


Special Issue Article

Resilience in Development: Pathways to Multisystem Integration

Empirical support for a model of risk and resilience in children and families during COVID-19: A systematic review & narrative synthesis

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Abstract

Background. The COVID-19 Family Disruption Model (FDM) describes the cascading effects of pandemic-related social disruptions on child and family psychosocial functioning. The current systematic review assesses the empirical support for the model. **Methods.** Study eligibility: 1) children between 2–18 years (and/or their caregivers); 2) a quantitative longitudinal design; 3) published findings during the first 2.5 years of COVID-19; 4) an assessment of caregiver and/or family functioning; 5) an assessment of child internalizing, externalizing, or positive adjustment; and 6) an examination of a COVID-19 FDM pathway. Following a search of PsycINFO and MEDLINE in August 2022, screening, full-text assessments, and data extraction were completed by two reviewers. Study quality was examined using an adapted NIH risk-of-bias tool. **Results.** Findings from 47 studies were summarized using descriptive statistics, tables, and a narrative synthesis. There is emerging support for bidirectional pathways linking caregiver-child functioning and family-child functioning, particularly for child internalizing problems. Quality assessments indicated issues with attrition and power justification. **Discussion.** We provide a critical summary of the empirical support for the model, highlighting themes related to family systems theory and risk/resilience. We outline future directions for research on child and family well-being during COVID-19. Systematic review registration. PROSPERO [CRD42022327191].

Keywords: Child functioning; COVID-19; family functioning; family systems; risk and resilience

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Introduction

The COVID-19 pandemic (hereafter referred to as pandemic) has impacted mental health across the globe (Kumar & Nayar, 2021; Wu et al., 2021). Families with children have been particularly vulnerable to the social disruptions caused by the pandemic. Factors such as financial burden, school closures, lack of childcare, and limited opportunities for socialization have resulted in unique challenges for both caregivers and children (Ford & Moore, 2022). However, the specific pathways through which the pandemic has influenced family processes remain to be elucidated. In the early months of the pandemic, Prime et al. (2020) proposed the COVID-19 Family Disruption Model (FDM) as a framework for understanding caregiver, family, and child functioning during the pandemic. However, at that time, there were few, if any, empirical articles related specifically to the consequences of COVID-19 on children and families. Since then, the paper delineating the model has been cited over 1800 times on Google Scholar, demonstrating its widespread

uptake. Given the scope and quantity of the available literature, as well as the chronicity and global ramifications of the pandemic, further investigation of the utility of the model for explicating the impact of the pandemic is warranted. The current study uses a systematic review methodology to synthesize and evaluate the empirical support and utility of the COVID-19 FDM for understanding how the pandemic has impacted children (i.e., children and adolescents between two and 18 years; defined hereafter as children), caregivers, and families.

Child and family functioning during the COVID-19 pandemic

Many children have experienced heightened mental health problems since the onset of the pandemic (Glynn et al., 2021; Panchal et al., 2021). Across 18 systematic reviews of studies that examined COVID-19-related lockdowns and mitigation measures in relation to child mental health, the global pooled prevalence for each of depression and anxiety was 32%, an increase in comparison to prepandemic estimates (Harrison et al., 2022). Other studies have found an increase in children's externalizing behaviors (e.g., hyperactivity and conduct problems; Giannotti et al., 2021). Pandemic-related school closures and lockdowns, in addition to other disruptions to children's daily routines, contributed to this increase in psychological maladjustment (Osgood et al., 2021; Viner et al., 2022). All told, children's emotional

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and behavioral difficulties have significantly increased since the onset of the pandemic.

Pandemic-related social disruptions have also coincided with deteriorations in caregiver and family functioning. For example, clinically elevated symptoms of depression and anxiety in mothers of young children nearly doubled and tripled, respectively, from before the pandemic (Racine et al., 2022). Increases in caregiver mental health problems during the pandemic have implications for parenting behaviors and parent-child relationships. For instance, greater parental psychological distress was associated with a higher likelihood of engaging in more negative and fewer positive parenting practices during the pandemic (Roos et al., 2021). Another study found that higher levels of depression in both mothers and fathers were related to greater parent-child relationship conflict (Russell et al., 2020). Pandemic stressors have further implications for entire family systems; heightened COVID-19 disruptions were linked to poorer parenting quality which, in turn, was associated with greater family dysfunction (Browne et al., 2021). The pandemic has altered the lives of caregivers, with implications for specific and whole-family relationships (Prime et al., 2020).

Principles of risk and resilience

The chronic, pervasive, and multisystemic nature of COVID-19 disruptions to communities, schools, families, and individuals created a natural opportunity to study risk and resilience in families globally. Not all families are expected to be similarly impacted by the social disruptions caused by the pandemic (Masten, 2021). For example, mothers (Yavorsky et al., 2021), members of racialized groups (Le et al., 2022), financially insecure families (Zheng et al., 2021), as well as other groups (e.g., those with existing physical and/or mental health conditions, belonging to sexually marginalized groups, and living closer to large infection sites; Gibson et al., 2021), have experienced greater stress due to the public health restrictions to contain COVID-19 (Thomas et al., 2022). Furthermore, some families may be more vulnerable due to preexisting stressors in the family system such as trauma, relationship strain, or poor mental health among family members (Chavira et al., 2022). Although families experiencing greater cumulative stress prior to and/or during COVID-19 are more likely to experience worse outcomes, *risk* is a probabilistic process and therefore not deterministic (Juster et al., 2016; Masten, 2013). Specifically, risk operates in tandem with promotive and protective factors. *Promotive* factors place family members on a trajectory toward positive development and functioning regardless of risk level (Masten & Cicchetti, 2016; Masten, 2013; Rutter, 2012; Sameroff, 2000). In contrast, *protective* factors promote positive adaptation and functioning when risk or adversity is heightened, over and above any effects at lower risk levels (Masten, 2013). These processes are relevant to studying resilience in children and/or families – that is, children and families' capacities to cope with, recover, positively adapt, and grow in response to threat, adverse circumstances, and trauma (Cicchetti, 2013; Walsh, 1996, 2003, 2016, 2021). Accordingly, the long- and short-term effects of the pandemic on families largely depend on developmental stages, the type and severity of challenges experienced, preexisting vulnerabilities and strengths, current availability (or lack) of resources, and the mobilization of resources and protective systems that foster resilience (Masten, 2021).

Development of the family disruption model

As families play a proximal role in influencing child functioning, various processes within families will be influential in shaping how children respond to the pandemic as a distal risk factor. The

COVID-19 FDM was developed to conceptualize potential pandemic-related threats to the structural and functional processes within the family and, thus, child functioning (Prime et al., 2020).

Model overview

Conceptual frameworks and/or models are typically developed after synthesizing research on a specific topic (Stansfeld et al., 2019). However, at the time of developing the COVID-19 FDM, there was no available empirical research on the COVID-19 pandemic. Model development necessitated authors to draw on preestablished systemic models of human development and family functioning, as well as research on the adverse impacts of economic hardships (e.g., Great Depression, World War II, the Great Farm Crisis, and the 2008 global recession), natural disasters (e.g., Hurricane Katrina), terrorist events (e.g., September 11 [9/11] attacks), and cumulative risk/poverty to child and family functioning. The COVID-19 FDM was formulated using four primary theoretical frameworks delineating multisystem cascades and/or intrafamilial processes: the Bioecological Model of Development, Family Stress Model, Family Systems Theory, and Family Resilience Framework. Bronfenbrenner's (2005) *Bioecological Model of Development* describes the transactional process in which multiple, nested systems of influence impact human development. Specifically, a child's biological and genetic predispositions interact with their proximal (e.g., family, peers, school) and distal environments (e.g., social services, mass media, societal values), across time, to influence development. Conger et al.'s (2010) *Family Stress Model* also informed the COVID-19 FDM in its emphasis on the cascading effects of economic hardship on family relationships and child functioning. Specifically, the model proposes that economic stress emanating from economic hardship leads to enhanced parental psychological distress, with negative consequences to interparental conflict and disrupted parenting. Sequentially, negative interparental relationships and disrupted parenting behaviors diminish the child's well-being. The COVID-19 FDM further draws from Bowen's (1985) *Family Systems Theory* to provide further insight into the potential impact of the pandemic on intrafamilial processes. This framework describes the family as a single emotional unit and emphasizes that individual members cannot be understood in isolation. Since individual family members are interdependent and interconnected, stressors that impact the functioning of one family member will ultimately have ripple effects on all other family members. Finally, Walsh's (2003) *Family Resilience Framework* emphasizes key familial processes that reduce stress in high-risk environments and promote positive adaptation and resilience, such as family belief systems (e.g., making meaning of adversity), organizational patterns (e.g., being flexible), and communication (e.g., open emotional expression).

