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The Importance of Caregivers, Family, and Context for Child Welfare Involved Youth and a National Child Sample: A Structural Equation Modeling Perspective

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THE IMPORTANCE OF CAREGIVERS, FAMILY, AND CONTEXT FOR CHILD WELFARE INVOLVED YOUTH AND A NATIONAL CHILD SAMPLE: A STRUCTURAL EQUATION MODELING PERSPECTIVE

A DISSERTATION SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL IN CANDIDACY FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

PROGRAM IN CLINICAL PSYCHOLOGY

BY DR. NATHAN M. LUTZ

CHICAGO, IL

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CHAPTER ONE
INTRODUCTION

Integrated Summary

The link between the presence of supportive individuals and both physical and mental health is well established (Uchino, 2009; Cohen & Willis, 1985; Barrera, 1986). By the time they reach adulthood, individuals have typically developed social networks that include both family and non-family members, but during childhood, social support networks are often made up mostly of family members (Levitt et al., 1993). An understanding of a child’s social network, therefore, can typically be achieved by examining the family, both immediate and extended. For children and adolescents, being a part of a supportive social network has been associated with coping with adverse events (Dean & Lin, 1977), moderating the relationship between maltreatment and self-esteem (Appleyard et al., 2010), and encouraging overall well-being (Chu et al., 2010).

Defining Social Support

Williams et al. (2004) conducted a review of articles studying social support and found 30 different definitions of the construct. One of the simplest definitions preferred by the authors was simply “being there” for another person (Coffman & Ray, 1999). The authors also described other supportive behaviors such as caring, respecting, knowing, believing in, and sharing information. Other studies have defined social support as informal helping behavior, which includes emotionally sustaining behaviors, problem-solving behaviors, indirect personal influences, and environmental action (Gottleib, 1978).
For children in particular, special support often comes from multiple individuals, and research has suggested that understanding full support networks is important, as perceptions of support from specific individuals can differ from global perceived support (Pierce et al., 1991). The sheer size of a support network alone (i.e., the number of individuals in the network) does not explain the amount of support someone is receiving, and it is necessary to understand the unique contributions of each individual in one’s social support network (Dubow & Ulman, 1989; Chu et al., 2010).

While understanding provision of social support is important, it is only one piece of the puzzle. Understanding the impact of social support on children is incomplete without an incorporation of the child’s perception of the individual providing the support (Srull & Wyer, 1989). Social support provision from negatively perceived individuals may not be as beneficial as support from positively perceived individuals (Rook, 1984), and an incorporation of how much someone likes the person providing support, or their satisfaction with the relationship, may contribute to the understanding of the benefit of support. Relationship satisfaction has been shown to be related to adjustment in adolescents (Cauce et al., 1994), positive self-esteem in children (Shute et al., 2002), and emotional support in young adults (Buhrmester et al., 1988).

Understanding Contexts

The understanding of the importance of systems in which children are embedded dates back to Bronfenbrenner’s (1979) Ecological Systems Theory. Various contexts such as children’s families (Rothon et al., 2012; Gomez, 2021; Bethell et al., 2019), neighborhoods (Burt et al., 2019; Caughy et al., 2003; Hurd et al., 2013; Henderson et al., 2016; Kingsbury et al., 2020), and extra-curricular activities (Sheikh, 2017; Cahill et al., 2020) have been associated with child mental health and well-being. In addition, larger systems such as a parent’s emotional support
network (Sharabi & Marom-Golan, 2018) and resources in a child’s community (Lo et al., 2019; Seltenrich, 2015; Bikomeye et al., 2021) may have impacts on child well-being.

The impacts of these systems on child mental health may be understood through the proximal process of the caregiver-child relationship (Bronfenbrenner & Ceci, 1994). The inability to form secure attachments to caregivers has been found to be associated with internalizing symptoms (Brumariu & Kerns, 2010; Groh et al., 2012) as well as externalizing behaviors (Fearon et al., 2010). While the caregiver-child relationship has been established as a mediator in relationships between stressful life events and mental health outcomes (Platt et al., 2016; Bifulco et al., 2006) and between general parenting practices and mental health outcomes (Chorot et al., 2017), only one study (Ashiabi & O’Neal, 2015) has attempted to examine this relationship as a proximal process in determining mental health outcomes.

The Child Welfare System

Entry into the child welfare system causes disruptions in all of the relationships, contexts, and outcomes mentioned above. 672,594 children were served by the child welfare system in 2019, and the majority (54%) had been in care for at least a year (United States Department of Health and Human Services, [USDHHS], 2020). While the initial removal from the home of their biological parents is a disruption, children often experience further disruptions in placement throughout their time in care. Samples including youth in the child welfare system have suggested children may average between 4 and 6 placements while in state custody (James et al., 2004; Beal et al., 2019). Mental health outcomes tend to be worse for youth in the child welfare system (Salazar et al., 2011; Sheikh, 2017), and understanding the differential impacts of the relationships and the contexts in which they take place on youth in the child welfare system may help to reveal why this is the case.
Overview of the Current Bundled Dissertation and Studies

This dissertation expands upon the existing literature in the aforementioned areas, utilizing administrative child welfare data as well as publicly available national datasets. In all three papers, the outcomes of interest are internalizing symptoms (e.g., depression, anxiety, etc.) and externalizing behaviors (e.g., ADHD, conduct problems, etc.). The first study examines a sample of youth in the child welfare system in Illinois to examine the moderating effect of relationship satisfaction on the relationship between kin involvement and child psychopathology. This study builds upon the literature examining the importance of kin involvement for youth in the child welfare system, while emphasizing the importance of understanding children’s perceived relationship satisfaction with involved kin. It was hypothesized that higher levels of mental health problems would be associated both with poorly rated kin being highly involved in children’s lives and with highly rated kin being uninvolved. Conversely, fewer symptoms were expected when highly rated kin are highly involved in children’s lives and when lower rated kin are less involved.

The second study uses data from the 2017 National Survey of Children’s Health (NSCH), examining the mediating effect of the parent-child relationship on the associations across various systems in which children are embedded and mental health diagnoses. Using a model-based approach, the study investigates multiple pathways simultaneously, testing the centrality of the parent-child relationship as a proximal process.

The third study further examines the impact of the parent-child relationship on child mental health, this time using a combined 2018-2019 version of the NSCH. Instead of examining the mediating effect of the parent-child relationship, this study utilizes methods similar to the first paper. It looks at the moderating effect of parents’ perceptions of their relationships with
their children both on the association between family strengths and mental health outcomes and on the association between parent involvement in child activities and mental health outcomes. In addition, this study includes an analysis of structural invariance across children living with their biological parents and those living with non-biological parent caregivers.

Taken in sum, these three studies emphasize the importance of children having quality relationships with caring adults, both those in caregiving roles and those embedded in the extended family network. This bundled dissertation provides insights into the importance of these relationships both in the general population and in child-welfare-involved samples. While this work tests existing theories in a confirmatory sense, it also reveals areas for further exploration because of the insights that can be gleaned from the advanced statistical methods being used, i.e., structural equation modeling.
CHAPTER TWO
UNDERSTANDING THE ROLE OF RELATIONSHIP SATISFACTION IN KIN SOCIAL SUPPORT FOR YOUTH IN THE CHILD WELFARE SYSTEM

Introduction

The Child Welfare System

The child welfare system in the United States is designed to promote the safety of children and serves hundreds of thousands annually. In 2019, 672,594 children were served by the child welfare system, with 251,359 entering foster care that year (United States Department of Health and Human Services [USDHHS], 2020). While state child welfare agencies are required to make reasonable efforts to preserve or reunify families, removing children from their homes is sometimes necessary (Child Welfare Information Gateway, 2020). The reasons children enter the child welfare system often include at least one form of child maltreatment, including neglect (63%), physical abuse (13%), abandonment (5%), and sexual abuse (4%; USDHHS, 2020).

After being removed from their homes, the majority of children (95%) spend at least one month in care. When the 2019 USDHHS report was released, the children currently in foster care had been there for 19.6 months on average, with 54% having been in care for at least a year and 27% having been in care for at least two years (USDHHS, 2020). Placement stability, defined as having no more than two placements while in care (USDHHS, 2021), becomes less likely as time in care increases. In 2018, the national median placement stability was 83.5% for children in care.
for fewer than 12 months, 65.8% for children in care for between 12 and 24 months, and 41.1%
for children in care for 24 months or more (USDHHS, 2021). While national estimates of the
total number of placements experienced are not available, research studies have suggested the
number of placements while in care can range from an average of 4.4 placements (James et al.,
2004) to 6.1 placements (Beal et al., 2019). Mental health symptoms tend to be higher in general
for maltreated children and youth in the child welfare system (Salazar et al., 2011; Sheikh,
2017), and previous research has suggested instability while in care is further associated with
higher levels of internalizing symptoms and externalizing behaviors (Newton et al., 2000; James
et al., 2004; Aarons et al., 2010).

**Engaging the Extended Family**

One way to maintain a sense of stability in the face of changing placements during a
child’s time in care is providing continuous contact with a child’s biological family members,
including their extended families. Perry (2006) found that youth in the child welfare system who
reported stronger relationships with their biological families experienced fewer symptoms of
depression and anxiety. Other studies have found that increasing the involvement of biological
extended family members is associated with fewer internalizing symptoms (Bai et al., 2016;
Hindt et al., 2018; Leon & Dickson, 2018), fewer externalizing behaviors (Bai et al., 2016), and
increased placement stability while in care (Proctor et al., 2011). The Family First Prevention
Services Act (USDHHS, 2018) supports this concept, encouraging family finding programs and
kin placements for youth in the child welfare system. In line with this legislation, placement with
extended family members is currently the preferred out-of-home placement for youth in the child
welfare system (Coleman & Wu, 2016). Zinn et al. (2017) found that child-reported social
support with multiple individuals predicted positive outcomes for youth in the child welfare
system. Indeed, in qualitative interviews with older children in foster care, social support provided by caring adults was one of the most important themes that emerged (Greeson & Bowen, 2008), while other studies have indicated social support is one of the most important, yet absent, categories of support while in care (Samuels, 2008; Goodwin-Smith et al., 2017).

**Defining Social Support**

Social support is a multi-faceted construct that has been defined in multiple ways throughout the history of its study (Williams et al., 2004). One strong indicator of overall social support is level of involvement, and one of the simplest definitions of social support is “being there” for another person (Coffman & Ray, 1999). In many of the studies mentioned above, social support was defined as the level of involvement individuals had in another person’s life. For example, Leon and Dickson (2018) collected information about presence of extended family members in 14 domains that included providing transportation, attending events, making phone calls, etc. Proctor et al. (2011) used a caregiver-rated scale that asked where they rated their involvement in support-related areas on a scale from “much less than I would like” to “as much as I would like.”

The presence and involvement of supportive individuals is important, but definitions that only account for these factors fail to account for possible conflictual relationships with those individuals. Rook (1984) found that the receipt of social support from negatively perceived individuals is not as beneficial as support from positively perceived individuals. Thus, the inclusion of measures of relationship quality may bolster the understanding of the benefit of presence alone. Relationship quality may also impact the perception of the support being given, and previous research has supported the idea that perceived and received support are distinct
constructs (Uchino, 2009; Haber et al., 2007). Therefore, understanding children’s perceptions of relationship quality in addition to family members’ levels of involvement may glean unique insights about the benefits of these relationships. Relationship satisfaction is one way to measure children’s perceptions of relationships, and it has been associated with adjustment in adolescents (Cauce et al., 1994), positive self-esteem in children (Shute, De Blasio, & Williamson, 2002), and emotional support in young adults (Buhrmester et al., 1988).

Youth in the child welfare system provide an ideal population for studying social support, as understanding each child’s support network is particularly important, and administrative data collected by caseworkers and other professionals are abundant. For youth who are not involved in the child welfare system, research has supported the idea that the presence of one individual may be enough (Dubow & Ullman, 1989). For those in the child welfare system, however, a variety of social connections is likely necessary, and one connection may not be enough (Zinn et al., 2017). Therefore, understanding support coming from the entire kin network is especially important in this population. In addition, inherent in child welfare involvement are some of the conflictual relationships described by Rook (1984), which provide additional opportunities for these patterns to emerge, and the interaction between social support and relationship satisfaction may be especially relevant for these youth.

**The Current Study**

The interaction between social support and relationship satisfaction can be visualized as existing in four quadrants (see Figure 1).
The first quadrant represents situations where highly rated kin have limited involvement in children’s lives. These patterns may be particularly common in the child welfare system, in which a child’s out-of-home placement may limit the ability of previously involved family members to continue involvement in the child’s life. The second quadrant represents a situation where highly rated kin are highly involved in a child’s life, the most ideal of the four situations. The third quadrant represents the second-most ideal situation, in which lower-rated kin are less involved in the child’s life. Finally, the fourth quadrant represents situations in which lower-rated kin are more involved in the child’s life. All relationships with kin are expected to exist in one of the four quadrants to varying degrees.
The current study aims to address gaps in understanding the impact of social support by evaluating the interaction between the level of involvement a child receives from members of their kin network and the level of satisfaction they have with those kin. Previous literature has looked at each of these constructs separately. Lutz (2020) examined this interaction but did so using averaged scores collapsed across family members. These averages examined between-person effects of the entire family network, but individual family member contributions were not incorporated into the model. The analytic methods used in the current study allow the examination of how multiple relatives, each with varying levels of patterns from Figure 1, contribute to overall child mental health. No study has evaluated these constructs while taking individual family member contributions into account and leveraging a network-based approach. Using more advanced methods than those used in previous studies of this research question, this has three aims. First, this study aims to evaluate the main effect of kin and social support on mental health outcomes. The author hypothesizes that high levels of kin involvement will be associated with fewer internalizing symptoms and externalizing behaviors. The second aim is to evaluate the main effect of relationship satisfaction on mental health outcomes. The author hypothesizes that high levels of relationship satisfaction with kin will be associated with fewer internalizing symptoms and externalizing behaviors. Finally, the third aim of this study is to evaluate the interaction of kin involvement and relationship satisfaction on mental health outcomes. The author hypothesizes that relationship satisfaction will moderate the relationship between kin involvement and mental health outcomes, including internalizing symptoms and externalizing behaviors. Specifically, the fewest mental health symptoms will be observed when children have high involvement from highly rated individuals (i.e., quadrant II) and low
involvement from lower rated individuals (quadrant III). Higher levels of mental health symptoms are expected when lower rated individuals are highly involved in a child’s life (quadrant IV) or higher rated individuals have limited involvement (quadrant I). This interaction is shown in Figure 2.

