was no evidence of a significant effect of initial parenting stress ($\beta = .05, p = .728$; 95% CI [−0.63, 0.38]) nor changes in parenting stress over time ($\beta = -.12, p = .167$; 95% CI [−0.36, 0.04]) on the relation between parental mental health and child problem behaviors (Hypotheses 4a and 4b).

Discussion

Parents of young children in our sample experienced increasing levels of parenting stress over the first year of the COVID-19 pandemic. This is consistent with national trends that reflect that, while the pandemic has been difficult for all, parents of young children are reporting high levels of stress (American Psychological Association, 2020). This trend is worrying and important, as parenting stress can have negative consequences for parents and children (Deater-Deckard, 2008; Neece et al., 2012). Initial parenting stress was heightened in parents who were experiencing higher levels of mental health symptoms in the beginning of the pandemic. Parental mental health symptoms at the beginning of

the pandemic were also linked to higher levels of child problem behaviors. Interestingly, parenting stress at the beginning of the pandemic was not related to later child problem behaviors, though changes in parenting stress over time were linked; those whose parenting stress increased at higher rates reported their children demonstrated more problem behaviors a year later. In concordance with the tripartite model of parenting stress (Abidin, 1992), characteristics that reduced parental resources or increased child demands, that is, household income and temperament, also influenced parental mental health and parenting stress.

Parenting Stress and COVID-19

As expected, American parents of young children reported increasing levels of parenting stress across the first year of the COVID-19 pandemic. Our findings complement research that found heightened levels of parenting stress, compared with prepandemic norms, reported by parents of young children in Germany (Dillmann et al., 2022) and in an American sample of families with school-age children (Adams et al., 2021). Parents of young children grappled with high demands of caregiving as their support systems abruptly diminished (Spinelli et al., 2020). Childcare facilities closed for long periods, and when reopened, were subject to unpredictable quarantines and closures based on cases. Many parents either quit working to care for their children, reducing familial financial resources, or balanced simultaneous work with caring for their children with limited to no support. Young children need intensive,

Table 2
Standardized Betas of Model Paths

Path	<i>b</i>	<i>SE_b</i>	β	<i>SE_{β}</i>	<i>p</i>
Parental mental health					
Parental mental health → initial parenting stress (intercept)	2.36	0.21	.69	.05	<.001
Parental mental health → parenting stress over time (slope)	−0.17	0.12	−.43	.31	.160
Parental mental health → child problem behaviors	0.99	0.34	.54	.18	.003
Covariates					
W1 income → parental mental health	−1.73	0.40	−.26	.06	<.001
Initial parenting stress (intercept)					
Initial parenting stress → child problem behaviors	.04	0.12	.08	.22	.729
Covariates					
W1 income → initial parenting stress (intercept)	2.76	1.24	.12	.05	.026
Child surgency → initial parenting stress (intercept)	−2.47	1.18	−.12	.06	.036
Child negative affectivity → initial parenting stress (intercept)	5.25	1.27	.24	.06	<.001
Child effortful control → initial parenting stress (intercept)	−6.36	1.23	−.30	.06	<.001
Parenting stress over time (slope)					
Parenting stress over time → child problem behaviors	1.33	0.61	.28	.14	.044
Covariates					
W1 income → parenting stress over time (slope)	−1.61	0.68	−.61	.31	.047
Child surgency → parenting stress over time (slope)	−0.41	0.64	−.17	.28	.533
Child negative affectivity → parenting stress over time (slope)	0.24	0.73	.09	.29	.747
Child effortful control → parenting stress over time (slope)	0.61	0.67	.25	.30	.397
Child problem behaviors					
Covariates					
Child surgency → child problem behaviors	1.43	1.12	.13	.10	.200
Child negative affect → child problem behaviors	1.68	1.34	.14	.11	.212
Child effortful control → child problem behaviors	−1.90	1.58	−.17	.14	.232

Note. *SE* = standard error. Statistics presented in bold are statistically significant.

moment-to-moment caregiving to ensure their safety, regulation, and well-being. Young children also rely heavily on their parents' to regulate them through times of crisis, especially challenging in light of unprecedented and novel stressors. (Spinelli et al., 2021). These demanding circumstances lasted for months, a chronic stressor that can have long-lasting consequences on parents, children, and the family system (Bronfenbrenner & Morris, 2006; Grose, 2021). Parenting stress can have negative effects on caregiving quality, reducing parental sensitivity, and the quality of parent-child interactions (Haapsamo et al., 2013).