Collectively, drawing on these theories, and previous research on risk and resilience, the COVID-19 FDM describes a negative cascade from which social disruptions due to COVID-19 and related mitigation efforts impact child, caregiver, and family functioning via various pathways (see Figure 1; Prime et al., 2020). The model begins by hypothesizing that the social disruptions caused by COVID-19 (e.g., job loss, financial insecurity, social distancing, and confinement) will infiltrate family systems through their influence on caregiver functioning, such as enhanced parent mental health problems and parenting stress. Caregiver psychological functioning is hypothesized to impact family functioning (i.e., comprised of parent-child, sibling, marital, and whole-family relationships), which, in turn,

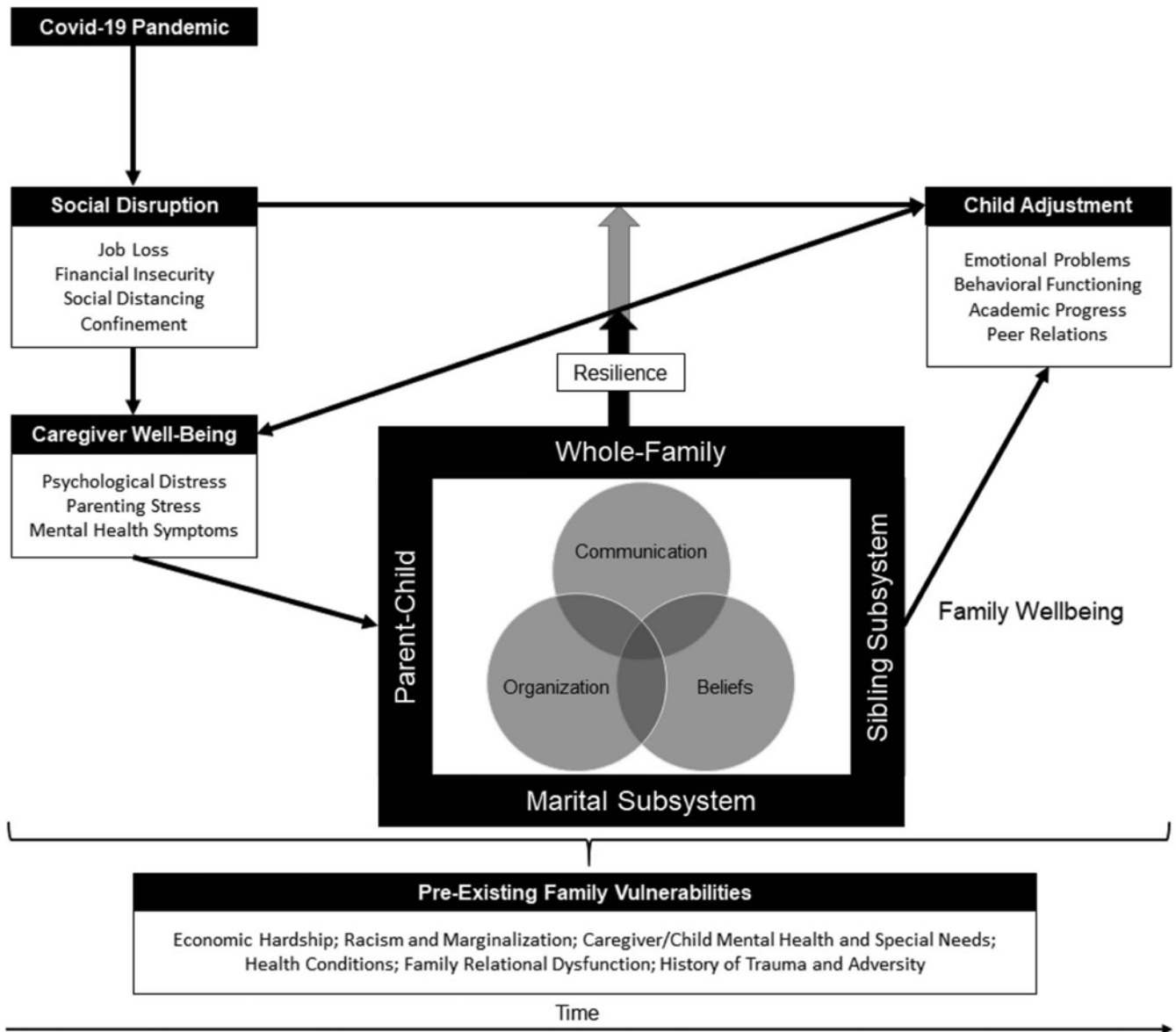


Figure 1. The COVID-19 family disruption model. Original COVID-19 FDM created by Prime et al. (2020). The development of this model was guided by theory and empirical research on multisystem risk and resilience, including the Bioecological Model of Development (Bronfenbrenner, 2005), Family Stress Model (Conger et al., 2010), Family Systems Theory (Bowen, 1985), and Family Resilience Framework (Walsh, 2003).

will influence child functioning (i.e., internalizing and externalizing problems, positive adjustment, collectively referred to hereafter as child functioning). The model further predicts a bidirectional relationship between child and caregiver functioning, whereby each will mutually impact one another. Importantly, the model predicts that vulnerability and protective factors will impact the various pathways by weakening or strengthening the capacity of families to cope with and/or positively adapt to adversity.

Initial support for the COVID-19 FDM pathways

By exploring studies on a case-by-case basis, the COVID-19 FDM appears to be a promising model for explaining child, caregiver, and family functioning during COVID-19. There is evidence from high-quality studies linking caregiver mental health and parenting practices

with child internalizing and externalizing problems during the pandemic (Fosco et al., 2022; Shelleby et al., 2022). There is also some support that these processes are bidirectional in nature (Browne et al., 2021; Rizeq et al., 2021). In addition to individual observational studies, one systematic review found that pandemic-related lockdowns were associated with increases in familial conflict, which, in turn, had negative implications for children's mental health (Naff et al., 2022). In another systematic review, positive parent-child communication was shown to protect youth at risk for negative mental health outcomes such as anxiety, depression, and stress (Panchal et al., 2021). These reviews provide some preliminary support for the COVID-19 FDM. However, these reviews do not include a comprehensive set of constructs relevant to child, caregiver, and family functioning, collectively. Moreover, they include many cross-sectional studies (rather than longitudinal), which are not able

to speak to change over time nor the temporal order of predictors and outcomes (Vaillancourt et al., 2021). The rapid growth of research on this topic, and its relevance to researchers and policymakers, alike, warrants a systematic synthesis of the extant literature to draw themes, identify gaps, and drive future research.

Current study

The current study provides a comprehensive examination of pathways linking child, caregiver, and family functioning in studies that used prospective, longitudinal designs. The overarching goal of the review was to examine the empirical support for the COVID-19 FDM in explaining processes of risk and resilience in children and families during the acute phase of the pandemic. Specific aims included:

1. To synthesize the extant literature on the most pertinent pathways of the COVID-19 FDM (see Figure 2), which included caregiver-to-child functioning (and the reverse) and family-to-child functioning (and the reverse). We considered pathways that originate pre-COVID (e.g., caregiver functioning pre-COVID to child functioning during COVID-19), as well as those that took place solely during the pandemic (e.g., caregiver functioning during Time 1 of COVID-19 to child functioning during Time 2 of COVID-19).
 - a. To explain why relationships exist between constructs (i.e., mechanisms) through the examination of mediating/indirect pathways.
 - b. To explore vulnerability and protective factors that might have influenced the strength and/or direction of relationships between constructs (i.e., moderation), signaling processes of heightened risk or resilience.
2. To assess whether the pathways of the COVID-19 FDM capture the existing empirical research and to adapt the model as indicated and necessary to better represent the empirical literature.
3. To identify inconsistencies between studies and gaps in the literature to inform future primary research.

Research objectives were addressed through a systematic review and narrative synthesis, which involved the systematic search, integration, and presentation of studies for the purposes of theory-building and refinement (Edwards & Kaimal, 2016; Kastner et al., 2016). Narrative syntheses have been previously used to develop or refine models related to personal recovery in mental health (Leamy et al., 2011) and caregiver sense of competence (Stansfeld et al., 2019), among others (Le Boutillier et al., 2019; Skiba et al., 2020). We followed published guidelines for a narrative synthesis approach to minimize potential bias by enhancing transparency, reproducibility, and robustness of findings (Popay et al., 2006). Finally, we conducted a risk-of-bias assessment of primary studies, which was used to contextualize findings and inform future research needs.

Methods

This systematic search and narrative synthesis was registered with the International Prospective Register of Systematic Reviews (PROSPERO; CRD42022327191) prior to data extraction. It followed the guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P; Moher et al., 2015) and the PRISMA 2020 Statement (Page et al., 2021), as well as guidelines for narrative syntheses (Popay et al., 2006).

Eligibility criteria

Eligibility criteria as outlined by the PECOS (Population, Exposure, Comparators, Outcome, Study Design) framework are described below. The population of interest was children between two and 18 years and/or their parents. No samples of children were excluded based on psychological and/or physical disability. At least one wave of data collection must have been completed during COVID-19 (i.e., following March 11, 2020, the date the World Health Organization declared COVID-19 a pandemic¹). Studies published during the first two and a half years of the pandemic were considered for inclusion (elaborated below). Outcomes of interest were assessed across time (i.e., longitudinally) either (i) pre-pandemic (T_{pre}) to during pandemic (T_{COVID}), or (ii) multiple time points during the pandemic. Given that the COVID-19 FDM describes developmental pathways, only prospective quantitative longitudinal designs were included. Intervention studies were excluded as the current review is not focused on treatment efficacy. All studies had to report on the following outcomes: child functioning (defined as internalizing problems, externalizing problems, and/or positive adjustment) and one of either caregiver functioning (e.g., psychological distress or well-being) or family functioning (e.g., parent-child conflict or family support). Studies were also required to examine at least one of the predetermined bidirectional or unidirectional pathways in Objective 1 (elaborated below in *Pathways*).

Only studies published in English were included. Publication type was restricted to peer-reviewed and published works. We did not include a gray literature search due to feasibility concerns, given the high volume of studies being published on the topic. Meta-analyses have shown that the inclusion of gray literature minimally impacts synthesis results (Bellefontaine & Lee, 2014; Schmucker et al., 2017).

Information sources and search strategy

Search terms were created using four key constructs relevant to the COVID-19 FDM: COVID-19, caregiver functioning, family functioning, and child functioning (Table S1). The search was further restricted to studies published in English and during 2020 or later. The search strategy was executed in PsycINFO (Ovid) and MEDLINE (Ovid) databases. We chose these two databases to balance our desire for relevance with feasibility and efficiency (i.e., identifying relevant studies while managing project capacity for reviewing abstracts in a burgeoning field). Notably, Booth (2016) concluded that MEDLINE, alone, is sufficient in reaching valid conclusions about health-related topics in both systematic reviews and meta-analyses. However, PsycINFO was also included as it is a specialized database that adds unique references related to specific psychological processes and mental health (Bramer et al., 2017; Eady et al., 2008; Rogers et al., 2018). We executed the search strategy in October 2021, June 2022, and August 2022.