Figure 2. Hypothesized interaction between kin involvement and relationship satisfaction

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**Method**

**Inclusion and Exclusion**

Data in this study come from the Recruitment and Kin Connection Project (RKCP), an evaluation of a family finding intervention for youth in the child welfare system in Cook and Will counties in Illinois. 450 youth entered the child welfare system during the recruitment stage for RKCP, which lasted from October 1, 2011 to October 1, 2014. All of the youth who met eligibility criteria were contacted to be in the study. Youth who were unable to complete self-
report measures because of age or ability were not contacted. Of those contacted, 172 children agreed to participate in RKCP. Data were collected using file reviews, phone interviews with child caseworkers, and in-home interviews with children, all of which were collected within 45 days of each child’s entry into state custody. Participants were included in the current study if they rated relationship satisfaction with at least one non-parental relative. This resulted in 133 participants being included in the study.

**Participant Characteristics**

Participants’ ages ranged from 8 to 14 ($M = 11.11$, $SD = 1.80$). Participants were mostly female (53.4%) and African American (61.7%). The sample experienced maltreatment at a higher rate than the national average for youth in the child welfare system based on USDHHS administrative data. In this sample, 30.8% experienced physical abuse, and 14.3% experienced sexual abuse, which are both higher than the national averages of 13% and 4% respectively (USDHHS, 2020).

**Sampling Procedures**

Randomization procedures were used in RKCP to assign participants to the family finding intervention, but these sampling strategies are not relevant to the current study. All 450 participants who met eligibility criteria were contacted by the research team, and the sample used ($N = 133$) in this study represents the eligible children who were able to be contacted, who agreed to participation in the study, and for whom relevant data were available. For each study visit, children received $10, and caregivers received $25 as compensation for their time. The Institutional Review Boards at Loyola University Chicago and the Illinois Department of
Children and Family Services (DCFS) approved the study, and waivers of consent were obtained.

**Measures and Covariates**

*The RKCP Kin Identification and Level of Engagement Form*

Research in social support rarely leverages network-based information and has instead used composite scores across all providers of social support, despite the fact that social support often differs from provider to provider and across categories of providers (Pierce et al., 1991; Stice et al., 2004). Network-based models that identify the unique contributions of each individual are more appropriate when measuring overall social support (Willis & Shinar, 2000), and the RKCP Kin Identification and Level of Engagement Form (KILE; Bai et al., 2016) was designed to incorporate network-based information across a number of categories that were specifically designed to assess the unique needs of youth in the child welfare system.

The KILE was completed in two stages. First, researchers collected information about each child’s relative and how involved they were in the child’s life using administrative data, then this information was confirmed with each child’s caseworker, and identification of any missing relatives was requested. There were 14 domains of involvement that included: respite care, visitation, home, phone calls, tutoring, mentoring, providing childcare, transportation, coaching, birthday cards, events, and support to the child’s biological and foster parent. Each domain was rated on a scale with ‘0’ indicating no involvement, ‘1’ indicating confirmed involvement, and ‘2’ indicating possible involvement. For the purposes of this study, all ‘2’s were recoded as ‘1’s for analysis. These scores were calculated separately for each relative the child rated. If a child rated their level of satisfaction with a relative, but that relative did not show
up in the administrative database and were not identified by the caregiver or caseworker, they were considered to have an involvement level of 0.

The KILE was developed for the purpose of RKCP, and it has yet to be used outside of the lab where it was developed, so the external validity and reliability of the measure across labs have not yet been developed. An exploratory factor analysis was conducted to examine potential factors within the KILE, and the one-factor model was found to be optimal (Φ = .76). This measure has been shown to have predictive validity in multiple studies (e.g., Blakely et al., 2016; Jhe Bai et al., 2016; Leon & Dickson, 2018).

**The Network of Relationships Inventory-Social Provisions Version**

The Network of Relationships Inventory-Social Provisions Version (NRI; Furman & Buhrmester, 1985) asks questions across a number of domains related to an individual’s relationship with another person. Of interest in this study was the relationship satisfaction subscale, which is made up of three items that ask about “how satisfied” the individual is with the relationship, “how good” the relationship is, and “how happy” the individual is with the relationship. These three items were rated on a one to five scale, with ‘1’ indicating ‘Little or none,’ ‘2’ indicating ‘Somewhat,’ ‘3’ indicating ‘Very much,’ ‘4’ indicating ‘Extremely much,’ and ‘5’ indicating ‘The most.’

**Child and Adolescent Needs and Strengths**

The Child and Adolescent Needs and Strengths measure (CANS; Lyons, 2009) was developed as a comprehensive tool to understand domains including family dysfunction, child maltreatment, and various youth outcomes. The CANS is completed for every child that enters the child welfare system in the state of Illinois. It is made up of 105 items rated on a scale from 0
to 3, with a ‘0’ indicating no evidence of needs, a ‘1’ indicating a need for monitoring, a ‘2’ suggesting a need to address the problem, and a ‘3’ indicating a need for immediate action. The CANS has been shown to have high inter-rater reliability among clinicians (.81) and researchers (.85; Anderson et al., 2003). A principal component analysis uncovered two subscales on the CANS related to mental health: an internalizing symptoms subscale and an externalizing behaviors subscale. The internalizing symptoms subscale included depression, anxiety, somatization, traumatic grief/separation, and adjustment to trauma. In the current study, 0 individuals had somatization at their baseline or recent measurements, so this variable was dropped from the analysis. The remaining four items in the internalizing symptoms factor had at least 37 individuals at both baseline and the most recent measurement. The externalizing behavior subscale included oppositional behavior, conduct, attention deficit/impulse control, anger control, danger to others, sexual aggression, and delinquency. Sexual aggression (0 individuals at baseline and 4 individuals in the most recent measurement), delinquency (5 individuals at baseline and 10 individuals in the most recent measurement), and conduct (11 individuals at baseline and 6 individuals in the most recent measurement) were all omitted due to low response rates. The remaining four items in the externalizing behaviors factor had at least 21 individuals at both baseline and the most recent measurement.

In the current study, participants completed between 1 and 9 CANS measures. The earliest CANS was used as the baseline measure of both internalizing symptoms and externalizing behaviors. These occurred between 100 days before the home visit and 300 days after the home visit. The most recent CANS was used as the outcome of interest. All of these
measurements were collected after the home visit and after the baseline measurements and occurred up to 1000 days after the home visit.

**Data Collection**

Data were collected with the aid of Illinois DCFS using the Statewide Automated Child Welfare Information System (SACWIS) database. The research team at Loyola University Chicago reviewed these databases, confirmed information via phone calls with case workers, and collected self-report information from youth and their families. Demographic information, kin involvement, and CANS data were collected using DCFS records, while relationship satisfaction was self-reported by the participants in the study.

**Quality of Measurements**

While administrative data are not collected for the purposes of research and therefore sometimes include missing or inconsistent data, a few safeguards were put in place to maximize the quality of measurements. First, all KILE forms were completed by two members of the research team. These forms were then confirmed with caseworkers, and inquiries were made about any additional information including unknown relatives or additional domains of involvement. Two items on the KILE, coaching and invitations to events, had low response rates and could not be included in the current study. Of the 495 relatives rated in the current study, 0 were involved in coaching, and only 4 were invited to events. The other 12 domains of involvement had between 11 and 135 relatives rated as involved with 56.17 involved on average and were retained in the analysis.

Finally, CANS outcomes were re-coded to align with the way the form is used in practice. While a ‘0’ on any item indicates no evidence of needs, and a ‘1’ indicates “watchful
waiting,” only ratings of ‘2’ or ‘3’ are considered actionable items. Therefore, CANS items were re-coded to align with caseworker priorities, with a ‘0’ indicating non-actionable items and a ‘1’ indicating actionable items. These items were used in this dichotomous form in the internalizing symptoms and externalizing behaviors factors.

**Analytic Strategy**

A previous analysis of the same dataset (Lutz, 2020) evaluated this interaction using the generalized linear model, which examined the moderation using a cross-product interaction term. This method required the use of averages for understanding social support and kin involvement and only evaluated these effects at the between-person level. The current methods utilize multilevel structural equation modeling (MSEM; Preacher et al., 2016), which allows each family member to contribute information to the model individually instead of looking at relative information as an average of all family members. This analysis utilizes the latent moderated structural equation (LMS) approach, which is shown in Figure 3.

Figure 3. Latent moderated structural equation for understanding interaction effects within and between family members
Results

Bivariate Correlations

Prior to conducting the SEM analysis, bivariate Spearman correlation analyses were conducted for each pair of variables that were used in the full model. Figure 4 shows a visualization of the relationships between these variables. Dark black boxes are used to separate the factors. In addition, measures of the same construct across timepoints are highlighted in yellow.

Figure 4. Bivariate correlations among items used in the analysis
Bivariate correlations revealed that, while some of the items within factors were correlated, there were several items that had little association with one another. Correlations ranged from -0.17 to 0.79. Of the 234 correlations, 17 were greater than 0.25, while 5 were greater than 0.5. In the relationship satisfaction factor, all items were positively correlated with one another with \( r > 0.74 \). For the kin involvement factor, correlations among items were inconsistent and ranged from -0.07 to 0.66. The home item in particular stood out and was negatively correlated with phone calls (-0.07), support to foster parent (-0.06), childcare (-0.06), tutor (-0.06), visitations (-0.05), and transportation (-0.01). Among items in the baseline and recent internalizing symptoms items, correlations ranged from -0.11 to 0.58, with the only negative correlation being between baseline depression and recent traumatic grief/separation. Within timepoints, correlations among adjustment to trauma, depression, and anxiety were all greater than 0.34, but correlations with traumatic grief/separation were lower. Correlations of the same items across timepoints were 0.10 (anxiety), 0.20 (depression), 0.33 (adjustment to trauma), and 0.34 (traumatic grief/separation). For baseline and recent externalizing behaviors items, correlations ranged from -0.01 to 0.64. The only negative correlation was between baseline ADHD and recent danger to others. At baseline, all correlations were greater than 0.23 except for those between ADHD and oppositional behavior \( (r = 0.08) \) and between ADHD and anger \( (r = 0.02) \). At the most recent measurement, correlations among anger, danger to others, and oppositional behavior were all above 0.42, but correlations with ADHD were lower. For externalizing behaviors, correlations of the same items across timepoints were 0.16 (anger), 0.21 (danger to others), 0.35 (oppositional behavior), and 0.47 (ADHD). Broadly, the bivariate correlations provided information that suggests the hypothesized measurement model may not be
the most ideal, despite these factors being successfully used in previous research in composite score form. To evaluate hypotheses related to the underlying constructs measured by these items, a structural equation modeling framework was utilized.

**Structural Equation Models**

Multilevel structural equation modeling (MSEM) was used to test all three hypotheses. 495 relatives (level one) were nested within 133 children (level two). Ratings of relative satisfaction and kin involvement existed at level one and represented within-person effects. Level two included between-person effects of kin satisfaction and involvement as well as child mental health outcomes, including baseline and recent measurements of both internalizing symptoms and externalizing behaviors. The Latent Moderated Structural Equation (LMS) Method (Klein & Moosbrugger, 2000) was used to evaluate interactions between kin involvement and relationship satisfaction. The benefits of MSEM over traditional multilevel modeling in this context are that it allows a measurement structure to be modeled, that it allows latent by latent interactions, and that it allows outcomes to exist at level two (Preacher et al., 2016). All analyses were conducted using Mplus 8.9 for Mac (Muthen & Muthen, 1998-2014). Because LMS was used, traditional fit statistics (e.g., RMSEA, SRMR, CFI, etc.) could not be obtained for these models. Similarly, tests of nested models are unavailable.