As noted by Adams et al. (2021), surveying parents during key timepoints in the pandemic allows us to understand relations between parental and child well-being during times of critical change. In this sample, parents reported their parenting stress during the spring of 2020 (Wave 1), when parents faced uncertainty and the total responsibility of caregiving of childcare closures and social distancing. We again surveyed parents in August and September of 2020 (Wave 2), as Americans first contended with limited childcare openings and frequent quarantines. Last, we surveyed parents during the 2020 winter holidays (Wave 3), which coincided with the promise of imminent vaccines and the largest COVID-19 spike up to that time period (Centers for Disease Control & Prevention, n.d.). In contrast to findings by Adams and colleagues that showed an overall decrease in *parental* stress across this time period, we found an increase in reported *parenting* stress from Spring 2020 (Wave 1) to late Summer/early Fall 2020 (Wave 2). They note that even within the overall decrease of parental stress in their sample during the fall, they note that over half the parents in their sample report increases in stress. The discrepancy may be tied to differences in the ages of the children (0–3 years in this

sample vs. 5–18 years in the Adams sample), or differences in measures used, PSI (Abidin, 2012) versus PSS (Cohen et al., 1983).

Parental Mental Health and Parenting Stress

Parental mental health symptoms at the beginning of the pandemic were positively related to initial parenting stress levels. This supports previous literature that also tied mental health symptoms to higher levels of parenting stress during the pandemic in cross-sectional studies (Babore et al., 2021; Fang et al., 2022). Parents who were struggling with their mental health had fewer psychological resources with which to cope with the stressors associated with the onset of the pandemic. Unsurprisingly, overall stress, depressive symptoms, and anxiety symptoms were heightened at the onset of the pandemic for parents (Calvano et al., 2022; Sahithya et al., 2020). Parents worried about their family's physical health and psychological well-being, the closing of most public spaces, and their financial resources in the face of a novel, unpredictable, and largely unknown threat.

In contrast, parental mental health symptoms at the beginning of the pandemic did not significantly impact parenting stress changes *over time* in our participants. This is similar to research that found that initial levels of parental psychiatric symptoms (Kahng et al., 2008) and cognitive readiness to parent (Barboza-Salerno, 2020) did not have a significant effect on parenting stress over time. The beginning of the pandemic may have been an especially unique time, and initially prone to more fluctuations in well-being and stress levels as information changed rapidly. Other factors, such as parental mental health trajectories and long-term family resources, may be more useful predictors of parenting stress over time.

Parenting Stress Trajectories and Child Problem Behaviors

Similarly, initial levels of parenting stress also did not impact later child problem behaviors. However, higher rates of parenting stress *over time* were related to later child problem behaviors, potentially revealing the effects of cumulative stress effects. This has policy and practice implications, as it suggests that increasing parenting stress levels over time affect children's behaviors, rather than the parents' initial response at a particular time. This can give practitioners time to effectively intervene to reduce psychological stressors and preserve parenting quality and the parent-child relationship. A similar finding was demonstrated in a pre-pandemic longitudinal study by Neece et al. (2012) in which they found parenting stress and child behavioral issues to have a transactional relationship over time.

Parental Mental Health and Child Problem Behaviors

Parental mental health symptoms at the beginning of the pandemic had direct effects on higher levels of child problem behaviors. This supports previous literature that found maternal depressive symptoms (Gordon-Hacker et al., 2023) and maternal anxiety symptoms (Jarvers et al., 2023) are linked to later emotional and behavioral problems in children. Parents struggling with more pandemic-related stressors likely face increased mental health symptoms, and thus find sensitive and responsive parenting more challenging. We did not find significant *indirect* effects of parenting stress trajectories on the relation between parental mental health and child behavior. It is possible that looking at more direct mechanisms, such as parental behaviors, may better highlight the mechanisms through which parental mental health impacts child behavior.

Initial Family Income and Child Temperament

When considering the impact of initial family financial resources, we again see a discrepancy between the early phase of the pandemic and later phases. Consistent with the previous research, those with lower incomes at the beginning of the pandemic reported higher levels of depressive symptoms, anxiety symptoms, and overall stress (Kerr et al., 2021). In contrast, those with higher levels of income reported *higher* levels of parenting stress at the onset of the pandemic. This may reflect differences in pandemic work at different income levels. For example, work with lower salaries may have been more likely to reduce or stop working at the onset of the pandemic, increasing overall mental health symptoms in parents. Work with higher salaries may have been more easily turned into remote work, requiring parents to simultaneously care for their children while continuing to work, thus increasing parenting stress. Additionally, during initial pandemic social distancing customs, there were no (or very limited) childcare resources regardless of purchasing power. The relation between income and parenting stress in our sample reversed over time, however; higher household incomes had a protective effect on parenting stress slopes. Parents with more financial resources reported lower rates of parenting stress over time in our model over the first year of the pandemic. This may be due to the cumulative impacts of lower incomes on families' ability to

procure necessities and child care. Over time, this likely added to the stress that parents with lower incomes faced.

Child temperament was also related to initial parenting stress in this sample. Parents of children who had higher levels of surgency or effortful control reported lower levels of parenting stress, while parents of children with higher negative affectivity experienced higher levels of parenting stress. This likely reflects that these children required more parental resources, especially during the tumult of the pandemic. This complements other findings regarding the importance of child temperament, for example, research that found that child temperament moderated the relation between parenting stress and child behavior (Lionetti et al., 2023).