Eligible studies included those published in the first two and a half years of the pandemic. This range represents data collected during the first two years of the pandemic plus an additional six months to accommodate average publication speed during this time (Forti et al., 2021; Horbach, 2021). This time frame was selected for several reasons: The first two years of COVID-19 represent a discrete period wherein there were continuous rolling waves characterized by high rates of COVID-19 infection, hospitalizations and deaths, lockdowns and stay-at-home orders, and school closures, on a global scale

¹Studies with data collected before March 11, 2020, were considered if participants were from China.

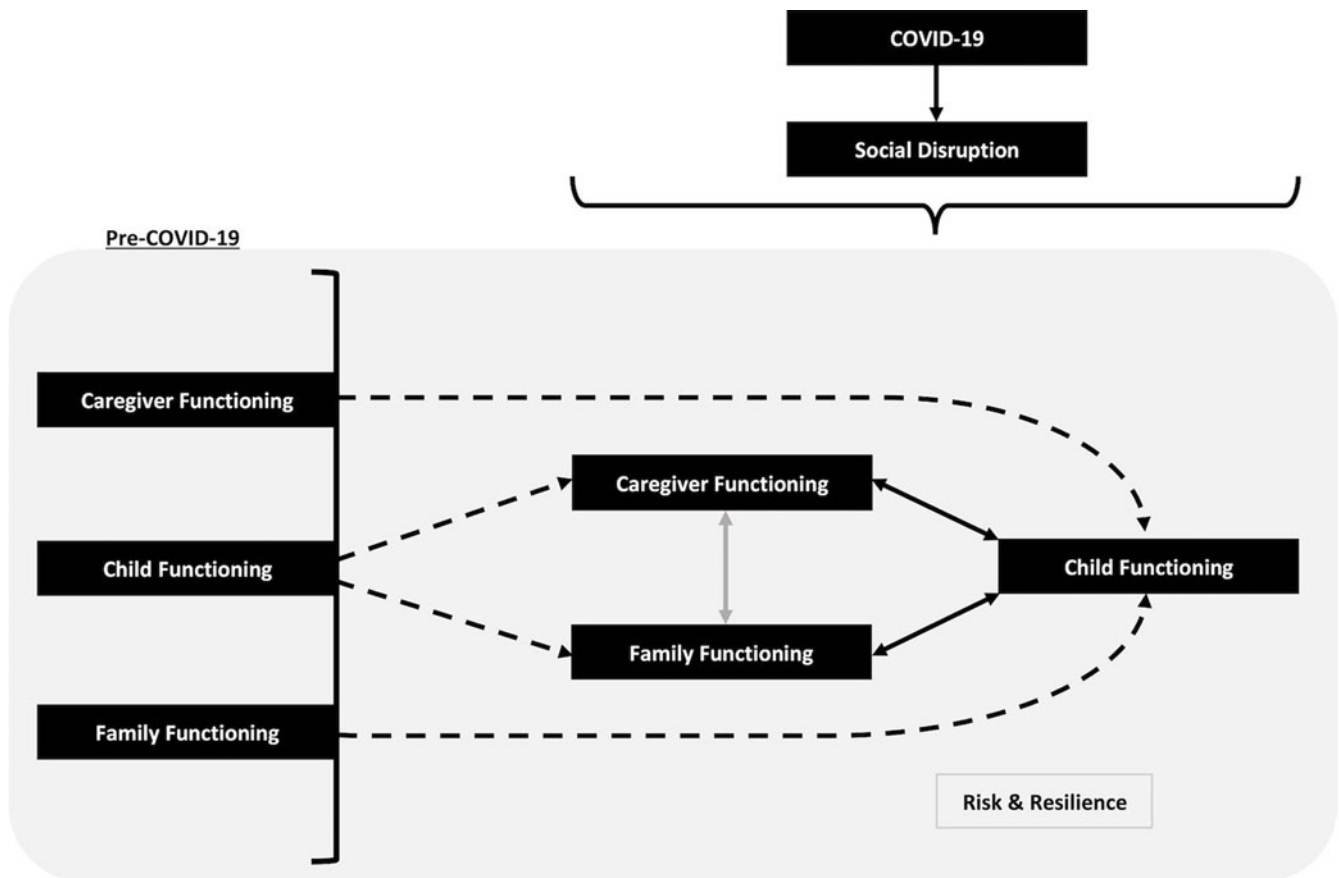


Figure 2. The simplified COVID-19 Family Disruption Model. Modified COVID-19 FDM serving as the model under empirical review in the current study. Dashed lines represent longitudinal pathways between pre-pandemic and pandemic variables. Solid lines illustrate longitudinal pathways between variables assessed during the pandemic. Black lines demonstrate the pathways under investigation in the current review. Light gray lines represent additional pathways that are not principal to the current study. Processes of risk and resilience are considered for all pathways enclosed in the simplified model.

(World Health Organization, 2021). Second, although rates of COVID-19 infection continue to fluctuate, the fatality of the disease had significantly declined as vaccination rates increased considerably (Scobie et al., 2021). Accordingly, around March 2022, many countries began lifting restrictions such as removing mask-mandates, stay-at-home orders, and travel bans, all of which contributed to a relative return to normalcy (Stokel-Walker, 2022). Lastly, we were interested in children and families' responses to the initial global crisis, rather than long-term adversity. This is an important distinction because processes of risk and resilience in families are likely to shift as the pandemic evolves and time passes (Masten, 2021).

Study selection

Records were exported to Covidence, a web-based software platform that is used for abstract screening, full-text review, quality assessment, and data extraction. Covidence automatically removed any duplicate records. Two independent reviewers completed a training activity for abstract screening (80 records) and full-text assessments (10 full-texts) to ensure they were making comparable decisions (percent agreement $\geq .80$; $\kappa \geq 0.60$; McHugh, 2012). Once reliability was attained, reviewers independently screened abstracts, in duplicate, according to the search criteria. Inter-rater reliability for abstract screening was good based on 1496 abstracts (87% percent agreement; $\kappa = 0.70$; McHugh, 2012). Full-text articles were assessed in a similar fashion to determine the final

number of included studies (91% percent agreement; $\kappa = 0.61$ based on 503 full-texts). The first author resolved conflicts with consultation from the senior author.

Data extraction process

The first and senior authors piloted data extraction using 10 articles to develop the manual in an iterative process. Following, data extraction was completed primarily by the first author, with a second reviewer extracting an overlapping 20% of articles to promote consistency. Discrepancies were resolved through consensus, with consultation from the senior author as necessary.

Data items and outcomes

Using a standardized extraction template developed by the first author, the following data items were extracted in Covidence: author, year, country, and sample characteristics for both children and caregivers (i.e., sample size, age, sex/gender, race/ethnicity, and income/socioeconomic status), variables of interest (i.e., child, caregiver, and family functioning) and their corresponding study instruments and scales (i.e., names of the measurement tools), relevant time points (i.e., $T_{pre} - T_{COVID}$ or $T_{COVID1} - T_{COVID+}$) and specific dates, types of analyses conducted, and main findings as they relate to pathways.

Primary outcomes included child, caregiver, and family functioning, and the pathways linking them. The method of

evaluating each outcome (e.g., child-reported, parent-reported, behavioral observation, and direct assessment) was documented.

Child functioning. Child functioning was defined by internalizing (e.g., emotional difficulties such as emotional reactivity, anxiety, depression, somatic complaints, and withdrawn behaviors) and externalizing symptoms (e.g., behavioral difficulties such as attention problems, aggressive behaviors, and rule breaking), in addition to positive adjustment (e.g., positive affect, well-being, happiness, and adaptive coping).

Caregiver functioning. Caregiver functioning was classified by emotional distress (e.g., internalizing symptoms, parenting stress, psychological distress, anger, suicide risk, substance use, and psychological inflexibility) and well-being (e.g., positive coping, life satisfaction, happiness, autonomy, competency, and self-confidence).

Family functioning. Family functioning was comprised of four family constellations: parent-child/parenting, couple/interparental/marital, sibling, and whole-family relationships. For each subsystem, several processes were considered, such as relationship quality (e.g., cohesion, supportiveness, warmth, closeness, attachment, and strong communication), relational negativity (e.g., conflict, aggression, maltreatment, harshness/coerciveness, and neglect), and structure (e.g., rules, routines, and rituals).

Pathways

The above constructs were examined within the context of predefined pathways. A pathway is defined as any link between two or more variables of interest, which must include a child functioning variable plus a caregiver and/or a family functioning variable (see Figure 2), examined longitudinally. We considered bidirectional relationships, when available. We extracted the most comprehensive set of variables that align with pathways in the simplified model of the COVID-19 FDM. That is, though studies must include pathways with at least two variables (e.g., parenting and child mental health), some may include three or four variables in the case of mediation or moderation. For example, positive parenting practices (T_{COVID}) may mediate the relationship between caregiver internalizing problems (T_{pre}) and child affect (T_{COVID}). Additionally, there are two categories of moderators that were investigated: (1) *demographic characteristics* such as economic hardship, child age, race, and gender, and (2) *process variables*, wherein our variables of interest (i.e., child, caregiver, and/or family functioning) themselves served as moderators. An example of a pathway with a process variable as a moderator would be co-parental support influencing the strength of the relationship between caregiver mental health and child maladjustment. If studies included a measure of pandemic-related social disruption, then that variable was also investigated in the pathway (though this was not required for inclusion in the review).