**Kin Involvement**

The first main effect of kin involvement was evaluated using MSEM with all 12 items included. The model tested the impact of involvement on recent measurements of both internalizing symptoms and externalizing behaviors simultaneously while controlling for baseline levels. This analysis resulted in an error stating the first-order derivative product matrix
was non-positive definite and that the standard errors may not be trustworthy. In this analysis, there was no effect of kin involvement on internalizing symptoms ($\beta = -1.43, p = .796$) or externalizing behaviors ($\beta = -4.88, p = .411$). While there was an effect of baseline externalizing behaviors on recent externalizing behaviors ($\beta = 0.47, p = .017$), there was no effect of baseline internalizing symptoms on recent internalizing symptoms ($\beta = 0.27, p = .111$), further suggesting estimation problems in the model. For the involvement factor, all of the loadings were significant except for home ($p = .495$) at the within level, but none of the loadings were significant at the between level. To attempt to simplify the model, the twelve involvement items were collapsed into five items including three of the original items (home, support to biological parents, and visits) as well as two composite items, foster parent support (made up of support to foster parent, transportation, respite, and childcare) and child support (made up of phone calls, tutoring, mentoring, birthday cards, and attending events). This model resulted in the same error. This time, all items loaded significantly onto the kin involvement factor at both the within and between levels except for home ($p = .984$ and .937), but all beta values were not significant at the .05 level, including those involving baseline symptoms. One final attempt was made to address the error, and two models were run separately, one for each outcome. For both internalizing symptoms and externalizing behaviors, the same error appeared. Additionally, the internalizing symptoms analysis indicated the model estimation reached a saddle point. Attempts to increase the number of integration points and use the MLF estimator resulted in models that did not fix the error or did not run at all. In these analyses, the home item again did not significantly load onto the factor at both the within and between levels. All other items except for
direct support at the between level in the internalizing symptoms analysis significantly loaded onto the involvement factor. The results of these analyses are presented in Table 1.

Table 1. Main effects of kin involvement on mental health outcomes

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>INV → INTr</td>
<td>-1.58</td>
<td>1.62</td>
<td>.330</td>
</tr>
<tr>
<td>INTb → INTr</td>
<td>0.32</td>
<td>0.21</td>
<td>.136</td>
</tr>
<tr>
<td>INV → EXTr</td>
<td>-2.60</td>
<td>1.86</td>
<td>.163</td>
</tr>
<tr>
<td>EXTb → EXTr</td>
<td>0.63</td>
<td>0.26</td>
<td>.016</td>
</tr>
</tbody>
</table>

Relationship Satisfaction

The second main effect was evaluated using MSEM with both outcomes included. Like with the kin involvement analysis, the error suggesting standard errors were not trustworthy was included in the output. Unlike with kin involvement, there did not appear to be problems in the measurement of relationship satisfaction, and all loadings were significant with \( p < .001 \). In this model, relationship satisfaction was not associated with internalizing symptoms (\( \beta = -0.02, p = .570 \)) or externalizing behaviors (\( \beta = 0.03, p = .319 \)). To attempt to address this error, separate models were run for the two outcomes. Like in all previous analyses, the same error was shown, and standard errors may not be trustworthy. In these analyses, all relationship satisfaction item loadings were significant with \( p < .001 \). The results of these analyses are presented in Table 2.

Table 2. Main effects of relationship satisfaction on mental health outcomes

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT → INTr</td>
<td>-0.02</td>
<td>0.04</td>
<td>.581</td>
</tr>
<tr>
<td>INTb → INTr</td>
<td>0.25</td>
<td>0.19</td>
<td>.182</td>
</tr>
<tr>
<td>SAT → EXTr</td>
<td>0.02</td>
<td>0.03</td>
<td>.353</td>
</tr>
<tr>
<td>EXTb → EXTr</td>
<td>0.51</td>
<td>0.24</td>
<td>.033</td>
</tr>
</tbody>
</table>
Moderating Effects

The interaction effect of relationship satisfaction on the association between kin involvement and mental health outcomes was evaluated using MSEM, and LMS was used to compute the interaction. Because the full hypothesized model had 136 parameters, and there are 133 clusters in the dataset, the model had to be simplified. The collapsed kin involvement items were used, and internalizing symptoms and externalizing behaviors were evaluated separately. In the model with externalizing behaviors as the outcome, the analysis resulted in an error that the covariance matrix at the between level could not be inverted. Despite attempts to change starting values and adjust path loadings, the model failed to run in each iteration. For internalizing symptoms, a model did run, although it included the error related to standard errors not being trustworthy. In this analysis, all items loaded onto relationship satisfaction with $p < .001$ at the within and between levels. For kin involvement, all items except home ($p = .924$) loaded with $p < .001$ at the within level, but none of the items loaded significantly at the between level. Baseline internalizing symptoms all loaded significantly at $p < .01$, but only traumatic grief/separation loaded significantly ($p = .004$) for the recent measurement factor. While none of the main effects, nor the effect of baseline symptoms on recent symptoms, were significant, the interaction was significant at the .05 level. The results of the analysis are presented in Table 3.

Table 3. Interaction effects of relationship satisfaction and kin involvement on internalizing symptoms

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT $\rightarrow$ INTr</td>
<td>-0.04</td>
<td>0.06</td>
<td>.466</td>
</tr>
<tr>
<td>INV $\rightarrow$ INTr</td>
<td>0.08</td>
<td>1.42</td>
<td>.953</td>
</tr>
<tr>
<td>SATxINV $\rightarrow$ INTr</td>
<td>-2.11</td>
<td>1.02</td>
<td>.038</td>
</tr>
<tr>
<td>INTb $\rightarrow$ INTr</td>
<td>0.29</td>
<td>0.18</td>
<td>.099</td>
</tr>
</tbody>
</table>
To examine the significant interaction, a simple slopes plot was created. Because the estimation of latent variable means and variances (i.e., TECH4) is not available unless Bayes estimation is used for LMS, the raw data were used to plot the interactions. To do this, composites of the factors were created by taking the mean of all items. In Figure 5, the x axis represents kin involvement, while the color of each line represents varying levels of relationship satisfaction. The y axis represents the fitted values from a regression of recent scores on baseline scores. This plot shows that, for high levels of relationship satisfaction, internalizing symptoms tend to be lower on average with higher levels of kin involvement. At lower levels of relationship satisfaction, however, more involvement is associated with higher levels of symptoms.

Figure 5. Simple slopes of interaction effect of relationship satisfaction on the association between kin involvement and internalizing symptoms
Discussion

Support of Original Hypotheses

Kin Involvement

The first hypothesis that kin involvement would be associated with mental health outcomes was not supported. Each analysis had similar problems in terms of estimation, but all of the results were the same. The current study does not support the main effect of involvement of family members on mental health outcomes when controlling for baseline levels of symptoms.

These results are not in line with previous research, which suggests the positive impact of social networks on coping (Dean & Lin, 1977), self-esteem (Appleyard et al., 2010), and overall well-being (Chu et al., 2010). In the child welfare context, previous research has supported this effect (Perry, 2006; Zinn et al., 2017) and has even done so using the measure from the current study (Bai et al., 2016; Hindt et al., 2018; Leon & Dickson, 2018). These studies used slightly different methods, and it is possible that the use of the MSEM, particularly given the inability to calculate appropriate standard errors, is part of the reason this effect was not detected. Previous studies using the KILE were conducted using composite scores, and these studies did not utilize SEM to incorporate the measurement of each item into the model. While exploratory factor analyses have been conducted in the past and suggested a one-factor model, the current analyses do not suggest the one-factor model is appropriate at the between-person level. One item that stands out at both the bivariate level and in the SEM is ‘home.’ On the KILE, this item is written as “Home of Relative Foster Care Option.” While this item is certainly related to the level a relative is involved, it is somewhat different from the other items. While other items (e.g., phone calls, childcare, visitations, etc.) all indicate current involvement, the ‘home’ item represents a
way a relative could potentially be involved. This involvement, while important, may be known only by a caseworker and not by the child themselves. The effect of this item on child outcomes may also operate in a different way because of this nuance.

**Relationship Satisfaction**

The second hypothesis that relationship satisfaction would be associated with mental health outcomes was also not supported. Like in the analyses related to kin involvement, it is possible that the problems in estimation hindered the ability to find an effect, and software suggested the conclusions drawn from these analyses may not be trustworthy. Unlike the analyses related to kin involvement, the problems did not exist at the measurement level. All three relationship satisfaction items consistently loaded onto the relationship satisfaction factor.

These results are also not in line with previous literature, which suggests relationship satisfaction has a direct effect on adolescent adjustment (Cauce et al., 1994), positive self-esteem (Shute et al., 2002), and emotional support (Buhrmester et al., 1988). The effect of relationship satisfaction at the between-person level did not exist, but the current methods could not evaluate direct within-person effects. This shortcoming is discussed further in the limitations section. It is possible that overall relationship satisfaction across all relatives is less important than high levels of relationship satisfaction with one or two individuals at the within-person level. The current methods could not capture these within-person idiosyncrasies. Finally, the crossed effect of the interaction between kin involvement and relationship satisfaction may have impacted both main effects. While theoretically, it makes sense that more kin involvement or higher levels of satisfaction may lead to fewer mental health symptoms, it would also make sense that high levels
of involvement from poorly rated individuals or high levels of satisfaction with family members who are not involved in a child’s life could lead to more mental health symptoms.

**Moderating Effect of Relationship Satisfaction**

The final hypothesis that relationship satisfaction moderates the relationship between kin involvement and mental health outcomes was partially supported, although the results should be interpreted with caution. The analysis involving externalizing behaviors resulted in a model that could not be run. Again, this speaks to the complexity of the MSEM and the difficulties in detecting effects when issues with measurement exist or when detecting small effects. For internalizing symptoms, the model was successfully run, but the error suggesting problems in estimation still existed. While a significant interaction was detected, it is possible that these effects are exaggerated due to incorrect standard errors. The interaction that was detected was mostly in line with the hypothesis. As hypothesized, the lowest levels of internalizing symptoms existed when both kin involvement and relationship satisfaction were high. The next lowest levels of symptoms were when poorly rated relatives were uninvolved in children’s lives. The highest levels of symptoms existed when poorly rated individuals were highly involved and when moderate-to-highly rated individuals were uninvolved.

These results are in line with previous literature, which suggests that incorporating an understanding of relationship satisfaction is necessary for understanding the effect of involvement on mental health outcomes (Rook, 1984). These results are also similar to those conducted using different methods with the same dataset (Lutz, 2020). In those analyses, average scores across all relatives were collapsed into single measurements of relationship satisfaction and kin involvement, but interactions were calculated using matched pairs. While the results
were significant in both studies, $p$ values were close to .05. Given the number of tests run, some would suggest an alpha level of .05 is not conservative enough and may lead to Type I errors. This in combination with problems in estimation contributes to the recommendation of overall caution when interpreting these results.

**Limitations and Generalizability**

As mentioned previously, a major limitation of this study is the set of estimation problems that existed in each model. These errors may have been due to a number of reasons. First, the latent constructs may not have been appropriately measured by the items in the current study. For example, the inclusion of the ‘home’ item on the kin involvement factor may not have been suitable. Further, while CANS mental health outcomes have been successfully used in previous studies (Bai et al., 2016; Lutz, 2020), only baseline measurements of CANS were used in these studies, and items were summed to create composite scores. The current study incorporated baseline measurements as a control but targeted the most recent CANS measure as an outcome. Second, the sample size, including the number of clusters, may not have been large enough to detect the complexities hypothesized in the current model. Any aberration in estimation may have been exaggerated due to smaller samples and limited variability within clusters. Finally, the model may have simply been incorrectly specified. While the current model was created based on theoretical justification, there may be alternative models that better fit the data.

Effects were tested at the between-person level (i.e., at the child level), but the interaction hypothesis of this study was actually at the within-person level (i.e., within individual relatives). The hypothesis in this study was that the relationship between level one kin involvement on level
two child outcomes (i.e., a $1 \rightarrow 2$ relationship) would be moderated by level one relationship satisfaction (i.e., $1x(1 \rightarrow 2)$). Existing analytic methods are limited to testing interactions within levels (i.e., $1x(1 \rightarrow 1)$ or $2x(2 \rightarrow 2)$) or using cross-level interaction via random slopes (i.e., $2x(1 \rightarrow 1)$, $2x(2 \rightarrow 1)$, or $1x(2 \rightarrow 1)$; Preacher et al., 2016). Literature supports the types of $1x(1 \rightarrow 2)$ relationships that exist in the current study theoretically (Preacher et al., 2016), but there is no precedent for evaluating these types of relationships using existing software.

Several decisions were made in this study in an attempt to most accurately test the hypotheses at hand. These decisions were made on a theoretical basis, but it is possible that some of them led to an inability to detect significant effects. One such decision was not including covariates. Covariates such as demographic factors (e.g., gender, age, ethnicity), barriers to relative involvement (e.g., out of state, incarcerated, etc.), or type of relative (e.g., grandmother, cousin, aunt, fictive kin, etc.) may have been relevant. Another decision was considering relatives who were rated on the NRI but were not identified on the KILE as having zero involvement across all categories. This decision was based on confidence in the thorough process of the family-finding methods and on caseworker knowledge of children they served, but it is possible it resulted in an under-estimate of kin involvement.

This study evaluated a sample of 133 youth living in Cook and Will County in Illinois who were in the custody of the Illinois Department of Children and Family Services. While some of the relationships in the current study may exist in the larger population of children in state custody or of all children, it is possible that some results would not generalize outside of this particular sample.
Implications and Future Directions

The current study highlights the complexity of understanding a child’s kin network and how relationships with family members in this network have differential impacts on mental health outcomes. The results indicate that merely understanding the level of involvement is not enough to comprehend the impact of kin involvement on child mental health outcomes. Other factors, such as relationship satisfaction, must also be considered. As this study suggests, involving as many individuals as possible in as many ways as possible without considering relationship satisfaction is not ideal. Rather, the objective should be to engage individuals with whom children already have high levels of relationship satisfaction or to improve relationship satisfaction with kin who are already highly involved. It is essential to conduct future research to understand how child welfare systems are incorporating children's perceptions of relatives, and programs and policies should encourage individuals to consider children's satisfaction with relationships and to use this information when making decisions.