Strengths, Limitations and Future Directions

Our article responds to calls in the literature (see Adams et al., 2021; Lionetti et al., 2023) for increased understanding of family well-being during the COVID-19 pandemic. First, while there is some evidence about child and parental well-being during the pandemic (e.g., Adams et al., 2021; Babore et al., 2021; Calvano et al., 2022; Spinelli et al., 2020), this model adds knowledge about the associations among multiple measures of parental well-being and later child behavioral problems. Second, this longitudinal design allows us to see changes over time and their effects. Third, the COVID-19 literature has largely focused on school-age or older children, or children of all ages, limiting our understanding of the pandemic's unique influence on early childhood. Understanding parenting stress in families with young children is important, as early childhood requires time-intensive caregiving and reorganization of roles, responsibilities, and parent self-concept, even in nonpandemic times (Crnic et al., 1984).

This study examined parenting stress trajectories and their effects on child problem behaviors. However, child behaviors can also influence parenting stress (Crnic et al., 2005; Williford et al., 2007), and future research should model bidirectional relations between the two (Deater-Deckard, 2008; Neece et al., 2012). We were unable to examine the impacts of child behavior on parenting stress, as the children in this study were too young to be assessed at earlier waves using the CBCL 1.5-5. Additionally, all measures were answered via self-report questionnaires administered in an online format. This was done for safety reasons and to increase participant geographic variability. However, self-report data can be biased (Morsbach & Prinz, 2006), and it is possible that mental health and parenting stress may affect a parent's perception of their child's behavior. Despite these shortcomings, parental *perception* of parent and child functioning is inherently important, and self-report questionnaires allow us to quickly gather comprehensive information that may not be feasible through observations. We only surveyed one parent from each family, and unfortunately, we do not have data from before the pandemic, so we cannot look at how pre-pandemic parental functioning affected early pandemic well-being. Future studies should include the use of multiple reporters or the use of observational methods. Additionally, given our use of self-report data, it is not possible to definitively tie the increase of parenting stress to the pandemic, but it should be noted that parenting stress generally decreases or remains stable as children age (Crnic et al., 2005; Williford et al., 2007). Last, future research should probe if parenting stress and parental mental health during this time period

had unique impacts on different types of problem behaviors (e.g., internalizing and externalizing).

Future research should probe potential moderators, especially the role that income has on pandemic familial well-being. Income may affect parenting stress trajectories in qualitatively different ways, as factors such as work demands, flexibility, and purchasing power may have affected families differently. Relatedly, future analyses should explore how changing income trajectories impact parenting stress trajectories. Model relations may also differ in meaningful ways across the developmental stages of children and their family composition. Given the dearth of research on parenting stress trajectories in families with young children, there may be important differences in families with infants compared with toddlers, or in families with multiple children.

Researchers should also examine mechanisms that explain how parental mental health and parenting stress affect child behavior. Parenting practices during the pandemic are one potential mechanism. Sensitive and responsive parental behaviors (e.g., emotion socialization, home routines, and child-appropriate discussions of the pandemic) have been shown to buffer the impact of pandemic-related stress on children (Cohodes et al., 2021). Another potential mechanism is parental burnout. Prolonged exposure to parenting stress can lead to parental burnout, which manifests through intense exhaustion in the parenting role, and emotional distance from their children and their identity as a parent (Mikolajczak & Roskam, 2018). Parental burnout can lead to severe negative consequences for the entire family system, and future work should consider this within the context of COVID-19.

Last, this sample consists of mostly married American parents, with a substantial percentage of white participants, participants with higher incomes, and participants with high levels of educational attainment. The privilege associated with these demographic factors may have been protective for these families, and these results may not be generalizable. Future research should investigate the well-being of more diverse families and family configurations, who likely faced even higher levels of parenting stress and mental health symptoms.

Understanding the antecedents and sequelae of parenting stress trajectories in families with young children can highlight the importance of supporting the well-being of families—both parents and children—in policy and practice. Practitioners can support both children and families by assessing parents' parenting stress and parental mental health. It is also important to note that many other countries supplied families with recurring relief funds, whereas parents in the United States had to continue working through the pandemic (Kaplan, 2020) while simultaneously leading educational activities and engaging in round-the-clock caregiving. This likely added to parenting stress and parental mental health symptoms. Policy makers should advocate for more economic assistance and, if appropriate, reduced work obligations during future national crises, for the well-being of the whole family system.

Conclusion

This study explores parenting stress trajectories of American parents of young children over the first year of the COVID-19 pandemic. On average, parenting stress increased for parents as the pandemic continued, and parental mental health impacted initial parenting stress levels. Parental mental health and parenting stress

trajectories over time were associated with higher rates of child problem behaviors. Resources that can buffer parental well-being and increase caregiving support may have positive effects on both parents and children, especially during times of crisis.

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