Risk-of-bias assessment

Following data extraction, risk of bias was assessed using a quality assessment tool developed by the National Heart, Lung, and Blood Institute (2013), adapted for the current study. The Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies was chosen as a brief risk-of-bias measure as it has items relevant to the types of studies included in our review, in addition to being implemented in other systematic reviews on similar topics (Hohls et al., 2021; Racine et al., 2022). Five out of the original 14 items were removed from the scale as they were not applicable to the studies included in this review. An additional three items were

added based on recommendations for assessing longitudinal research during the pandemic (Vaillancourt et al., 2021). The full list of items, including their sources and rationale for inclusion/exclusion can be found in Supplemental File 5. Items evaluated information about the research question, study population and recruitment, sample size justification, whether predictors were assessed more than once over time, the use of psychometrically sound measures, attrition rate, the inclusion of baseline measurements, the inclusion of mediators and moderators, whether important confounding variables were considered, and whether child-reported measures were included. Two independent raters piloted the quality assessment tool. Subsequently, one reviewer completed the quality assessment, with 20% of studies double-coded by a second reviewer to promote consistency. Disagreements were resolved by consensus and, when needed, through consultation with the senior author. Studies were not excluded based on their quality scores; however, risk of bias was taken into consideration when synthesizing the results.

Data synthesis

Description of studies

Frequencies and percentages were used to describe the included studies. Symbols k and n refer to the number of studies and pathways, respectively. First, study characteristics such as country, number of data collection points (T_{pre} vs. T_{COVID}), and timing of data collection periods were described. Following, sample characteristics were reported including caregiver type (e.g., mother), child age (i.e., early childhood, middle childhood, and adolescence), and presence of a clinical diagnosis. Lastly, characteristics of pathways were summarized, such as the most and least frequently reported paths, and the most common predictors/outcomes.

Risk-of-bias assessment

A visual depiction of the risk-of-bias assessments was created using the *robvis* visualization tool (McGuinness & Higgins, 2020). This tool created “traffic light” plots of domain-level judgements for each study included in the review. The risk-of-bias assessments were used to depict overall strengths and weaknesses of the pool of included studies. Moreover, ratios of *yes-to-no* responses were considered in determining the overall quality of an individual study. Studies with lower scores indicated a higher risk of bias (i.e., lower quality). Scores falling below the median were considered lower quality. All studies were included in data tables for readers to review. However, the narrative synthesis included only higher-quality studies (those with scores at and above the median).

Narrative synthesis

Main findings of individual studies were presented in tabular form and synthesized using descriptive statistics (e.g., frequencies and percentages) and through a narrative approach. Findings were categorized in accordance with the primary child functioning predictors/outcomes (i.e., internalizing problems, externalizing problems, and positive adjustment) and within each section, specific uni/bidirectional pathways proposed in the COVID-19 FDM were described (i.e., child-caregiver; child-family). Processes of mediation and moderation (i.e., vulnerability and protective factors) were considered within each pathway. Heterogeneity in study characteristics was also described narratively. In the Discussion, a critical summary of the model’s fit to empirical data is presented, discussing whether adaptations are needed, and

providing suggestions for future research on risk and resilience in child and family well-being during COVID-19.

Ethical considerations

To reduce the risk of confirmation bias, we followed rigorous research methods in line with the PRISMA protocol (Moher *et al.*, 2015; Page *et al.*, 2021) and preregistered our review on PROSPERO. Also, we have a team of quantitative and qualitative researchers with extensive experience in systematic reviews and related methodologies. Finally, we conducted quality assessments for each study to assess various features that could alter the interpretation of findings.

Results

Study selection

Results of the study selection process are depicted in a PRISMA flow diagram (Figure 3). Once duplicates were removed, 1496 abstracts were screened, with 503 proceeding to full-text review. During this stage, studies were excluded if their variables of interest were not measured longitudinally ($k = 274$, 60.1%) or no relevant pathway was examined ($k = 129$, 28.3%). Additional reasons for exclusion were secondary and/or nonquantitative data collection, language of publication, participant age, dissertations, and intervention studies ($k = 53$, 11.6%). Accordingly, 47 studies were included in the final review. Studies were assessed for overlapping samples, producing 44 independent samples across 47 studies.

Description of studies

Descriptive characteristics of individual studies are summarized in Table S2. Studies include samples from 14 countries, including the United States ($k = 17$, 36.2%), China ($k = 6$, 12.8%), Italy ($k = 5$, 10.6%), Germany ($k = 4$, 8.5%), the Netherlands ($k = 3$, 6.4%), Canada ($k = 2$, 4.3%), Japan ($k = 2$, 4.3%), Australia ($k = 1$, 2.1%), Brazil ($k = 1$, 2.1%), England ($k = 1$, 2.1%), Ireland ($k = 1$, 2.1%), Israel ($k = 1$, 2.1%), Jordan ($k = 1$, 2.1%), Peru ($k = 1$, 2.1%), and one (2.1%) multinational sample. Twenty-five studies (53.2%) included a pre-pandemic time point, of which 11 (23.4%) were from 2018 or earlier, 13 (27.7%) were from 2019 or 2020, and one (2.1%) did not specify. Almost all studies included at least one COVID-19 time point in 2020 ($k = 46$; 97.9%), whereas nine (19.1%) studies collected data in 2021. The number of data collection points during COVID-19 ranged from one to five, except for one study that conducted bi-weekly assessments for a year. Twenty studies (42.6%) had one pandemic time point, 15 studies (31.9%) had two pandemic time points, and eight studies (17.0%) had three pandemic time points. The remaining three studies (6.4%) included four or more data collection periods during the pandemic.

Sample size ranged from 45 to 7940 across 47 studies. Out of 30 studies that reported caregiver type, 27 (90.0%) consisted of mostly mothers (i.e., more than two-thirds of the sample), whereas three studies (10.0%) had a relatively equal ratio of mothers to fathers. Most studies ($k = 27$, 57.4%) examined children in the adolescence period (mean age in 2020: 12–18 years), with 14 studies (29.8%) exploring middle childhood (mean age in 2020: 6–11 years) and five studies (10.6%) focusing on early childhood samples (mean age in 2020: 2–5 years). One study did not report mean age (range = 4–18). Nine studies (19.1%) included children with current or previous neuropsychiatric diagnoses (e.g., anxiety disorder, attention-deficit/hyperactivity disorder [ADHD], autism

spectrum disorder, communication disorder, conduct disorder, epilepsy, fragile X syndrome, intellectual disability, and specific learning disorder). Lastly, samples were diverse on several sociodemographic indicators, including child sex/gender, race/ethnicity, and income/SES (Table S3).

Pathway characteristics

Studies most frequently examined pathways from family functioning ($k = 42$ studies, $n = 128$ paths²) and caregiver functioning ($k = 28$, $n = 77$) to child functioning. Fewer studies examined pathways from child to family functioning ($k = 19$, $n = 47$) and caregiver functioning ($k = 14$, $n = 38$). No studies investigated relationships between marital/couple/interparental functioning and child functioning, and only one study explored child functioning in relation to sibling functioning. Regarding child functioning, depression ($k = 12$), positive adjustment (e.g., positive affect, well-being, coping, prosocial behavior; $k = 11$), anxiety ($k = 8$), and conduct/behavioral problems ($k = 8$) were most often examined (Table S4). In terms of caregiver and family constructs, commonly reported variables were caregiver stress ($k = 8$), depression ($k = 7$), and anxiety ($k = 4$), as well as parental/familial support ($k = 7$), parenting quality ($k = 6$), parent-child/family conflict ($k = 5$) and parental monitoring ($k = 4$).

Risk of bias

The risk of bias for individual studies is illustrated in Figure 4. Each criterion was rated as *yes*, *no*, or *not reported*. Studies were given a score of 1 for *yes* and 0 for *no* or *not reported*. The pool of included studies had several strengths, such as clearly describing their research questions ($k = 47$, 100.0%) and populations ($k = 46$, 97.9%), in addition to implementing valid and reliable measures for assessing predictors ($k = 46$, 97.9%) and outcomes ($k = 43$, 91.5%). Most studies measured and statistically controlled for key confounding variables ($k = 33$, 70.2%) and assessed predictors more than once over time ($k = 31$, 66.0%). Many studies included youth-report measures of child functioning ($k = 29$, 61.7%). Approximately half of the studies included a pre-COVID-19 baseline measurement ($k = 26$, 55.3%), examined mediators and moderators in the pathways of interest ($k = 25$, 53.2%), and had over 50% of eligible individuals participating in their studies ($k = 24$, 51.1%). Regarding study weaknesses, only 18 studies (38.3%) had low attrition rates (< 20%) and 14 studies (29.8%) provided power justification for sample size. The distribution of risk-of-bias scores ranged from 42 to 92% with a median of 67%. Scores at the first and third quartiles were 67 and 75%, respectively. Scores falling below the median were considered lower-quality studies and were not included in the narrative synthesis. However, main findings from all eligible primary studies are summarized in Table S2.

Narrative synthesis of higher-quality studies³

Child internalizing symptoms

Caregiver functioning. There is emerging support for longitudinal links between caregiver functioning and child internalizing symptoms. For instance, pre-pandemic parental emotional distress

²Several studies examined multiple pathways within one study (e.g., Fosco *et al.*, [2022]: change in family conflict predicted child internalizing problems; change in lax discipline predicted child externalizing problems).

³Efforts were made to include all higher-quality studies in the synthesis; however, five higher-quality studies were left out and only included in tables (Hastings *et al.*, 2021; Köhler-Dauner *et al.*, 2022; Operto *et al.*, 2022; Pelham *et al.*, 2022; Penner *et al.*, 2021).