Future work should also focus on methods that can evaluate $1x(1 \rightarrow 2)$ relationships. The current study was unable to evaluate the impact of the within-person interaction due to these shortcomings in methodology. Similarly, the measurement model in the current study had some weaknesses, particularly at the between-person level. Future work should be done to understand how to optimally use the KILE to measure kin involvement as well as how to use the CANS to measure mental health outcomes, particularly across timepoints.

The focus of this study was to measure the impact of relationships on negative outcomes, specifically those related to mental health. However, it's important to consider that positive relationships can also have an effect on a child's strengths, which are also measured in the
CANS. Future research should explore how kin involvement and relationship satisfaction with members of a child's kin network influence child strengths. Although this study evaluated various methods of measuring relationships within a child's kin network and their impact on multiple mental health outcomes, there is still much work to be done in understanding how the kin network affects the mental health and well-being of children in the child welfare system. This study only scratches the surface of these complex and intricate relationships.
CHAPTER THREE
EXAMINING MECHANISMS UNDERLYING FAMILY- AND ENVIRONMENT-RELATED PREDICTORS OF YOUTH MENTAL HEALTH OUTCOMES: THE PARENT-CHILD RELATIONSHIP AS A MEDIATOR

Introduction

Understanding the multi-layered environmental contexts in which children live has long been considered important for evaluating outcomes related to child well-being. One popular example is Bronfenbrenner’s Ecological Systems Theory (1979), which categorizes components of a child’s environment into the microsystem (e.g., family, neighborhood, school, etc.), the mesosystem (i.e., the interactions between two or more systems), the exosystem (e.g., parent workplace, social services, etc.), and the macrosystem (e.g., culture, societal values, access to resources, etc.). The current study will focus on three microsystems (the family, the neighborhood, and child activities), one exosystem (parent external support), and one macrosystem (community resources) and their associations with child well-being.

Family Strengths

The family can be thought of as one of the smallest systems in which children exist, and in many cases, families consist of only a few other individuals. While small, these systems are important, and Bronfenbrenner (1986) called a child’s family “the principal context in which human development takes place.” The importance of the family in child development has been
established in previous literature. Rothon et al. (2012) examined longitudinal effects of family involvement and found that higher levels of reported family relationship quality (i.e., parental monitoring, conversations, and interest in the child) were associated with reduced odds of being diagnosed with mental-health-related problems. In addition, the authors found that children in families that ate meals together 6-7 nights a week were twice as likely to pass graduate exams than children from families who did not eat meals together. It is no wonder that family-based services are considered an important option for addressing child mental health problems (Hoagwood et al., 2010). The ability of a family to work together in the face of problems is also important, and promoting family resilience has been associated with improved mental health outcomes (Gomez, 2021; Bethell et al., 2019).

**Neighborhood Strengths**

Outside of the family, the next most immediate environment in which a child lives is the neighborhood, and child development can also be supported by non-family members who live in the child’s immediate environment. The importance of the neighborhood context, including the people and overall safety of the neighborhood, has been supported in previous research. Burt et al. (2019) examined social characteristics of neighbors and showed that simply living in the vicinity of other neighbors who exhibited rule-breaking was associated with children’s own rule-breaking behaviors. Caughy et al. (2003) found that having relationships with more neighbors led to fewer internalizing symptoms, although the authors noted this association only existed for those in high-SES neighborhoods. Further, Hurd et al. (2013) discovered a mediating effect of neighborhood cohesion in the relationship between other neighborhood characteristics (e.g., unemployment rate, poverty rate, and residential stability) and child internalizing symptoms. Neighborhood social cohesion has also been found to be associated with lower levels of
perceived stress (Henderson et al., 2016) and has been shown to provide a buffer against the negative effects of stressful life events (Kingsbury et al., 2020).

**Child Activities**

Involvement in extra-curricular activities can play an important role in child development, and these organizations, clubs, or teams teach children how to work with others, help them develop relationships with peers, and can lead to a sense of belonging. Participation in activities can reduce perceptions of social isolation, which have been shown to impact child and adolescent mental health (Sheikh, 2017). Additionally, physical activity has been found to have some beneficial effects in terms of reducing depression and anxiety in children (Biddle & Asare, 2011; Andermo et al., 2020). Occupational- or activity-based interventions, including camps, creative arts, sports, and yoga, have also been shown to have positive effects on child mental health (Cahill et al., 2020).

**Parent External Support**

The availability of an emotional support network for parents is a system that is sometimes overlooked in studies of child development. Bronfenbrenner (1986) identified this exosystem as an “excellent example” of an external influence on child well-being. Feeling supported by others has been shown to facilitate increased involvement in managing children’s healthcare for parents of youth diagnosed with autism spectrum disorder (Sharabi & Marom-Golan, 2018). Perceived social support is also a protective factor against the development of depression and anxiety in adults (Roohafza et al., 2014), which can indirectly impact child mental health (Goodman et al., 2011). Mothers’ reported engagement with extended family members has also been positively associated with mothers’ optimism and negatively associated with both mother and child mental health symptoms (Taylor, 2015). While literature establishing the effect of parent support
networks on child mental health is limited, the link between general social support and overall mental health is well-established (Uchino, 2009; Barrera, 1986; Cohen & Wills, 1985).

**Community Resources**

The final context investigated in this study is the macrosystem that includes resources available to children in their communities. In particular, resources such as recreation centers, libraries, parks, and walking paths will be included. The benefits of libraries (Lo et al., 2019) and “bookmobiles” (Lo & Stark, 2020) have been established in previous literature, and both promote social inclusion and impact overall well-being. The presence of parks in children’s communities has been shown to impact overall child health (Seltenrich, 2015). Similarly, activities like “schoolyard greening” (transforming school play areas from asphalt to a park-like environment) have been associated with positive impacts on child mental health (Bikomeye et al., 2021). In addition, living in communities with few resources may be associated with perceiving oneself as being of a lower socioeconomic status, which impacts child and adolescent ratings of health (Goodman et al., 2007).

**Moving Beyond Context: The Incorporation of Proximal Processes**

In 1994, Bronfenbrenner and Ceci expanded on Ecological Systems Theory by establishing the bioecological model, which emphasizes the importance of process, person, context, and time (PPCT) in understanding child development. This model posits that all components of PPCT work synergistically to bolster child outcomes, but that proximal processes (i.e., frequent and regular interactions with people, objects, or symbols in a child’s immediate environment) are central to child development (Bronfenbrenner & Ceci, 1994). One such proximal process is the parent-child relationship.
The aforementioned microsystem contexts each have been found to be associated with the parent-child relationship. Family strengths have been associated with overall parenting stress (Gleeson et al., 2016; Ma et al., 2011). Neighborhood strengths have been shown to moderate the relationship between parenting strain and mastery for caregivers (Carpiano & Kimbro, 2012). Parent external support has been associated with greater perceived parenting competence in parents of adolescents (Angley et al., 2015) as well as with overall levels of parenting stress (Gleeson et al., 2016).

There is a large body of research establishing the association between insecure attachment styles and negative mental health outcomes, including internalizing symptoms (Brumariu & Kerns, 2010; Groh et al., 2012) and externalizing behaviors (Fearon et al., 2010). Certain parental qualities, such as higher levels of punishment and lower levels of modeling and reassurance, have also been associated with internalizing symptoms (van der Sluis et al., 2015). Kaminski et al. (2008) evaluated popular parent training programs for various child mental health problems. The authors identified improving parent-child communication and increasing positive interactions between the parent and child as two of the most important components of successful treatment. Ashiabi & O’Neal (2015) used an earlier version of the survey used in the current study to evaluate the parent-child relationship as a mediator between SES, the neighborhood, and child social behavior. They found that parent-child interactions were the strongest predictors of positive social behaviors and the second-strongest predictors of negative social behaviors, supporting the idea that these proximal processes may be more central to child development than contextual factors. In line with research underlining the importance of the parent-child relationship, the current study will aim to evaluate the centrality of the parent-child relationship as a proximal process.
Previous research has established the parent-child relationship as a mediator in the relationship between mental health outcomes and stressful life events (Platt et al., 2016), child maltreatment (Bifulco et al., 2006), and general parenting practices (Chorot et al., 2017). Other than the study by Ashiabi and colleagues mentioned above, however, no study has evaluated the parent-child relationship as a mediator of contextual factors with child mental health outcomes.

**Hypotheses, Aims, and Objectives**

The current study aims to evaluate the mediating role of the parent-child relationship in the associations between multiple systems in which children are embedded and child mental health outcomes. The study will evaluate the following aims:

1. Examining the parent-child relationship as a mediator between family strengths and mental health outcomes
2. Examining the parent-child relationship as a mediator between neighborhood strengths and mental health outcomes
3. Examining the parent-child relationship as a mediator between child activities and mental health outcomes
4. Examining the parent-child relationship as a mediator between parent external support and mental health outcomes
5. Examining the parent-child relationship as a mediator between community resources and mental health outcomes

**Method**

Data used in this study come from the 2017 version of the National Survey of Children’s Health (NSCH; Child and Adolescent Health Measurement Initiative, 2018). This survey was
previously conducted via telephone and was administered by the Centers for Disease Control in 2003, 2007, and 2012. The current version of the survey is funded by the Health Resources and Services Administration-Maternal and Child Health Bureau and has been administered annually since 2016. Each dataset includes between 20,000 and 50,000 families from across the United States.

**Inclusion and Exclusion**

Families were selected randomly from non-institutionalized households across the United States. Provided that there was at least one child between the ages of 0 and 17 in the household, the family was eligible to participate. Administrative data were used to identify households that were more likely to have children ages 0-17, and the survey over-sampled children with special healthcare needs, those between the ages of 0 and 5, and those with two or more children. Within each household, one child was randomly selected to be the subject of the survey.

For the purposes of this study, only children between the ages of 6 and 17 were included. The NSCH does not ask questions about child activities, school, or parents and children sharing ideas if the child is between ages 0 and 5, so these children were excluded from the sample.

**Participant Characteristics**

Participants in this study came from all 50 U.S. states and Washington D.C. At least 237 children from each state were included, with no more than 361 children from a single state. 57.2% of the sample was from a metropolitan area. The majority of the sample (77.0%) lived with both of their parents, while 16.8% lived with one parent, and 4.5% lived with neither parent. Participants lived in households that had between 2 and 10 people living there (\(M = 3.97, SD =1.09\)) with 42.8% having a single child in the household, 38.4% having two children, 13.0% having three children, and 5.8% having four or more children. The majority of the sample
(93.4%) came from households where English was the primary language, followed by “other” (3.0%), and Spanish (2.9%). Participants’ ages ranged from 6 to 17 ($M = 12.14$, $SD = 3.45$), although it should be noted that age was provided as age in years, meaning the average age is likely a slight underestimate of the true average of the sample. The sample was mostly male (51.2%) and White, non-Hispanic (68.9%). 11.5% of the sample were Hispanic, 6.7% were Black, non-Hispanic, 5.2% were Asian, non-Hispanic, and 7.7% were coded as multiple races or “other.” Most of the participants (95.8%) were born in the United States. Of the 562 who were not born in the U.S., 95.7% had lived in the country for at least a year. Similarly, the majority of adults who filled out the survey (85.3%) were born in the U.S., and 96.0% had been living in the U.S. since 2000. Therefore, while this sample includes participants from all across the U.S., it is not representative of the global population.

The ages of the caregivers who filled out the survey ranged from 19 to 75 ($M = 45.22$, $SD = 8.48$). The majority of the caregivers who completed the survey were female (66.6%), the child’s biological or adoptive parent (89.7%), married (75.3%), had at least a college education (53.6%), and were employed during the previous year (75.2%).

**Sampling Procedures**

Surveys were randomly either mailed to participants (30%), or participants were sent instructions to complete the survey online (70%). After two reminder letters and a postcard reminder to complete the survey online, households who did not complete the online survey were sent paper screeners by mail. Families could also request paper surveys if they did not wish to complete the questionnaire online. In total, 59,135 households were screened for age-eligible children, and 58,510 initial screeners were completed. Of these, 21,599 questionnaires were
completed and returned, including between 343 and 454 from each U.S. state. The overall weighted response rate was 37.4% (Child and Adolescent Health Measurement Initiative, 2018). 6,161 children were removed from the sample because they were under the age of 6, leaving 15,438 children in the current study.

Sample Size, Power, and Precision

A power analysis was conducted using Preacher and Coffman’s (2006) calculator for determining power for a structural equation model. Parameters for the power analysis included 722 degrees of freedom (40 measured variables/820 knowns; 98 estimated paths/unknowns), an alpha of .05, a sample size of 15,438, a null RMSEA of 0.025, and alternative RMSEA values of .10 (poor fit), .08 (acceptable fit), and .05 (close fit). For all levels of fit, power was determined to be sufficient to assess model fit with the given sample size. In all calculations, a value of 1 was returned for power, meaning power was greater than 0.999 for all potential levels of fit. This suggests that the sample is large enough to detect overall fit of the full model even if the model fit was poor. In terms of detecting specific paths, this analysis used diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics. The use of diagonally weighted least squares estimation is appropriate for the current data due to the way the outcomes are measured, which is described below. The use of robust standard errors and adjusted test statistics allows the full sample to be utilized in the analysis, improving the precision of the estimates. Additionally, this method of estimation accounts for the bias in estimates that would exist if these measurements were treated as continuous (i.e., if maximum likelihood estimation was used).
Measures and Covariates

The full NSCH questionnaire includes 830 items related to child and family health and well-being. The items used in the current study are those related to each child’s family, neighborhood, school, and social contexts as well as their mental health and wellbeing. The factors in this study are based on a principal component analysis conducted by Lutz et al. (2021) using the 2016 version of the NSCH. Eight factors were identified, including five predictors, one mediator, and two outcomes. The composition of each factor is described in the sections below:

Family Strengths

This factor is made up of five items related to the family’s reaction to problems, problem solving skills, and quality time (i.e., eating meals together). Families with high levels of strengths involve the whole family in problem solving. These families prioritize activities like mealtime and may create environments where parent-child interactions are more frequent. These caregivers utilize their families, of which their children are members, as resources to solve problems. The first four items in this factor were measured using a Likert scale where 1 indicated ‘None of the time’ and 4 indicated ‘All of the time’ (note that this is a reverse-coding from what is in the NSCH). The ‘Eats meals together’ item was re-coded so that ‘0 days’ was a ‘0,’ ‘1-3 days’ was a ‘2,’ ‘4-6 days’ was a ‘5,’ and ‘Every day’ was a ‘7.’ Based on the principal component analysis, in the 2016 survey, Cronbach’s alpha was 0.62 for the five items related to family strengths (Lutz et al., 2021), and it is 0.82 in the 2017 survey. Table 4 summarizes factor loadings for each item in both the 2016 and 2017 surveys.
Table 4. Factor loadings for each item on the 2016 and 2017 NSCH for the family strengths factor

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Works together to solve problems (WRK)</td>
<td></td>
<td>.863</td>
<td>.907</td>
</tr>
<tr>
<td>Talks together about problems (TLK)</td>
<td></td>
<td>.845</td>
<td>.884</td>
</tr>
<tr>
<td>Draws on strengths to solve problems (STR)</td>
<td></td>
<td>.804</td>
<td>.877</td>
</tr>
<tr>
<td>Stays hopeful in the face of problems (HOP)</td>
<td></td>
<td>.704</td>
<td>.786</td>
</tr>
<tr>
<td>Eats meals together (MEL)</td>
<td></td>
<td>.438</td>
<td>.391</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2017 NSCH. In the confirmatory factor analysis, the model had a scaled chi square of 593.22 with 5 degrees of freedom. The model had a robust RMSEA of 0.045, an SRMR of 0.034, a robust CFI of 0.995, and a robust TLI of 0.990. All loadings were statistically significant with p values less than .001. The weights of each item's loading are shown in Figure 6.

Figure 6. Confirmatory factor analysis of the family strengths factor
**Neighborhood Strengths**

This factor is made up of eight items related to neighborhoods children live in, specifically related to child safety, getting help from neighbors, and overall upkeep of the neighborhood environment. Neighborhoods with high levels of strengths provide children with opportunities to explore their environments, which allows them to develop relationships with peers who live nearby and develop a sense of independence. The items related to housing, vandalism, and litter had response options of ‘Yes,’ and ‘No.’ All other items were measured using a Likert scale where 1 indicated ‘Definitely disagree’ and 4 indicated ‘Definitely agree.’ In the 2016 survey, Cronbach’s alpha was 0.63 for the eight items related to family strengths, and it is 0.78 in the 2017 survey. Table 5 summarizes factor loadings for each item in both the 2016 and 2017 surveys.

Table 5. Factor loadings for each item on the 2016 and 2017 NSCH for the neighborhood strengths factor

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child is safe in neighborhood (SAF)</td>
<td></td>
</tr>
<tr>
<td>People in neighborhood help each other out (HLP)</td>
<td>.741</td>
</tr>
<tr>
<td>Neighborhood watches out for each other’s children (WTC)</td>
<td>.707</td>
</tr>
<tr>
<td>Know where to go for help in neighborhood (WHR)</td>
<td>.698</td>
</tr>
<tr>
<td>Poorly kept/run-down housing (HOU)</td>
<td>.606</td>
</tr>
<tr>
<td>Vandalism in neighborhood (VAN)</td>
<td>-.571</td>
</tr>
<tr>
<td>Litter or garbage in neighborhood (LIT)</td>
<td>-.531</td>
</tr>
<tr>
<td>Child safe at school (SCH)</td>
<td>-.509</td>
</tr>
<tr>
<td></td>
<td>-.485</td>
</tr>
<tr>
<td></td>
<td>.468</td>
</tr>
<tr>
<td></td>
<td>-.441</td>
</tr>
<tr>
<td></td>
<td>-.416</td>
</tr>
<tr>
<td></td>
<td>.520</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2017 NSCH. In the confirmatory factor analysis, the model had a scaled chi square of 2921.89 with 20 degrees of freedom. The model had a robust RMSEA of
0.072, an SRMR of 0.100, a robust CFI of 0.925, and a robust TLI of 0.895. All loadings were statistically significant with $p$ values less than .001. The weights of each item's loading are shown in Figure 7.

**Figure 7.** Confirmatory factor analysis of the neighborhood strengths factor

*Child Activities*

This factor is made up of five items related to the child’s participation in activities including sports, clubs and organizations, the arts, and community service. This factor also includes the parents’ level of participation in these activities. The item ‘Parents attend activities’ was measured using a Likert scale where 1 indicated ‘Never’ and 4 indicated ‘Always.’ All other items had response options of ‘Yes’ or ‘No.’ In the 2016 survey, Cronbach’s alpha was 0.71 for the seven items related to child activities, and it was 0.53 in the 2017 survey. Table 6 summarizes factor loadings for each item in both the 2016 and 2017 surveys.
Table 6. Factor loadings for each item on the 2016 and 2017 NSCH for the child activities factor

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016</td>
</tr>
<tr>
<td>Organized activities-music/arts (ART)</td>
<td>.779</td>
</tr>
<tr>
<td>Parents attend activities (ATT)</td>
<td>.689</td>
</tr>
<tr>
<td>Sports teams after school/weekends (SPT)</td>
<td>.607</td>
</tr>
<tr>
<td>Clubs/orgs after school/weekends (CLB)</td>
<td>.599</td>
</tr>
<tr>
<td>Community service/volunteer work (VOL)</td>
<td>.401</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2017 NSCH. In the confirmatory factor analysis, the model had a scaled chi square of 380.78 with 5 degrees of freedom. The model had a robust RMSEA of 0.055, an SRMR of 0.036, a robust CFI of 0.972, and a robust TLI of 0.943. All loadings were statistically significant with p values less than .001. The weights of each item's loading are shown in Figure 8.

Figure 8. Confirmatory factor analysis of the child activities factor
**Parent External Support**

This factor is made up of eight items related to individuals from whom parents can get support. Parents with high levels of support have a larger number of individuals who can help them with tasks like supervising their children and can provide emotional support. All of these items had response options of ‘Yes’ or ‘No.’ In the 2016 survey, Cronbach’s alpha was 0.57 for the eight items related to parent external support, and it is 0.63 in the 2017 survey. Table 7 summarizes factor loadings for each item in both the 2016 and 2017 surveys.

Table 7. Factor loadings for each item on the 2016 and 2017 NSCH for the parent external support factor

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family/friend support-other (OFA)</td>
<td>.666</td>
</tr>
<tr>
<td>Healthcare provider support (HCP)</td>
<td>.630</td>
</tr>
<tr>
<td>Place of worship support (WOR)</td>
<td>.601</td>
</tr>
<tr>
<td>Spouse support (SPO)</td>
<td>.526</td>
</tr>
<tr>
<td>Peer support group (PER)</td>
<td>.472</td>
</tr>
<tr>
<td>Counselor support (MHP)</td>
<td>.445</td>
</tr>
<tr>
<td>Health condition support group (GRP)</td>
<td>.441</td>
</tr>
<tr>
<td>Mentor for child (MTR)</td>
<td>.225</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Loadings</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>.710</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.639</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.593</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.576</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.474</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.438</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.417</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.268</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2017 NSCH. In the confirmatory factor analysis, the model had a scaled chi square of 1555.68 with 20 degrees of freedom. The model had a robust RMSEA of 0.064, an SRMR of 0.070, a robust CFI of 0.925, and a robust TLI of 0.895. All loadings were statistically significant with p values less than .001. The weights of each item's loading are shown in Figure 9.
Community Resources

This factor is made up of four items related to the resources available to the child in the community, including parks, libraries, rec centers, and sidewalks or walking paths. Unlike the neighborhood strengths factor, this domain is related to the resources in the community, not necessarily the people who live in the neighborhood. This factor may have more to do with the financial resources of the community and is less related to the environment created by residents of an individual’s neighborhood. All four of these items had response options of ‘Yes’ or ‘No.’ In the 2016 survey, Cronbach’s alpha was 0.73 for the four items related to community resources, and it is 0.74 in the 2017 version. Table 8 summarizes factor loadings for each item in both the 2016 and 2017 surveys.
Table 8. Factor loadings for each item on the 2016 and 2017 NSCH for the community resources factor

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings 2016</th>
<th>Loadings 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park or playground (PRK)</td>
<td>.783</td>
<td>.803</td>
</tr>
<tr>
<td>Library or bookmobile (LIB)</td>
<td>.747</td>
<td>.763</td>
</tr>
<tr>
<td>Recreation center (REC)</td>
<td>.727</td>
<td>.747</td>
</tr>
<tr>
<td>Sidewalks or walking paths (WLK)</td>
<td>.677</td>
<td>.690</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2017 NSCH. In the confirmatory factor analysis, the model had a scaled chi square of 696.69 with 2 degrees of freedom. The model had a robust RMSEA of 0.107, an SRMR of 0.049, a robust CFI of 0.980, and a robust TLI of 0.941. All loadings were statistically significant with $p$ values less than .001. The weights of each item's loading are shown in Figure 10.

Figure 10. Confirmatory factor analysis of the community strengths factor
**Parent-Child Relationship**

This factor is made up of five items related to caregivers sharing ideas with their children, feeling confident about handling the demands of raising children, and their level of frustration with their children. Because these items are completed by the caregiver, they tap into the caregiver’s perception of their relationship with the child. The items with a negative valence (i.e., ‘Child bothers parent,’ ‘Child is hard to care for,’ ‘Angry with child’) were measured using a Likert scale where 1 indicated ‘Never’ and 4 indicated ‘Always.’ The items with a positive valence (i.e., ‘Shares ideas with child’ and ‘Can handle demands of raising children’) were measured using a Likert scale where 1 indicated ‘Not at all’ and 4 indicated ‘Very well.’ In the 2016 survey, Cronbach’s alpha was 0.79 for the five items related to the parent-child relationship, and it is 0.79 in the 2017 survey. Table 9 summarizes factor loadings for each item in both the 2016 and 2017 surveys.

Table 9. Factor loadings for each item on the 2016 and 2017 NSCH for the parent-child relationship factor

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings 2016</th>
<th>Loadings 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child bothers parent (BTH)</td>
<td>.818</td>
<td>.844</td>
</tr>
<tr>
<td>Child is hard to care for (HRD)</td>
<td>.788</td>
<td>.795</td>
</tr>
<tr>
<td>Angry with child (ANG)</td>
<td>.725</td>
<td>.743</td>
</tr>
<tr>
<td>Shares ideas with child (SHR)</td>
<td>-.535</td>
<td>-.654</td>
</tr>
<tr>
<td>Can handle demands of raising children (HDL)</td>
<td>-.511</td>
<td>-.638</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2017 NSCH. In the confirmatory factor analysis, the model had a scaled chi square of 1260.83 with 5 degrees of freedom. The model had a robust RMSEA of 0.075, an SRMR of 0.054, a robust CFI of 0.975, and a robust TLI of 0.950. All loadings were
statistically significant with p values less than .001. The weights of each item's loading are shown in Figure 11.

Figure 11. Confirmatory factor analysis of the parent-child relationship factor

**Internalizing Symptoms**

This factor is made up of three items related to parent-rated severity of child anxiety, child depression, and child somatic symptoms (i.e., headaches). Parents were asked about each item in three parts. First, they were asked whether the child had ever experienced symptoms. Then, they were asked whether the child was experiencing symptoms at the time the survey was completed. Finally, they were asked the current severity of the child’s symptoms. If they answered ‘no’ to either of the first two questions, they were marked as a ‘0’ on the scale (i.e., no symptoms ever and no current symptoms were both treated as ‘0’). Each item was rated on a 0-3 scale, with ‘0’ indicating no current symptoms, ‘1’ indicating mild symptoms, ‘2’ indicating moderate symptoms, and ‘3’ indicating severe symptoms. In the 2016 survey, Cronbach’s alpha
was 0.55 for the three items related to internalizing symptoms, and it is 0.57 in the 2017 survey.

Table 10 summarizes factor loadings for each item in both the 2016 and 2017 surveys.

Table 10. Factor loadings for each item on the 2016 and 2017 NSCH for the internalizing symptoms factor

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety (ANX)</td>
<td></td>
<td>.931</td>
<td>.847</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td></td>
<td>.712</td>
<td>.841</td>
</tr>
<tr>
<td>Headaches/Migraines (HED)</td>
<td></td>
<td>.267</td>
<td>.472</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2017 NSCH. Because there are only three items in this factor, this analysis is just-identified, and all fit statistics indicate perfect fit. The weights of each item's loading are shown in Figure 12.

Figure 12. Confirmatory factor analysis of the internalizing symptoms factor
Externalizing Behaviors

This factor is made up of two items related to parent-rated severity of ADHD and behavioral or conduct problems. Each item was rated on the same 0 to 3 scale as the internalizing symptom items. In the 2016 survey, Cronbach’s alpha was 0.72 for the two items related to externalizing behaviors, and it is 0.71 in the 2017 survey. Table 11 summarizes factor loadings for each item in both the 2016 and 2017 surveys.