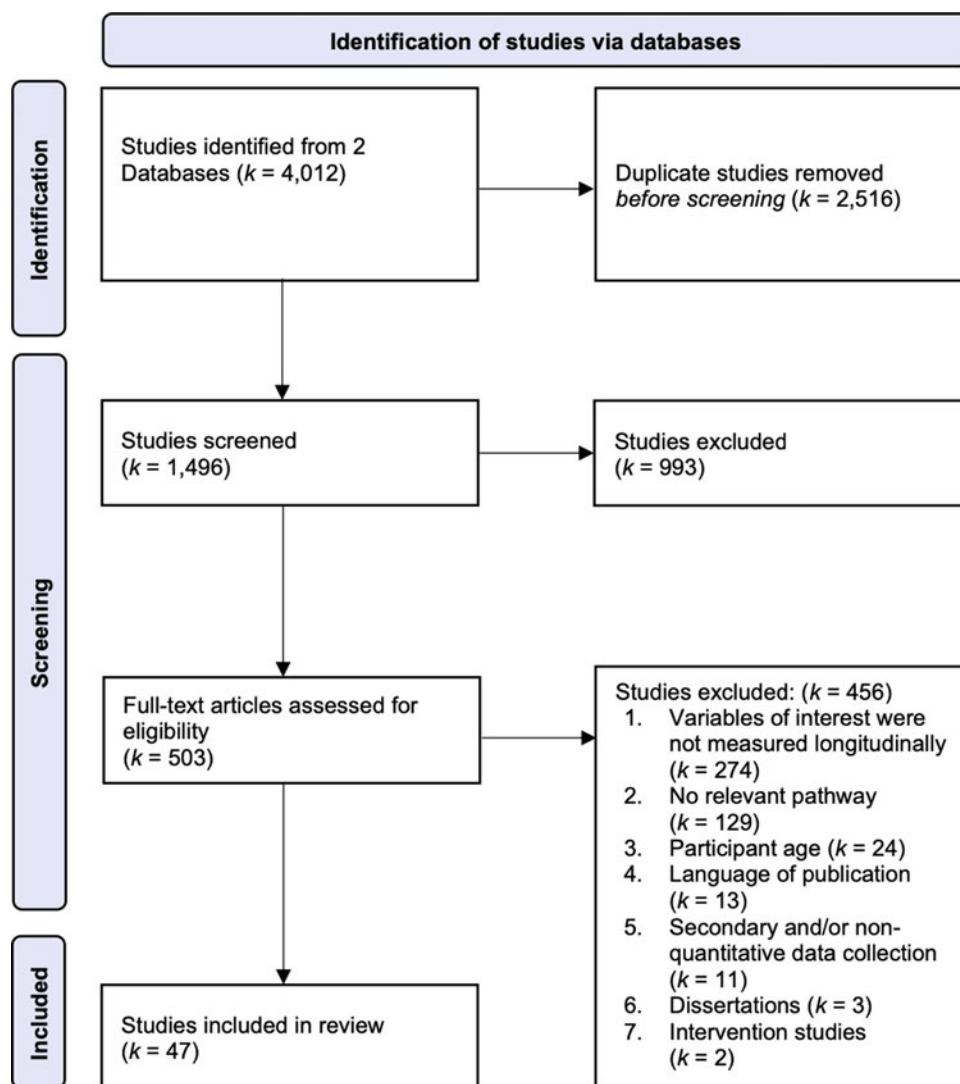


Figure 3. PRISMA flow diagram.

was a robust predictor of elevated internalizing problems in young children during the pandemic, even after accounting for prior and current changes in family functioning and parenting quality (Fosco et al., 2022). In another study, maternal mood moderated the trajectory of child internalizing problems from before to during the pandemic, such that child anxious/depressed, emotionally reactive, and withdrawn symptoms tended to increase only when mothers were more anxious and depressed (Frigerio et al., 2022). These findings suggest that preexisting caregiver problems may reflect a vulnerability factor, leading children to have more adjustment problems during the pandemic. Nevertheless, several studies did not find prepandemic caregiver stress (e.g., parental negative feelings, history of major depressive disorder, and maternal mental health difficulties) to be a vulnerability factor for children's internalizing problems (e.g., stress, depression, and anxiety; Achterberg et al., 2021; Duttweiler et al., 2022; Feurer et al., 2021; Fogarty et al., 2022; Wong et al., 2022).

Caregiver functioning and child internalizing difficulties may mutually influence one another in the pandemic context, with evidence for a bidirectional relationship between increases in caregiver stress (from before to during the pandemic) and increases in child stress (Paschke et al., 2021). In one multinational

study, greater COVID-19 disruption indirectly predicted elevated caregiver stress through its effect on family-average child mental health problems (Browne et al., 2021). In another study, maternal mental health was a mediator linking prepandemic income and COVID-stressors to adolescent internalizing symptoms during the pandemic (Lengua et al., 2022). Together, these findings suggest a ripple effect whereby pandemic disruptions adversely altered the functioning of individual members of the family (e.g., caregiver or child), with consequences for other individual family members (e.g., caregiver or child).

However, there were several studies that did not find links between caregiver functioning and child internalizing problems during the pandemic (Gordon-Hacker et al., 2022; McArthur et al., 2021; Neubauer et al., 2021). Inconsistent findings can sometimes signal the presence of moderators. One potential moderator may be measurement approach. For instance, in one study adult stress during the pandemic predicted child stress when the child outcome was caregiver-reported but not when it was child-reported (Corbett et al., 2021). Alternatively, preexisting characteristics may moderate pathways. For children reporting warm and loving relationships with parents prior to the pandemic, increases in parental stress were related to increases in child distress (Wong

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	Judgement
Achterberg 2021	+	+	+	×	+	+	+	+	×	×	+	+	+
Berry 2021	+	+	+	+	+	+	×	+	×	+	×	×	×
Browne 2021	+	+	+	×	+	+	×	+	×	+	+	+	+
Cooper 2021	+	+	×	×	×	+	×	+	+	×	+	×	×
Corbett 2021	+	+	+	×	+	+	×	+	+	×	+	×	×
DiGiunta 2021	+	+	×	×	+	+	+	+	×	×	+	×	×
Donker 2021	+	+	×	+	+	×	+	×	+	+	+	+	+
Duttweiler 2021	+	+	×	×	+	+	+	+	+	×	+	+	+
Essler 2021	+	+	+	+	+	+	×	+	×	×	×	+	+
Feurer 2021	+	+	×	+	+	×	+	+	+	×	+	+	+
Fogarty 2022	+	+	×	+	+	+	+	+	+	×	×	×	×
Fosco 2022	+	+	+	×	+	+	+	+	×	+	+	×	×
Frigerio 2022	+	+	×	×	+	+	+	+	×	×	+	+	+
Gordon-Hacker 2022	+	+	+	×	+	+	×	+	×	+	+	×	×
Guazzelli Williamson 2022	+	+	×	×	+	×	×	+	+	×	×	+	+
Hastings 2021	+	+	×	×	+	+	+	+	+	+	+	×	×
Janssen 2020	+	+	+	×	+	×	+	×	+	×	×	+	+
Jones 2022	+	+	×	+	+	+	+	×	×	×	+	+	+
Jordan 2022	+	+	×	+	+	×	+	×	×	×	+	×	×
Köhler-Dauner 2021	+	+	+	×	+	×	+	+	×	×	+	+	+
Lengua 2022	+	×	+	+	+	+	+	+	+	×	+	+	+
Liang 2021	+	+	×	×	+	×	×	+	×	×	+	+	+
McArthur 2021	+	+	+	×	+	×	+	+	+	×	+	×	×
Neubauer 2021	+	+	+	×	+	+	×	+	×	+	+	×	×
Nocentini 2022	+	+	+	×	+	+	+	+	+	×	+	×	×
Omiya 2022	+	+	+	×	+	×	+	+	+	×	×	×	×
Operto 2022	+	+	+	×	+	+	+	+	×	+	×	×	×
Paschke 2021	+	+	×	×	+	+	+	+	+	×	+	×	×
Pelham 2022	+	+	+	×	+	+	×	+	+	+	+	×	×
Penner 2021	+	+	×	×	+	+	+	+	+	×	+	×	×
Ou 2021	+	+	+	×	+	×	×	+	+	+	+	+	+
Ren 2021	+	+	×	+	+	×	×	+	+	+	+	+	+
Rizeq 2021	+	+	×	×	+	+	×	+	+	×	+	+	+
Roche 2022	+	+	+	×	+	×	+	+	+	+	×	+	+
Rosenthal 2022	+	+	×	×	+	×	+	+	+	×	+	+	+
Shelleby 2022	+	+	+	+	+	+	×	+	×	+	+	×	×
Shi 2021	+	+	×	×	+	×	+	+	+	+	+	+	+
Trucco 2022	+	+	+	×	+	×	×	+	+	×	+	+	+
Ueda 2022	+	+	×	×	+	+	×	+	×	×	×	×	×
Wang, Henry 2021	+	+	+	+	+	+	×	+	+	+	+	+	+
Wang, Henry 2022	+	+	+	+	+	+	×	+	+	+	×	+	+
Wang, Ng 2022	+	+	×	×	+	+	+	+	+	×	×	+	+
Wang, Toro 2021	+	+	+	+	+	+	×	+	+	+	+	+	+
Wong 2022	+	+	×	+	+	+	+	+	+	+	+	+	+
Zhou 2022	+	+	×	×	+	+	×	+	×	×	×	×	×
Zhu 2021	+	+	×	×	+	+	+	+	+	×	×	×	×
Zuccolo 2022	+	+	+	×	+	×	×	+	×	×	×	×	×

Figure 4. Risk of bias. D1: Was the research question or objective in this paper clearly stated? D2: Was the study population clearly specified and defined? D3: Was the participation rate of eligible persons at least 50%? D4: Was a sample size justification, power description, or variance and effect estimates provided? D5: Were the predictor measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants? D6: Was the predictor(s) assessed more than once over time? D7: Was a pre-COVID-19 baseline measure included in the analysis? D8: Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants? D9: Was the child adjustment variable child-reported? D10: Was loss to follow-up after baseline 20% or less? D11: Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between predictor(s) and outcome(s)? D12: Were moderators and/or mediators examined?

et al., 2022). This pattern of functioning was reversed among children who reported less satisfying family life pre-pandemic (i.e., increases in parent stress were related to decreases in child psychological distress; Wong et al., 2022). These paradoxical findings highlight that there may be different mechanisms of influence for children with preexisting vulnerabilities (e.g., poor parent-child relationships), a point to which we will return in the Discussion.