Table 11. Factor loadings for each item on the 2016 and 2017 NSCH for the externalizing behavior factor

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings 2016</th>
<th>Loadings 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADHD (ADD)</td>
<td>.936</td>
<td>.883</td>
</tr>
<tr>
<td>Behavioral/Conduct problems (BEH)</td>
<td>.719</td>
<td>.883</td>
</tr>
</tbody>
</table>

A confirmatory factor analysis could not be conducted for this factor, since it only has two items and is therefore under-identified. This factor will still be a part of the larger analysis. Two-item factors can be used in SEM analysis, given that there are two or more factors where each has two or more indicators (Kline 2016).

Data Collection

Invitations to participate in the NSCH were sent to households by mail. A screener questionnaire was completed by web or mail by an adult who is “familiar with the child’s health and healthcare,” which was typically a parent or guardian of the child. The screener asked for information about all children ages 0-17 who lived in the household. If a child was identified, parents who were completing the screener online were immediately directed to the age-appropriate detailed questionnaire about their child. If there was more than one child, one of the identified children was randomly selected. If parents completed the screener by mail, the full questionnaire was mailed to them at a later date. 58,510 screens were completed between August
2017 and February 2018, and 21,599 completed the questionnaire, of whom 15,438 were within the desired age range (6-17).

Table 12 describes the pattern of missingness for each factor as well as for the overall dataset. Some of the factors had a large proportion of missingness that came from individuals who skipped entire sections of the questionnaire (i.e., participants who were “completely missing” and skipped all items within a factor). Overall, 13,133 (85.1%) of the participants had no missing data.

Table 12. Missingness across factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Complete Data (%)</th>
<th>Cases with any missing (n)</th>
<th>Completely missing (n)</th>
<th>Completely missing (%) of any missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Symptoms</td>
<td>98.9%</td>
<td>176</td>
<td>8</td>
<td>4.55%</td>
</tr>
<tr>
<td>Ext. Behaviors</td>
<td>98.4%</td>
<td>242</td>
<td>10</td>
<td>4.13%</td>
</tr>
<tr>
<td>Fam. Strengths</td>
<td>96.8%</td>
<td>495</td>
<td>163</td>
<td>32.93%</td>
</tr>
<tr>
<td>Neigh. Strengths</td>
<td>95.2%</td>
<td>744</td>
<td>226</td>
<td>30.38%</td>
</tr>
<tr>
<td>Ext. Support</td>
<td>95.9%</td>
<td>632</td>
<td>130</td>
<td>20.57%</td>
</tr>
<tr>
<td>Child Activity</td>
<td>95.4%</td>
<td>715</td>
<td>164</td>
<td>22.94%</td>
</tr>
<tr>
<td>Comm. Res.</td>
<td>96.8%</td>
<td>496</td>
<td>235</td>
<td>47.38%</td>
</tr>
<tr>
<td>P-C Relation</td>
<td>97.3%</td>
<td>412</td>
<td>96</td>
<td>23.30%</td>
</tr>
<tr>
<td>Overall</td>
<td>85.1%</td>
<td>2305</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

As mentioned above, diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was used for the analysis. This strategy was employed using the command “estimator = "WLSMV"” in the lavaan package in R (Rosseel 2012). This estimator replaced missing data using robust WLS estimation. No patterns of missingness were detected to suggest the data were missing not at random, and analyses proceeded with all individuals in the sample included.
Analytic Strategy

Structural equation modeling (SEM) was used to evaluate how the parent-child relationship acts as a mediator between each of the five factors and mental health outcomes. As noted by Tudge et al. (2016), this method of analysis allows for testing multiple relationships simultaneously instead of separately, which is more in line with bioecological theory. Additionally, child sex and child age were added as covariates for both outcomes. In addition to the full SEM, alternative models were explored, such as using a single mental health factor (i.e., fixing the correlation between mental health outcomes to one), the parent-child relationship as a predictor (i.e., fixing all paths between predictors and the parent-child relationship to zero), and the parent-child relationship as an outcome (i.e., fixing paths between the parent-child relationship and mental health outcomes to zero). Chi square difference tests using the anova() function in R were used to compare nested model.
Figure 13. Full hypothesized structural equation model
Results

Statistics and Data Analysis

Bivariate Correlations

Prior to conducting the SEM analysis, bivariate Spearman correlation analyses were conducted for each pair of variables that were used in the full model. Figure 14 shows a visualization of the relationships between these variables. Dark black boxes are used to separate the factors, while the red box encloses the items that load onto the predictors.

Figure 14. Bivariate correlations between items used in the analysis
Correlations ranged from -0.37 to 0.85. Of the 861 correlations, 43 were greater than 0.3, while 10 were greater than 0.5. Only 5 of the correlations were less than -0.3, while 0 were less than -0.5. The 15 strongest and 15 weakest correlations are shown in Figure 15.

Figure 15. Strongest positive and strongest negative bivariate correlations
All 15 of the strongest positive correlations included variables that came from the same factors. For the strongest negative correlations, however, there were some correlations that included variables from different factors. For example, ‘Angry with child’ from the parent-child relationship factor was negatively correlated with ‘Family stays hopeful in the face of problems’ from the family strengths factor. The only items with negative valence in the dataset were the ones in the parent-child relationship factor, neighborhood strengths, and the mental health outcomes, so it is expected that many of the strongest negative correlations would come from these factors. The five strongest negative correlations were all from items within the parent-child relationship factor. While some insights can be gained from evaluating the bivariate correlations between items, the structural equation model allows for the measurement of underlying latent factors and relationships between these factors.

**Structural Equation Models**

The structural equation model shown in Figure 8 represents the hypothesized model. In all analyses, diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics were used. The first model is based on Figure 8 with orthogonality (i.e., no correlations among factors) on the predictor side. Restricting correlations between predictors allows for testing of the parent-child relationship as a predictor in subsequent models, while allowing these correlations (i.e., using an oblique model) would result in a subsequent model with the parent-child relationship treated as a predictor that is numerically isomorphic to the mediation model. An oblique model with correlations among all predictors was also considered after testing the importance of the parent-child relationship as a mediator.
In the SEM analysis of the full model with orthogonality on the predictor side, the model had a scaled chi square of 25,107.54 with 799 degrees of freedom. The model had a robust RMSEA of 0.058, an SRMR of 0.065, a robust CFI of 0.777, and a robust TLI of 0.759. All of these fit statistics fail to meet criteria suggested by Hu and Bentler (1999), suggesting this model is not the best way to represent the relationships among the sample data. While the $R^2$ value for a factor made up of Likert scale items does not have the exact same interpretation as it would when continuous items are used, this measure still helps to provide an effect size estimate for the amount of variance explained in the outcomes. In this model, the $R^2$ values suggest there is a moderate amount of variability explained for both internalizing symptoms ($R^2 = 0.214$) and externalizing behaviors ($R^2 = 0.313$).

Table 13 shows these fit statistics and effect size measures for alternative models, including the parent-child relationship as a predictor, the parent-child relationship as an outcome, and a mediation model where predictors are allowed to correlate. The final columns in the table show the scaled chi square difference (Satorra, 2000) using the anova function in R and level of significance when comparing these models to the hypothesized model. Note that $p$ values below .05 suggest the tests with fewer degrees of freedom (i.e., more parameters estimated) are statistically significant improvements on the models with more degrees of freedom.
Table 13. Fit statistics and effect size metrics for alternative models

<table>
<thead>
<tr>
<th>Model</th>
<th>$X^2$</th>
<th>df</th>
<th>RMSEA</th>
<th>SRMR</th>
<th>CFI</th>
<th>TLI</th>
<th>Int. $R^2$</th>
<th>Ext. $R^2$</th>
<th>$\Delta X^2$</th>
<th>$\Delta df$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full orthogonal</td>
<td>25107.54</td>
<td>799</td>
<td>0.058</td>
<td>0.065</td>
<td>0.777</td>
<td>0.759</td>
<td>0.214</td>
<td>0.313</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>PCR as Predictor</td>
<td>34139.31</td>
<td>804</td>
<td>0.074</td>
<td>0.081</td>
<td>0.643</td>
<td>0.617</td>
<td>0.295</td>
<td>0.396</td>
<td>2775.89</td>
<td>5</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>PCR as outcome</td>
<td>26011.18</td>
<td>801</td>
<td>0.060</td>
<td>0.068</td>
<td>0.767</td>
<td>0.750</td>
<td>0.188</td>
<td>0.208</td>
<td>508.80</td>
<td>2</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Full oblique</td>
<td>17765.51</td>
<td>789</td>
<td>0.044</td>
<td>0.052</td>
<td>0.879</td>
<td>0.867</td>
<td>0.217</td>
<td>0.318</td>
<td>2379.43</td>
<td>10</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
The model with a single mental health outcome did not converge, even when the correlation between the two mental health outcomes was fixed to 0.9 instead of 1.0. This model was not evaluated, and the two separate mental health factors were retained. In all cases, the model with more estimated pathways and fewer degrees of freedom was significantly better. This meant that the best model for these data was the fully oblique model with the parent-child relationship as a mediator and not a predictor or an outcome, but it also suggests the mediation pathways and the direct pathways from the five predictors are important components of the model. In the SEM analysis of the full model with all predictors correlated, the model had a scaled chi square of 17,765.51 with 789 degrees of freedom. The model had a robust RMSEA of 0.044, an SRMR of 0.052, a robust CFI of 0.879, and a robust TLI of 0.867. These fit measures are more in line with recommendations from Hu and Bentler (1999), although relative fit indices (i.e., CFI and TLI) still fall under the suggested threshold of 0.900.

Modification indices were examined to attempt to understand where fit could be improved. Table 14 shows all modification indices with values over 500 (i.e., the chi square of the model would be improved by 500 or more). In all cases, these improvements would be statistically significant. While some of the modification indices made some sense theoretically (e.g., allowing support from mental health provider to load onto mental health outcomes or allowing presence of a mentor to load onto neighborhood strengths), others were not in line with theory (e.g., support from spouse loading onto internalizing symptoms). In an effort to retain the theory-driven nature of the current study, modifications to the current model were not made, although these indices may suggest something beyond idiosyncrasies in the data and could be considered in future work.
Table 14. Modification indices for full structural equation model

<table>
<thead>
<tr>
<th>Item/Factor</th>
<th>Type of relationship</th>
<th>Item/Factor</th>
<th>Modification Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing symptoms</td>
<td>Factor Loading</td>
<td>Support from mental health provider</td>
<td>1841.35</td>
</tr>
<tr>
<td>Externalizing behaviors</td>
<td>Factor Loading</td>
<td>Support from mental health provider</td>
<td>1748.84</td>
</tr>
<tr>
<td>Parent-child relationship</td>
<td>Factor Loading</td>
<td>Support from mental health provider</td>
<td>1665.02</td>
</tr>
<tr>
<td>Family strengths</td>
<td>Factor Loading</td>
<td>Parent attends events</td>
<td>1056.78</td>
</tr>
<tr>
<td>Parent-child relationship</td>
<td>Factor Loading</td>
<td>Support from mental health provider</td>
<td>917.90</td>
</tr>
<tr>
<td>Neighborhood strengths</td>
<td>Factor Loading</td>
<td>Parent attends events</td>
<td>844.84</td>
</tr>
<tr>
<td>Family strengths</td>
<td>Factor Loading</td>
<td>Mentor for child</td>
<td>761.49</td>
</tr>
<tr>
<td>Family strengths</td>
<td>Factor Loading</td>
<td>Can handle demands of raising children</td>
<td>680.22</td>
</tr>
<tr>
<td>Neighborhood strengths</td>
<td>Factor Loading</td>
<td>Support from mental health provider</td>
<td>653.11</td>
</tr>
<tr>
<td>Family strengths</td>
<td>Regression</td>
<td>Age</td>
<td>640.17</td>
</tr>
<tr>
<td>Child activities</td>
<td>Factor Loading</td>
<td>Support from mental health provider</td>
<td>607.12</td>
</tr>
<tr>
<td>Child bothers parent</td>
<td>Residual Correlation</td>
<td>Angry with child</td>
<td>599.69</td>
</tr>
<tr>
<td>Age</td>
<td>Regression</td>
<td>Family strengths</td>
<td>598.29</td>
</tr>
<tr>
<td>Child activities</td>
<td>Factor Loading</td>
<td>Mentor for child</td>
<td>591.94</td>
</tr>
<tr>
<td>Externalizing behaviors</td>
<td>Factor Loading</td>
<td>Child is hard to care for</td>
<td>590.71</td>
</tr>
<tr>
<td>Externalizing behaviors</td>
<td>Factor Loading</td>
<td>Support from healthcare provider</td>
<td>544.72</td>
</tr>
<tr>
<td>Family strengths</td>
<td>Regression</td>
<td>Internalizing symptoms</td>
<td>533.76</td>
</tr>
<tr>
<td>Internalizing symptoms</td>
<td>Factor Loading</td>
<td>Support from healthcare provider</td>
<td>518.37</td>
</tr>
</tbody>
</table>
Because mediation pathways cannot be explicitly evaluated using model comparison due to the correlated structure across predictors, indirect and direct effects will be computed instead using the full oblique model.