Family functioning. Changes to children's family conditions during the pandemic may influence how they respond to stress during the pandemic. Although baseline family well-being did not significantly predict later internalizing problems in children, increases in family well-being from pre-pandemic to during COVID-19 were associated with decreases in child internalizing problems (Nocentini et al., 2022). Furthermore, increases in family conflict and decreases in the quality of emotional connections among family members (i.e., family cohesion) were predictive of heightened child internalizing problems during the pandemic, while baseline levels were not (Fosco et al., 2022). The degree of disruption to family life from pre-pandemic to during the pandemic (i.e., deterioration or improvement in family functioning) may be a more salient predictor of adjustment than absolute levels of prior child and/or family functioning. These findings highlight the complex interplay between starting levels and change in functioning in the family system, its children, and their caregivers.

In addition to whole-family functioning, changes to parental discipline practices (i.e., harsh: angry/coercive/over-reactive and lax: overly permissive/inconsistent) and parent-child conflict also predicted child internalizing problems in studies using pre-pandemic data (Fosco et al., 2022) and those with all data collection taking place during the pandemic (Qu et al., 2021; Wang, Henry, et al., 2021; Wang, Henry, et al., 2022). Other predictors of more child internalizing problems were prior parental overreactivity (Achterberg et al., 2021), less supportive parental responses to child emotions (Shi & Wang, 2021), parental fear induction practices regarding the severity of the pandemic (Ren et al., 2021), and more fear-inducing pandemic-focused family conversations (e.g., importance of hand washing, preventing spread of germs, protecting vulnerable people; Trucco et al., 2022). Taken together, there is ample support that problematic parent-child interactions are linked to worsening child internalizing problems during the pandemic.

The parenting environment (e.g., parent-child conflict, positive parenting practices) may help to explain when and/or why some children are more vulnerable during the pandemic than others, as examined in mediation and moderation models. Wang, Henry, et al. (2021) found that parents who experienced job loss had elevated parent-child conflict, which, in turn, predicted heightened negative affect on children during the pandemic. Notably, low-income families were twice as likely to lose their jobs and therefore more vulnerable to deteriorating family relationships and later child internalizing difficulties. Though parental warmth did not emerge as a significant mediator linking job loss and child affect, it was influential in minimizing negative affect on children whose parents worked from home during the pandemic. Another study revealed that children who felt more stressed about school reopening earlier in the pandemic were more likely to experience greater levels of depression and anger several months later, but only when parent-child conflict earlier in the pandemic was high (Qu et al., 2021). Coming from a more conflictual home environment appeared to increase child vulnerability to the effects of their own stress.

Positive parenting did not consistently emerge as a protective factor for children during the pandemic. For instance, in a study of Latinx adolescents, parental support was not a significant moderator of the relationship between COVID-19 stressors and internalizing problems (Roche et al., 2022). Adolescents in this study reported increased childcare responsibilities particularly if they endorsed pandemic-related economic and health stressors. The added burden of childcare responsibilities may have outweighed any protective effect of parental support. Taken together, although less conflict and more positivity in the parenting environment are important for minimizing children's internalizing symptoms during the pandemic, its protective effect may depend on prior and ongoing child and family vulnerabilities.

Regarding the reverse direction from child internalizing to family functioning, in one study, pre-pandemic child internalizing symptoms did not predict parenting practices/whole-family functioning following the onset of the pandemic (Fosco et al., 2022). Relatedly, in a daily diary design in the initial month of the pandemic, daily negative affect on children did not significantly predict changes in the family environment (cohesion, expression, organization, and control; Neubauer et al., 2021). In contrast, youth-reported pandemic-related stress and internalizing difficulties (i.e., anxiety and depression) negatively predicted family functioning one month later (Rizeq et al., 2021). Support for this child-driven pathway was also demonstrated by Browne et al. (2021) using a within-family design (i.e., all families had at least two children in the home), whereby pandemic-related social disruptions led to higher child mental health problems (on average), which, in turn, led to lower quality parenting and made siblings more dissimilar in their internalizing problems. The sibling with worse mental health was more likely to receive lower-quality parenting across the pandemic, particularly in families that engaged in more differential parenting. Thus, siblings' individual vulnerabilities may influence the quality of parenting that they receive during the pandemic, leaving the struggling child with less protective familial support.

Child externalizing symptoms

Caregiver functioning. No studies explored whether child externalizing problems prior to the pandemic impacted caregiver functioning during the pandemic. Findings with measurement during the pandemic were mixed, with one study demonstrating that child behavior problems predicted maternal psychological distress (Shelleby et al., 2022) and another not supporting this direct link (Berry et al., 2021).

Regarding associations between pre-pandemic caregiver functioning and subsequent child externalizing problems, prior maternal mood predicted increases in child aggressive behavior (but not attention problems), only when mothers were highly depressed and anxious (Frigerio et al., 2022). In another study, preexisting parental distress was related to heightened child externalizing behaviors during the pandemic, over and above changes in family conflict and lax discipline (but not other family functioning variables; Fosco et al., 2022). There was no support for this relationship in studies with measurement during the pandemic, only (Gordon-Hacker et al., 2022; Neubauer et al., 2021; Shelleby et al., 2022).

Cascading effects were explored in Lengua et al. (2022), wherein preexisting financial hardship indirectly predicted heightened youth externalizing problems via an increase in pandemic-related stressors and worsened maternal mental health. Taken together, although there is limited research assessing children's externalizing

problems, available studies provide mixed evidence for the link between this caregiver-child relationship.

Family functioning. Two studies investigated the impact of prior levels of child externalizing problems on family functioning during the pandemic. Children with an ADHD diagnosis were more likely to experience greater family conflict earlier in the pandemic, as compared to children without a previous ADHD diagnosis (Rosenthal *et al.*, 2022). In contrast, Fosco *et al.* (2022) did not find any evidence to suggest that prior child externalizing problems predicted changes in whole-family functioning (e.g., family cohesion, conflict, and routines) or parenting practices (e.g., warmth and discipline).

In examining whether deteriorating family relationships had an impact on child externalizing problems, increases in parental discipline (harsh and lax) and family conflict from pre- to during COVID-19, but not changes in family cohesion, routines, and parental warmth, predicted greater child externalizing problems during the pandemic (Fosco *et al.*, 2022). This was, in part, supported with data collected during the pandemic; negative parenting practices predicted child behavior problems a few weeks later, but not the reverse (Shelleby *et al.*, 2022). Similarly, fluctuations in household chaos positively predicted fluctuations in child behavioral problems (Gordon-Hacker *et al.*, 2022). Thus, an increase in harsh and/or inconsistent family interactions may be a salient vulnerability factor for how children negatively respond to the pandemic.

Other studies exploring relations between family functioning and child externalizing symptoms did not support this pathway, such as fear-inducing pandemic-focused family conversations and parenting practices (e.g., autonomy-supportive parenting, warmth, acceptance, parent-child conflict, and social support) in relation to child externalizing behaviors (Neubauer *et al.*, 2021; Roche *et al.*, 2022; Trucco *et al.*, 2022; Wang, Henry, *et al.*, 2022). Taken together, there is limited, and mixed, research examining family functioning and child externalizing problems. Findings thus far suggest that family functioning is a more salient predictor of child externalizing problems than the reverse relationship, and that harsh and/or unpredictable family environments may be a particular risk factor for a deterioration in child functioning.

Child positive adjustment

Caregiver functioning. It is also important to consider the positive adjustment of children in the context of pandemic disruptions and stressors. Several studies explored pathways examining the positive adjustment of children in relation to caregiver functioning. In one study examining maternal resilience during the pandemic, both child (i.e., effortful control) and maternal (i.e., well-being) prepandemic functioning predicted how children were coping early in the pandemic (Jones *et al.*, 2022). Children's adaptive coping during the pandemic also went on to predict subsequent maternal coping. Indeed, children's coping mediated the effects of both child effortful control and maternal well-being on subsequent maternal coping (Jones *et al.*, 2022). These findings illustrate that both child and maternal characteristics prior to the pandemic have protective effects on how children cope with pandemic stressors, and this has ripple effects on how mothers cope, too. Bidirectional effects were also examined in a study examining child emotional well-being and parental strain during the pandemic. Specifically, Essler *et al.* (2021) demonstrated that child emotional well-being during lockdown restrictions negatively predicted parental strain approximately two months later when restrictions loosened,

though the reverse relationship was not significant (Essler *et al.*, 2021). However, intraindividual change in parental strain negatively predicted intraindividual change in child emotional well-being from early in the pandemic to several months later, further demonstrating the complex interplay between children and their caregivers.

In another study, maternal mental health (i.e., anxiety and depression) during COVID-19 did not predict child self-reported happiness a month later (McArthur *et al.*, 2021). Inconsistencies across these studies may be due to the fact that the specific measures of child positive adjustment were inherently different constructs (e.g., adaptive coping, emotional well-being, and happiness). Furthermore, assessments of caregiver functioning varied in valence (i.e., well-being versus distress) and intensity (e.g., parental strain vs. mental health symptoms). It may be that indices of caregiver functioning within the normative range are more strongly linked to child resilience and positive adaptation, as compared to clinical symptomatology.