**Mediation Pathways**

Using the full oblique model, mediation pathways were extracted to evaluate the mediating effect of the parent-child relationship. In the model specification, the following lines of code were used in the regression computation:

\[
\begin{align*}
\text{INT} & \sim c_1\text{FAM} + c_2\text{NEI} + c_3\text{SUP} + c_4\text{ACT} + c_5\text{COM} + b\text{PCR} \\
\text{EXT} & \sim d_1\text{FAM} + d_2\text{NEI} + d_3\text{SUP} + d_4\text{ACT} + d_5\text{COM} + e\text{PCR} \\
\text{PCR} & \sim a_1\text{FAM} + a_2\text{NEI} + a_3\text{SUP} + a_4\text{ACT} + a_5\text{COM}
\end{align*}
\]

Using these additional variables, indirect, direct, and total effects could be computed within the model specification. For example, to understand the mediating effect of the parent-child relationship on the association between family strengths and internalizing symptoms, the following lines of code were used:

\[
\begin{align*}
\text{ind.int.fam} & := a_1b \\
\text{dir.int.pcr} & := b \\
\text{dir.pcr.fam} & := a_1 \\
\text{tot.int.fam} & := c_1 + (a_1b)
\end{align*}
\]

The lavaan package in R uses the delta method to compute standard errors for each pathway as well as the total and indirect effects (Rosseel, 2012). This method allowed for levels of significance to be computed.
Family Strengths. The analysis of the family strengths factor demonstrated a significant partial mediating effect of the parent-child relationship on the association between family strengths and both mental health outcomes. For externalizing behaviors, the total effect was \(-0.094 (p < .001)\), while it was \(-0.144\) for internalizing symptoms \((p < .001)\). The direct pathways were significant between family strengths and externalizing behaviors (standardized effect = \(0.168, p < .001\)) and between family strengths and internalizing symptoms (standardized effect = \(0.045, p = .005\)). There was a significant direct effect of family strengths on the parent-child relationship (standardized effect = \(0.477, p < .001\)). The indirect effect was significant for both externalizing behaviors (standardized effect = \(-0.263, p < .001\)) and internalizing symptoms (standardized effect = \(-0.189, p < .001\)). These path coefficients are shown in Figure 16.

Figure 16. Path diagram showing the parent-child relationship’s mediating effect on the association between family strengths and mental health outcomes
**Neighborhood Strengths.** The analysis of the neighborhood strengths factor demonstrated a significant partial mediating effect of the parent-child relationship on the association between neighborhood strengths and both mental health outcomes. For externalizing behaviors, the total effect was -0.093 ($p < .001$), while it was -0.106 for internalizing symptoms ($p < .001$). The direct pathway was not significant between neighborhood strengths and externalizing behaviors (standardized effect = -0.020, $p = .165$), but it was significant between neighborhood strengths and internalizing symptoms (standardized effect = -0.053, $p = .001$). There was a significant direct effect of neighborhood strengths on the parent-child relationship (standardized effect = 0.134, $p < .001$). The indirect effect was significant for both externalizing behaviors (standardized effect = -0.074, $p < .001$) and internalizing symptoms (standardized effect = -0.053, $p < .001$). These path coefficients are shown in Figure 17.

Figure 17. Path diagram showing the parent-child relationship’s mediating effect on the association between neighborhood strengths and mental health outcomes.
**Child Activities.** The analysis of the child activities factor demonstrated a significant partial mediating effect of the parent-child relationship on the association between child activities and both mental health outcomes. For externalizing behaviors, the total effect was -0.249 (p < .001), while it was -0.180 for internalizing symptoms (p < .001). Direct pathways were significant between child activities and externalizing behaviors (standardized effect = -0.156, p < .001) as well as between child activities and internalizing symptoms (standardized effect = -0.113, p < .001). There was a significant direct effect of child activities on the parent-child relationship (standardized effect = 0.169, p < .001). The indirect effect was significant for both externalizing behaviors (standardized effect = -0.093, p < .001) and internalizing symptoms (standardized effect = -0.067, p < .001). These path coefficients are shown in Figure 18.

Figure 18. Path diagram showing the parent-child relationship’s mediating effect on the association between child activities and mental health outcomes.
**Parent External Support.** The analysis of the parent external support factor demonstrated a significant partial mediating effect of the parent-child relationship on the association between parent external support and both mental health outcomes. For externalizing behaviors, the total effect was 0.063 ($p < .001$), while it was 0.045 for internalizing symptoms ($p < .001$). Direct pathways were significant between parent external support and externalizing behaviors (standardized effect = 0.057, $p < .001$) as well as between parent external support and internalizing symptoms (standardized effect = 0.079, $p < .001$). There was a significant direct effect of parent external support on the parent-child relationship (standardized effect = -0.113, $p < .001$). The indirect effect was significant for both externalizing behaviors (standardized effect = 0.063, $p < .001$) and internalizing symptoms (standardized effect = 0.045, $p < .001$). These path coefficients are shown in Figure 19.

Figure 19. Path diagram showing the parent-child relationship’s mediating effect on the association between parent external support and mental health outcomes.
**Community Resources.** The community resources factor had the smallest total effect on both predictors. For externalizing behaviors, the total effect was 0.003 ($p = .789$), while it was -0.004 for internalizing symptoms ($p = .729$). Direct pathways were also not significant between community resources and externalizing behaviors (standardized effect = -0.012, $p = .263$) as well as between community resources and internalizing symptoms (standardized effect = -0.015, $p = .192$). There was a significant direct effect of community resources on the parent-child relationship (standardized effect = -0.028, $p = .007$) and of the parent-child relationship on both externalizing behaviors (standardized effect = -0.552, $p < .001$) and internalizing symptoms (standardized effect = -0.396, $p < .001$). The indirect effect was significant for both externalizing behaviors (standardized effect = 0.015, $p = .007$) and internalizing symptoms (standardized effect = 0.011, $p = .009$). These path coefficients are shown in Figure 20.

Figure 20. Path diagram showing the parent-child relationship’s mediating effect on the association between community resources and mental health outcomes.
Discussion

Support of Original Hypotheses

The study aimed to evaluate the mediating role of the parent-child relationship on associations between multiple systems in which children are embedded and child mental health outcomes. The study evaluated the following aims, each of which is explored in the subsequent sections:

1. Examining the parent-child relationship as a mediator between family strengths and mental health outcomes
2. Examining the parent-child relationship as a mediator between neighborhood strengths and mental health outcomes
3. Examining the parent-child relationship as a mediator between child activities and mental health outcomes
4. Examining the parent-child relationship as a mediator between parent external support and mental health outcomes
5. Examining the parent-child relationship as a mediator between community resources and mental health outcomes

Family Strengths

The mediating effect of the parent-child relationship on the association between family strengths and mental health outcomes was supported by the analyses in the current study and represented the largest indirect effects across the five predictors. Family strengths, which included items related to facing problems and spending quality time as a family (i.e., eating meals together), were positively associated with the parent-child relationship, which included items related to not feeling bothered or frustrated by the child, having confidence in parenting, and a willingness to share ideas and talk with the child. This was associated with a significant negative total effect on the severity of both internalizing mental health diagnoses (e.g., depression and anxiety) and externalizing mental health diagnoses (e.g., behavior problems and
ADHD). These results suggest that one pathway by which family strengths reduce negative mental health outcomes is by way of the parent-child relationship; as the larger family unit faces problems together and spends quality time with one another, parents’ relationships with their children improve, and this reduces the severity of mental health problems.

These findings are in line with previous research, which suggests relationships between family strengths and improved mental health outcomes (Rothon et al., 2012; Gomez, 2021; Bethell et al., 2019) as well as associations between family strengths and parent stress (Gleeson et al., 2016; Ma et al., 2011). The findings expand on the existing understanding of family strengths by teasing apart the strengths of the family at-large with the strengths of the parent-child relationship and how these uniquely contribute to mental health outcomes.

These results did include one surprising outcome in terms of the direct effects on both internalizing symptoms and externalizing behaviors. In both cases, higher levels of family strengths resulted in a higher severity of mental health problems. Because many of the family strengths items were related to facing problems as a family, it is possible that confounding variables are at play. For example, it is possible that families who have more problems (e.g., financial stress, marital issues, experiences with racism, etc.) are required to draw on family strengths more frequently and that these problems lead to higher levels of mental health symptoms in children. Additionally, it is possible that the mental health diagnoses themselves are the very problems that parents are referring to, and having more mental health problems allows for more opportunities for addressing problems as a family. The possibility of reverse causality in the current analysis is described in further detail in the limitations section.
**Neighborhood Strengths**

The mediating effect of the parent-child relationship on the association between neighborhood strengths and mental health outcomes was also supported by the analyses. Neighborhood strengths, which include items related to living in neighborhoods where children are safe, where neighbors help each other, and where there are few negative factors (e.g., vandalism, litter, rundown housing), were positively associated with the parent-child relationship. The mediation included a significant negative total effect and significant negative indirect effect for both mental health outcomes, suggesting the impact of neighborhood strengths on mental health is at least partially mediated by the parent-child relationship. Parents who can trust that their children are safe in their schools and neighborhoods and who have support from neighbors tend to have more positive relationships with their children, and this in turn results in fewer mental health symptoms.

These findings are in line with previous research, which suggests an association between negative neighborhood aspects and negative mental health outcomes (Burt et al., 2019), an association between positive relationships with neighbors and fewer internalizing symptoms (Caughy et al., 2003), and a relationship between neighborhood cohesion and internalizing symptoms (Hurd et al., 2013). Further, previous research has indicated neighborhood strengths positively impact parent mastery and reduced parenting strain (Carpiano & Kimbro, 2012). This analysis provides support that at least a partial mediation exists in this relationship.

**Child Activities**

The mediating effect of the parent-child relationship on the association between child activities and mental health outcomes was supported by the analyses. Child activities, which included involvement in arts, sports, and volunteering as well as parent attendance at activities,
was positively associated with the parent-child relationship. This was associated with negative total effects and negative indirect effects on both internalizing symptoms and externalizing behaviors. Children who are involved in activities and whose parents attend those activities have parents who are more confident and less frustrated with parenting, which is associated with better mental health outcomes.

These findings are in line with previous research, which suggests child activities reduce perceptions of isolation and mental health severity (Sheikh, 2017) and are directly linked to child mental health (Cahill et al., 2020). This study adds to this understanding by proposing a potential mediator, the parent-child relationship, that at least partially explains this association.

**Parent External Support**

The mediating effect of the parent-child relationship on the association between parent external support and mental health outcomes was supported, although the direction of the effect was the opposite of what was hypothesized. Parent external support from individuals such as a spouse, support groups, friends, or a health care provider as well as the presence of a mentor for the child was negatively associated with the parent-child relationship, which was negatively associated with mental health outcomes. This resulted in a significant positive total effect and a significant positive indirect effect, suggesting partial mediation of the parent-child relationship on the association between external support and mental health outcomes. Direct effects between parent support and mental health outcomes were also significant and positive.

These findings are not in line with previous research, which suggests feeling supported by others is associated with increased parental involvement in childcare (Sharabi & Marom-Golan, 2018) and with fewer mental health diagnoses in adults (Roohafza et al., 2014), which can impact child mental health (Goodman et al., 2011). Engagement with extended family
members has also been linked to parental optimism and to reduced mental health symptoms (Taylor, 2015). Previous findings also suggest having support is associated with greater perceived parenting competence (Angley et al., 2015) and reduced parental stress (Glesson et al., 2016). As was discussed with family strengths, it is possible that reverse causality is leading to the somewhat surprising results. If a child has a mental health diagnosis with a more severe presentation, parents may engage more individuals in providing support. Similarly, if a parent perceives a negative parent-child relationship, they may seek support from others to aid them in parenting their child. Certain items in the parent support factor, such as support from a health care provider or from a health condition support group, may also be caused by the presence of mental health symptoms and may be attenuating the relationship that would suggest causality in the opposite direction. Finally, parent external support is categorized as part of a child’s exosystem (Bronfenbrenner, 1979). While important, the effects of exosystem factors may be obscured by the presence of the three microsystem factors included in the current study (family strengths, neighborhood strengths, and child activities).

**Community Resources**

The mediating effect of the parent-child relationship on the association between community resources and mental health outcomes was supported, although effect sizes were small. There was a significant negative relationship between community resources and the parent-child relationship and a significant positive indirect effect. These results suggest that community strengths, which include the presence of parks, libraries, recreation centers, and sidewalks, are negatively associated with the parent-child relationship, which leads to an increase in mental health severity. The total effects and direct effects of community resources on mental
health outcomes were not significant for both internalizing symptoms and externalizing behaviors.

These findings are not in line with previous research, which suggests a link between child well-being and libraries (Lo et al., 2019), parks (Seltenrich, 2015), and “schoolyard greening” (Bikomeye et al., 2021). The relationship between community resources and the parent-child relationship had not been established in previous studies, and the presence of a significant but small positive effect in the current study cannot be compared to previous findings. Like with neighborhood strengths, there is likely a relationship between community resources and SES that may be attenuating the effects of community strengths on the outcomes. It is known that health disparities exist for individuals in underserved and socially disadvantaged communities (Kronenfeld, 2019), and areas without parks, sidewalks, libraries, and recreation centers may also be areas without accessible mental health care. Each mental health outcome was rated by parents, who would not be likely to confidently rate these symptoms without access to providers who could make related diagnoses. It is possible that it is not that the mental health of these children is actually better but instead that parents did not have access to individuals who could help identify these symptoms in the first place. Finally, like with parent external support, this factor is part of a more distal system, the macrosystem (Bronfenbrenner, 1979). In the presence of the microsystem and exosystem factors, the effects may be attenuated.