Family functioning. There is emerging evidence that parental and familial support is important for children's positive coping during the pandemic, with implications for their subsequent adjustment. Children with parents who were more emotionally supportive were more likely to use approach coping (e.g., problem solving, seeking support, or reappraising the problem), which, in turn, was related to decreased emotional problems (Shi & Wang, 2021). Parental supportive reactions, rather than unsupportive reactions, were important for adaptive coping (Shi & Wang, 2021). Similarly, adolescents who reported increases in parental support, compared to their daily average, were more likely to report elevated next-day positive affect during the pandemic (Wang, Toro, *et al.*, 2021; Wang, Henry, *et al.*, 2022). Finally, family support was related to children's self-efficacy, optimism, hope, and resilience, as well as their adaptive coping, which, together, enhanced children's well-being (Wang *et al.*, 2022).

There is evidence that the family environment links pandemic stressors to children's levels of positive adjustment during the pandemic. One study found that parents who lost their jobs during the pandemic experienced greater parent-child conflict, which, in turn, was associated with decreased positive affect in children (Wang, Henry, *et al.*, 2021). In contrast, parents who worked from home were more likely to demonstrate parental warmth, which sequentially predicted increased positive affect in children. Together, we are seeing that the emotional climate during the pandemic has important ripple effects on how children cope and adjust to the stressors inherent in the pandemic.

Children's active coping (e.g., reassessing the situation and seeking support) may also impact their environments during the pandemic. Donker *et al.* (2021) found that parents' responses to child stress depended on their children's own coping abilities. Specifically, among youth who engaged in high levels of coping (prior to the pandemic), greater pandemic-related stress in children was associated with decreased positive parenting. In contrast, for adolescents who engaged in low levels of coping, elevated pandemic-related stress was associated with increases in positive parenting (Donker *et al.*, 2021). Child coping did not moderate the relationship between child stress and parental support, discipline, and negative interactions. In another study, children's use of problem solving and emotion regulation strategies for coping early in the pandemic did not predict positive parenting practices mid-pandemic (Jones *et al.*, 2022). Thus, there is mixed evidence regarding the salience of child-driven positive coping in parenting practices.

Discussion

The primary objective of the current review was to examine the empirical support for the COVID-19 FDM, allowing us to consider the utility of the model in delineating processes of risk and resilience in children and families during the COVID-19 pandemic. This review synthesized findings across heterogeneous studies exploring complex pathways linking child, caregiver, and family functioning prior to and during the pandemic. By only including longitudinal studies, we were better able to infer directionality of relationships between children, caregivers, and multiple family subsystems. We used a narrative synthesis, as it is most suitable for concept formation and theory-testing (Edwards & Kaimal, 2016; Kastner et al., 2016), enabling us to assess how existing research aligns with the pathways described in the COVID-19 FDM. After providing a summary of support and highlighting the generated themes, we discuss potential adaptations to the model and future directions.

Summary of support

Overall, we found emerging support for some of the pathways in the COVID-19 FDM, though to varying degrees. The most examined pathways were those linking caregiver, parent-child, and whole-family functioning to child internalizing problems. More studies explored internalizing problems as an indicator of child functioning than they did externalizing problems or positive adjustment. Additionally, more studies investigated caregiver/family-to-child effects in comparison to the reverse. Despite this, there is some support for pathways stemming from child to caregiver and family functioning, though this research is less common and yielded mixed results. There was a dearth of research on child functioning in relation to sibling subsystems and/or couple/marital/interparental functioning. This lack of research is consistent with existing literature wherein there is an emphasis on caregivers and parenting, to the exclusion of other important subsystems (Perez-Brena et al., 2022).

There was ample support linking caregiver and family (i.e., whole-family and parent-child) functioning with child internalizing behaviors, both from T_{pre} to T_{COVID} (e.g., Achterberg et al., 2021; Donker et al., 2021; Fosco et al., 2022; Frigerio et al., 2022; Lengua et al., 2022; Nocentini et al., 2022; Operto et al., 2022; Paschke et al., 2021; Shi & Wang, 2021; Wang et al., 2022; Wong et al., 2022) and at multiple time points during the pandemic (e.g., Browne et al., 2021; Corbett et al., 2021; Qu et al., 2021; Ren et al., 2021; Rizeq et al., 2021; Trucco et al., 2022; Wang, Henry, et al., 2021; Wang, Henry, et al., 2022; Wang, Toro, et al., 2021). In contrast, there was less and mixed support for the interrelations between caregiver/family functioning and child externalizing problems (e.g., Berry et al., 2021; Fosco et al., 2022; Frigerio et al., 2022; Gordon-Hacker et al., 2022; Lengua et al., 2022; Neubauer et al., 2021; Operto et al., 2022; Penner et al., 2021; Roche et al., 2022; Rosenthal et al., 2022; Shelleby et al., 2022; Trucco et al., 2022; Wang, Henry, et al., 2022). Lastly, there is emerging evidence linking caregiver/family functioning with child positive adjustment (e.g., Donker et al., 2021; Essler et al., 2021; Jones et al., 2022; Neubauer et al., 2021; Shi & Wang, 2021; Wang et al., 2022; Wang, Henry, et al., 2021; Wang, Henry, et al., 2022; Wang, Toro, et al., 2021), though more research is needed to better explicate these relationships. Notably, there was support for bidirectional relationships within pathways, such as between (i) child internalizing behaviors and family dysfunction (e.g., Browne et al., 2021), parental stress (e.g., Paschke et al., 2021), and change

in family well-being (e.g., Nocentini et al., 2022) and between (ii) child positive adjustment and caregiver functioning (e.g., maternal coping [Jones et al., 2022] and parental strain [Essler et al., 2021]). However, additional primary studies are needed to study the extent to which family members are reciprocally influencing one another, and/or whether effects are stronger in one direction than another.

Mixed findings across studies may be due to several factors, as studies were heterogeneous in terms of design, sample attributes, number of and interval between time points, current state of the pandemic at the time of data collection, and varying constructs, among other characteristics. For example, some studies explored caregiver distress (e.g., depression and stress), while others explored caregiver well-being (e.g., resilience and coping). Likewise, studies varied in whether they examined positive child adjustment (e.g., primary coping and positive affect) or child maladjustment (e.g., anxiety and conduct problems). The nature of valence (positive or negative) or intensity of constructs may influence the strength of relationships among variables.

An iterative review of our synthesis findings allowed our team to generate several themes that characterize the available data. These themes encompass (a) mechanisms of influence (i.e., *Cascading Effects*, *Complementarity Processes*, and *Stress Inoculation*) and (b) processes of *Risk and Resilience*. What follows is a description of these themes for explicating our findings in relation to the COVID-19 FDM to enhance our understanding of the impacts of COVID-19 social disruptions on child and family functioning.

Cascading effects, complementarity processes, and stress inoculation

Developmental cascades (also referred to as *spillover effects*) describe “cumulative consequences for development of the many interactions and transactions occurring in developing systems that result in spreading effects across levels, among domains at the same level, and across different systems or generations” (Masten & Cicchetti, 2010). In line with the COVID-19 FDM, there is robust evidence in support of a cascading process wherein pandemic-specific social disruptions impact child and caregiver/family functioning (Browne et al., 2021; Lengua et al., 2022; Rizeq et al., 2021; Wang, Henry, et al., 2021). Cascading processes were also evident within pathways including only caregiver/family and child constructs (e.g., heightened parent-child conflict predicting elevated adolescent depression; Achterberg et al., 2021; Corbett et al., 2021; Essler et al., 2021; Fosco et al., 2022; Frigerio et al., 2022; Gordon-Hacker et al., 2022; Hastings et al., 2021; Jones et al., 2022; Köhler-Dauner et al., 2021; Neubauer et al., 2021; Nocentini et al., 2022; Paschke et al., 2021; Penner et al., 2021; Qu et al., 2021; Ren et al., 2021; Shelleby et al., 2022; Shi & Wang, 2021; Trucco et al., 2022; Wang, Henry, et al., 2022; Wang et al., 2022; Wang, Toro, et al., 2021; Wong et al., 2022). These spillover effects within the family system align with other research published earlier during the pandemic (Masten, 2021).

Beyond cascades, there were other mechanisms of influence within families identified in the current review. Family Systems Theory posits that families aim to maintain *homeostasis* (i.e., a state of functioning based on established behaviors/norms; Lloyd-Hazlett, 2016; Watson, 2012), which may be accomplished through *complementary* patterns of interaction – when family members’ interactions represent “behavior-like puzzle pieces” that result in functional or dysfunctional relationships (Seshadri, 2019). In the current review, in relation to pandemic-related child stress, there were lower levels of positive parenting for children who were

coping well pre-pandemic, and higher levels of positive parenting for children who were coping poorly prior to COVID-19 (Donker et al., 2021). This may reflect a process of adaptive complementarity – parents are responding to a stressful context (the pandemic) in a way that is responsive to their child's existing needs (i.e., coping ability), which may be adaptive if parental resources are limited for reasons such as dealing with their own mental health or financial struggles. In another study, children who were not satisfied with family life pre-pandemic had a reduction in stress when their parents' stress increased during the pandemic (Wong et al., 2022). In this example, the reversal of roles between children and their caregivers (i.e., an increase in caregiver stress was related to a decrease in child stress) may have restored balance within the family system. When the desire to maintain homeostasis trumps a family's ability to adapt to changing demands (e.g., redrawing boundaries or renegotiating relationships in response to reductions in income, school closures, loss of childcare, etc.) this can result in maladaptive and dysfunctional processes within families (Lebow & Sexton, 2016). Notably, processes of resilience and positive adaptation can vary across contexts and cultures (Ungar, 2008). For instance, it is possible that patterns of child and family functioning that are typically maladaptive in one context can be adaptive in a pandemic context, or that circumstances that are adaptive for some families during the pandemic are maladaptive for others. We are not able to speak to this process based on the current findings, but this is a ripe area for future pandemic research.

Yet another mechanism of influence that was identified in the literature supports *stress inoculation* effects – prior exposure to moderate stressors may be protective for youth who experience subsequent trauma or challenges (Masten & Narayan, 2012). For instance, in two studies, children and caregivers who started worse off pre-pandemic (e.g., low family functioning or greater levels of caregiver stress) were doing better than families who had higher baseline levels of functioning (Fosco et al., 2022; Paschke et al., 2021). Findings from Wong et al. (2022), described above, may alternatively be interpreted using a stress inoculation perspective: Children who reported less satisfaction with family life pre-pandemic coped well with caregiver stress during the pandemic (i.e., they were stress-adapted). In this case, being unsatisfied with family life pre-pandemic may have acted as a moderate stressor, enabling youth to better tolerate and respond to subsequent stressful experiences such as heightened caregiver stress during COVID-19. This is in contrast with the negative spillover occurring for children who were more satisfied with their family life pre-pandemic (i.e., an increase in parent stress resulted in an increase in child stress; Wong et al., 2022). These alternative mechanisms of influence may help to explain the unexpected findings, not in line with the COVID-19 FDM and, as a result, future research is needed.

Processes of risk and resilience

The second theme we generated following our review related to processes of risk and resilience. Our findings capture vulnerability and protective factors as moderators serving to heighten or mitigate risk, respectively. One pre-existing vulnerability to child and family functioning was economic hardship, which contributed to the cumulative effects of risk and adversity experienced by some families during the pandemic. For instance, higher socioeconomic hardship prior to the pandemic indirectly predicted parent-reported pandemic stress and child mental health via greater material and economic deprivation due to COVID-19 (Rizeq et al.,

2021). Other studies provided evidence that these linkages may have operated through changes to the caregiving and family environment; lower-income families were more vulnerable to the negative disruptions caused by the pandemic (i.e., health, financial, social, school, and environment stressors), which had negative consequences to caregiver and family functioning and, in turn, child adjustment (Lengua et al., 2022; Wang, Henry, et al., 2021). This is in accordance with the Bioecological Model of Development, as child adjustment was indirectly impacted by distal factors (i.e., prior economic hardship) through more proximal COVID-19-specific disruptions (e.g., food and housing) and family influences. Financial instability during the pandemic was itself a vulnerability factor for child and family well-being (Paschke et al., 2021). For instance, family income loss during the pandemic worsened mental health among Latinx adolescents due to increased childcare responsibilities (Roche et al., 2022). Notably, parental support did not buffer or protect against the cumulative negative impact of job loss and adolescent caregiving burden on adolescent mental health. Consistent with the Family Stress Model, pre-existing financial hardship and pandemic-related economic strain represent key vulnerability factors for poor child and family adjustment during COVID-19.

Other vulnerability factors included pre-pandemic neurodevelopmental and mental health diagnoses (e.g., autism spectrum disorder, ADHD [Corbett et al., 2021; Operto et al., 2022; Rosenthal et al., 2022], epilepsy, specific learning disorder, intellectual disability, behavioral disorder [Operto et al., 2022]), prior relationship strain (e.g., unsupportive parenting [Shi & Wang, 2021]), and parental overreactivity (Achterberg et al., 2021). Processes of vulnerability were not consistently supported. For instance, a few studies tested whether baseline functioning (i.e., vulnerability) or change in functioning (i.e., improvement/deterioration) was a stronger predictor of positive and negative outcomes during COVID-19. Across several pathways, Fosco et al. (2022) found more support for change in family dynamics (e.g., conflict, cohesion, and discipline) predicting child maladjustment rather than initial scores of the same measures. Similarly, another study demonstrated that baseline family well-being did not predict change in child emotional difficulties; rather, change in family well-being covaried with change in child emotional difficulties (Nocentini et al., 2022). Essler et al. (2021) also provided support for change scores in parental strain predicting intraindividual change in child emotional well-being. Overall, these findings illustrate the importance of considering the magnitude of change in family relationships, rather than simply the starting point, in predicting child and family functioning during the pandemic. This has implications for identifying who might be at greatest risk for negative outcomes during the pandemic. In line with the principles of homeostasis, greater dysfunction within the family system compared to “normal” results in disequilibrium (i.e., imbalance) and therefore causes instability and discomfort among individual members within the system (Lebow & Sexton, 2016). Although disruptions to the family system can result in dysfunction, they can also lead to conditions that promote positive change and improvement in functioning among its members.

Processes of resilience were examined in various ways, such as pre-existing circumstances that support child/family functioning during the pandemic or processes during the pandemic that facilitate healthy adjustment. In line with Walsh's (2003) Family Resilience Framework, several protective factors emerged such as working from home during the pandemic (Wang, Henry, et al., 2021), family/parent support (Wang et al., 2022; Wang, Toro, et al.,

2021), and adaptive coping (Jones et al., 2022). For instance, prepandemic maternal well-being had positive ripple effects on family coping during the pandemic (Jones et al., 2022). Similarly, children from more supportive families prepandemic had enhanced self-efficacy, optimism, hope, and resilience during the pandemic (Wang et al., 2022). Despite only a few studies exploring processes of resilience and positive adaptation via pathways linking children, caregivers, and family subsystems, there are likely many other proximal and distal protective factors contributing to positive functioning during the pandemic.

Possible adaptations to the COVID-19 FDM

There are a few areas of modification to the model that would better represent the empirical literature thus far. Specifically, the COVID-19 FDM relies on developmental cascades/spillover effects, without considering other processes of change such as complementary relational patterns and stress-inoculation (stress-adapted) effects. These are interesting patterns that were identified within this review and, as a result, should be considered in future longitudinal work. Two questions we could ask are: 1) Under which circumstances do processes of spillover versus complementarity occur? 2) Under what conditions does existing hardship lead to stress-inoculation versus heightened vulnerability? Additionally, the model would benefit from distinguishing between magnitude of change (e.g., deterioration/improvement) as a complement to considering initial levels of functioning (e.g., vulnerability/asset) in conceptualizing processes of risk and resilience. Lastly, the original COVID-19 FDM emphasized unidirectional effects, for example from caregiver well-being to family well-being, and family well-being to child adjustment. However, including these as bidirectional pathways is justified based on the findings from this review.

Strengths and limitations

This review had many strengths such as the rigorous study design including preregistration with PROSPERO, a comprehensive and systematic search, and reporting in line with PRISMA guidelines. Moreover, the papers included represent a geographically diverse sample of longitudinal studies, enabling a better understanding of the global impact of COVID-19 on child and family functioning. By only including longitudinal studies, which include leveraging natural experiments with prepandemic data, we were able to speak to the directionality of effects – an important component of studying developmental cascades. Another strength was incorporating a risk-of-bias assessment to complement our narrative synthesis; this allowed us to use higher-quality studies when generating interpretations and conclusions about the explanatory utility of the COVID-19 FDM. Lastly, this review was comprehensive in that it captured processes of risk in addition to positive adaptation and resilience, the latter of which is often overlooked and understudied during times of adversity.

There are also limitations that should be considered. First, in attempting to balance comprehensiveness with feasibility, we excluded several important domains of child development, including academic, cognitive, biological, and social functioning. Additionally, we did not examine all components of the COVID-19 FDM, such as the caregiver-family interrelations. Another important limitation is that this review only covers the first two years of the pandemic. Future research should explore this model over a longer period to decipher how study timing during the pandemic influenced child, caregiver, and family functioning. It is

further possible that we missed key studies that were published in languages other than English, which could have implications for our synthesis. A final limitation was that we altered the risk-of-bias tool and, thus, utilized an unvalidated scale. We believe the benefits gained by adding items based on recommendations from the literature outweigh the risks. Despite these limitations, we believe this is a foundational start to the theory-building work required for pandemic research.

Future directions

Findings from the current review highlighted several gaps in the existing literature. In addition to those already mentioned in the *Summary of Support*, there are further methodological considerations that should be incorporated into future work. Specifically, results from the risk-of-bias assessment indicated the following limitations in primary studies: i) there was a significant issue with attrition and strategies to reduce attrition are important for future longitudinal work and ii) only a few studies provided power justification and, therefore, it is possible that studies were underpowered to detect effects. Additionally, although the current review did not focus on effect sizes, it would be helpful for subsequent meta-analyses to quantify the magnitude of effects to determine clinical relevance.

In addition, only three studies (6.4%) in our review included four or more periods of data collection during the pandemic, which may have been due to our eligibility criteria. Longitudinal designs with more than three time points are needed to truly assess nonlinear change and developmental cascades (Masten & Cicchetti, 2010; Vaillancourt et al., 2021). Additionally, multiple informants should be included particularly when conducting family systems research as findings may differ based on the respondent (e.g., Corbett et al., 2021; De Los Reyes et al., 2015; Georgiades et al., 2019). Studies should also attempt to include fathers rather than over-relying on mothers, as evidenced by the vast majority of included studies consisting mostly of mothers. This will help us determine whether the COVID-19 FDM represents a gendered framework for understanding family processes during the pandemic. Although our review captured geographically diverse studies, there was no research from regions such as South Asia and Africa. More work should focus on child and family functioning in lower-income and non-WEIRD (Western, Educated, Industrialized, Rich, and Democratic) countries to fully understand the global impact of pandemic social disruptions on children and families, and whether our model is meaningful across cultures and contexts. Another consideration for future work is exploring the COVID-19 FDM pathways within different age groups of children, particularly since there were very few studies on young children (i.e., mean age: 2–5 years). Finally, whether this COVID-19-specific model can be generalized to other multisystem, cascading disasters should be examined empirically.

Conclusions

The social disruptions caused by the pandemic have had an immense impact on child, caregiver, and family functioning. Findings from the current study provide initial support for the utility of the COVID-19 FDM for understanding processes of risk and resilience in family systems and implications for child internalizing, externalizing, and positive adjustment. Notably, the findings included in this study provide a 2-year snapshot in time for how families experienced and adapted to the COVID-19 pandemic. Processes of risk and resilience are dynamic and will

likely shift as time passes. The COVID-19 FDM provides a working framework, in need of continued development, that will aid in future research, clinical work, and policy for supporting pandemic recovery efforts.

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