**Limitations and Generalizability**

The strength of the NSCH is its size and its thorough recruitment strategies, which resulted in a 2017 sample that was mostly representative of the United States population at large and included hundreds of children from each U.S. state. One of the survey’s weaknesses, however, is that is given once annually, and participants are not tracked over time. While it is
possible that the same individuals are represented across samples, there is no way to link individuals across different years of the survey. This reduces any researcher’s ability to detect truly causal relationships, as temporal precedence cannot be established. This is one of the greatest limitations of the current study. Indeed, some authors (e.g., Kline, 2016) argue for the use of the term “mediation” being reserved for longitudinal studies. This cross-sectional analysis could detect what these authors would call “indirect effects,” but it could not detect true mediation. The concept of equivalent models was described by MacCallum et al. (1993) and emphasizes the importance of using theory to govern the creation of these types of models. Theory guided the current analyses and suggested that the parent-child relationship was caused by each predictor, and the outcomes were caused by the predictors and the parent-child relationship. However, the cross-sectional nature of the sample leaves the possibility that causality could have been occurring in the opposite direction, and equivalent models with different theoretical backings are plausible. For example, it is possible that children already had existing mental health problems, and those problems led to caregivers needing additional support from family members or others in their network. Instead of a supportive network impacting child mental health outcomes, the presence of mental health problems may have led to the increased presence of parents’ external supports.

As mentioned by Caughey et al. (2003), an important consideration when evaluating child contexts is socioeconomic status (SES). In the current study, the neighborhood strengths, child activities, and community resources factors may all have acted as proxies for SES. The effect of any of these factors on the parent-child relationship and on mental health outcomes may have had more to do with this confound than it did with strengths in the child’s environment.
The sampling methods also included over-sampling children with special healthcare needs, a method that may have introduced a small amount of bias into the study. Parents who completed the survey had to be “familiar with the child’s health” and also had to be willing to fill out a lengthy survey. This may have led to parents self-selecting into the study who would have had higher ratings on certain factors (e.g., parent-child relationship, family strengths) than those who would have declined to participate. As mentioned in the participant characteristics section, this sample is restricted to children living in the U.S. and is not representative of the global population. While some relationships may exist across countries and cultures, future work is needed to evaluate these relationships in samples of children located outside of the U.S.

Implications and Future Directions

This study provides further evidence of the importance of the parent-child relationship in improving child mental health. Only one previous study (Ashiabi & O’Neal, 2015) has attempted to examine this relationship as a proximal process in determining mental health outcomes, and the current study adds to the existing literature supporting this proximal process. As noted by Tudge et al. (2016), the use of a structural equation model allowed for testing multiple relationships simultaneously instead of separately, which is more in line with bioecological theory and further bolsters the evidence supporting this relationship as a central proximal process as first described by Bronfenbrenner & Ceci (1994). The current study adds to a large body of literature related to the importance of strengthening the parent-child relationship in order to improve the mental health of children. These findings support the use of clinical interventions that target improving the parent-child relationship, as outlined by Kaminski et al. (2008). Whether a provider has conceptualized a child’s mental health problems as originating from environmental (e.g., community or neighborhood) factors, the child’s involvement in social
activities, the child’s family, or the support provided to the child’s parent, this study suggests that a worthy target for intervention would be improvement of the child’s relationship with their parent as well as finding ways to improve the parent’s confidence in parenting and to reduce parenting-related frustration.

Future studies should investigate this relationship further including by use of longitudinal methods and in clinical samples. The current study was cross-sectional in nature, and direct causal links could therefore not be established. Future studies that can establish temporal precedence will help to disentangle actual causality from the reverse causality that may have been present in the current study. Using a clinical sample may also help researchers gain more insight into the reduction in severity of mental health problems. In the current study, 95.2% of the sample did not experience chronic headaches, 94.6% did not experience depression, 88.4% did not experience anxiety, 91.5% did not experience behavioral problems, and 87.4% did not experience ADHD. A clinical sample would include individuals with higher baseline levels of the outcomes used in this study and would allow researchers to gain a better understanding of whether improving the parent-child relationship impacts these outcomes over time.

Finally, future studies should continue to utilize the NSCH to understand how relationships between parents and their children are related to a range of outcomes as well as how these relationships change across samples over time. The factors used in this study were based on prior work conducted in a factor analysis context, but the modification indices in the current analysis suggested that certain items (e.g., child mentor loading onto neighborhood strengths instead of parent external support or support from a mental health provider loading onto mental health factors) may adhere to a different structure in the full SEM. Future studies should continue to evaluate optimal factor structures for understanding relationships among the
underlying latent constructs in this survey. Further, these results suggested a somewhat surprising relationship between family strengths and increased mental health symptoms. Continued evaluation of this relationship (e.g., testing for interactions among factors and including relevant covariates) is warranted. The relationships among constructs related to children’s environments and related mental health outcomes can be evaluated using the National Survey of Children’s Health, which is given annually to thousands of children across the entire United States. The current study was thorough in its use of the survey as it related to the hypotheses at hand, but the NSCH holds a wealth of untapped potential for advancing our understanding of the complex relationships among children's environments and their mental health outcomes, and future research should strive to delve deeper into this rich dataset.
CHAPTER FOUR
THE MODERATING EFFECT OF THE CAREGIVER-CHILD RELATIONSHIP:
STRUCTURAL INVARIANCE FOR YOUTH IN IN-HOME AND OUT-OF-HOME PLACEMENT

Introduction

Caregiver-Child Interactions

The relationship with a caregiver is one of the most important in the life of a developing child. From attachment (Bowlby, 1969; Ainsworth, 1989), to family systems (Lebow & Gurman, 1998), to ecological systems (Bronfenbrenner, 1986), incorporating an understanding of the influence that caregivers have on children is ubiquitous across theories of child development. These interactions have been found to predict both positive and negative social behaviors (Ashiabi & O’Neal, 2015) and are often the targets of parent training programs to improve child mental health (Kaminski et al., 2008). Unhealthy attachment to caregivers is associated with internalizing symptoms (Brumariu & Kerns, 2010; Groh et al., 2012) and externalizing behaviors (Fearon et al., 2010). In addition, the parent-child relationship has been shown to mediate the associations between stressful life events (Platt et al., 2016), child maltreatment (Bifulco et al., 2006), and general parenting practices (Chorot et al., 2017) with mental health outcomes.

In general, defining the interactions adults have with children is difficult, and the provision of social support to children is particularly complex and sometimes misconstrued (Gottlieb,
1978; Williams et al., 2004). While social support can be defined as simply “being there” for another person (Coffman & Ray, 1999), understanding an individual’s perception of the relationship in addition to the frequency and availability of contact is important (Rook, 1984). Uchino (2009) outlined a number of reasons single measures of social support do not capture the entirety of the relationship, including the impact stress has on interpretation of support and potential conflictual relationships between provider and receiver of support.

The caregiver-child relationship is particularly complex, as it occurs in multiple contexts and can be understood as a collection of multiple components. Caregivers and children interact as parts of the larger family unit, and the dyadic relationship between caregiver and child are influenced by the larger family context. In addition, an understanding of caregiver involvement in child activities may indicate overall engagement in the child’s life. Understanding caregiver confidence and frustration with the caregiving role may provide insight into the overall child relationship. For these reasons, three different components of the caregiver-child relationship are used in the current study. These include overall family strengths and interactions, caregiver participation in child activities, and quality of the caregiver-child relationship.

**Family Strengths**

One way that caregivers interact with their children is as a member of the overall family unit. Reported family relationship quality has been linked to reductions in mental health problems, while family activities like eating meals together are associated with improved educational outcomes (Rothon et al., 2012) and mental health outcomes (Elgar et al., 2013). Family resilience has been associated with improved mental health outcomes (Gomez, 2021; Bethell et al., 2019), and family-based services are often considered as clinical options to address child mental health problems (Hoagwood et al., 2010).
The ability to talk with caregivers about problems has been indicated as a moderator in the relationship between adverse childhood experiences and emotional and behavior problems (Rebicova et al., 2020). According to family communication patterns theory, one of two processes emerge to create the family’s shared reality: conversation orientation or conformity orientation (Koerner & Fitzpatrick, 2002). Rueter and Koerner (2008) found that conformity orientations, in which parents demand obedience and determine family beliefs, were associated with increased externalizing behaviors in adolescents. This theory suggests a caregiver who is able to encourage all members of the family to discover meanings and solve problems (i.e., one who promotes a conversation orientation) is less likely to experience child behavior problems.

**Caregiver Involvement in Child Activities**

Child participation in activities can reduce perceptions of social isolation, which can improve mental health (Sheikh, 2017). Physical activity has been shown to have positive effects on internalizing symptoms (Biddle & Asare, 2011; Andermo et al., 2020), and activity-based interventions have been shown to benefit children in terms of mental health (Cahill et al., 2020). Above and beyond the impact of the activities themselves, caregiver involvement in activities may provide additional benefits to children (Renaud & Mannoni, 1997), although research in this area is limited.

**Caregiver-Child Relationship Quality**

The way other individuals are evaluated plays a role in how these individuals are represented cognitively (Srull & Wyer, 1989), so understanding an individual’s perception of relationship quality is important for understanding how they view relationships with others. For parents in particular, understanding how they view their role as a caregiver may be reflective of the overall relationship they have with their children. Positive factors such as sharing ideas with
their child and confidence in caregiving abilities in conjunction with negative factors such as frustration with their child provide a thorough picture of the overall relationship. Parental aggravation has been found to be associated with negative mental health outcomes, even above and beyond other indicators such as adverse childhood experiences (Suh & Luthar, 2020). Conversely, positive outcomes are associated with parent confidence in handling child behavior and the willingness to share ideas (Rueter & Koerner, 2008).

**Relationship Quality as a Moderator**

While the associations of mental health outcomes with family strengths, caregiver involvement, and relationship quality have been established in isolation, the understanding of how each impacts child mental health outcomes is incomplete without evaluating interactions among these indicators of relationship strength. Previous research has shown that understanding factors like family functioning and parent-child interactions in conjunction with one another provides unique information about the family as a whole (Hayden et al., 1998). In terms of interactions between these variables, there is also some evidence of their impact on child mental health. Berge et al. (2014) found that parental psychological control moderates the relationship between family functioning and disordered eating behaviors in adolescent girls. In general, relationship quality has been shown to moderate the association between involvement and various outcomes (Kaul & Lakey, 2003; Lutz, 2020), and this general concept may also extend to the caregiver-child relationship.

**Differences across In-home and Out-of-home Placements**

Most studies of the caregiver-child relationship have used samples of children living with their biological parents. The associations described above may not hold for youth who do not live with their parents, i.e., those in out-of-home placements. For example, communication
patterns have been found to differentially affect the mental health of youth in foster families when compared to those living with their birth families (Vuchinich et al., 2002). Depending on the length of time that a child has been living in their out-of-home placement, it is possible that the family “unit” has not been fully developed, and certain communication patterns have not yet emerged or been tailored to the child. The impact of the reasons for the child’s removal from home should also be considered. While not all youth in out-of-home placements are involved in the child welfare system, child welfare data may provide a glimpse into reasons children leave their homes. In 2019, children were removed from their homes for reasons that included neglect (63%), physical abuse (13%), abandonment (5%), and sexual abuse (4%; USDHHS, 2020). These reasons for entry have profound impacts on children and may also impact the child’s ability to form relationships with their new caregivers. Additionally, out-of-home placements are often with older adults, especially grandparents, which introduces other considerations related to the caregivers’ physical health and emotional wellbeing (Joslin & Harrison, 2002). Research related to the differences in these associations across youth in in-home and out-of-home placements is limited and worthy of further study.

**Hypotheses, Aims, and Objectives**

This study explores six aims. The first five aims are confirmatory, examining relationships based on previous literature. The final aim is exploratory in nature and involves identifying differences across youth in in-home and out-of-home placements.

1. Understand the main effect of family strengths on child mental health outcomes
2. Understand the main effect of caregiver-child involvement on child mental health outcomes
3. Understand the main effect of the caregiver-child relationship on child mental health outcomes
4. Understand the interaction between family strengths and the caregiver-child relationship on mental health outcomes

5. Understand the interaction between caregiver-child involvement and the caregiver-child relationship on mental health outcomes

6. Explore differences in the above relationships across children living with their biological parents and children living with non-biological parent caregivers

**Method**

Data used in this study come from the combined 2018-2019 version of the National Survey of Children’s Health (NSCH; Child and Adolescent Health Measurement Initiative, 2019). This survey was previously conducted via telephone and was administered by the Centers for Disease Control in 2003, 2007, and 2012. The current version of the survey is funded by the Health Resources and Services Administration-Maternal and Child Health Bureau and has been administered annually since 2016. Each dataset includes between 20,000 and 50,000 families from across the United States. According to the authors of the survey, using combined (i.e., multi-year) versions allows users to “analyze smaller population groups and rare outcomes that are not sufficiently represented in a single year sample” (U.S. Census Bureau, 2020). Because this study involves youth who are not living with their biological or adopted parents, a small subset of the overall sample, the combined sample is preferred.

**Inclusion and Exclusion**

Families were selected randomly from non-institutionalized households across the United States. Provided that there was at least one child between the ages of 0 and 17 in the household, the family was eligible to participate. Administrative data were used to identify households that were more likely to have children ages 0-17, and the survey over-sampled children with special
healthcare needs, those between the ages of 0 and 5, and those with two or more children. Within each household, one child was randomly selected to be the subject of the survey.

For the purposes of this study, only children between the ages of 6 and 17 were included. The NSCH does not ask questions about parents and children sharing ideas or about child activities if the child is between ages 0 and 5, so these children were excluded from the sample.

**Participant Characteristics**

Participants in this study came from all 50 U.S. states and Washington D.C. At least 615 children from each state were included, with no more than 1033 children from a single state ($M = 847.3$, $SD = 63.0$). 57.4% of the sample was from a metropolitan area. The majority of the sample (75.2%) lived with both of their parents, while 20.3% lived with one parent, and 4.5% lived with neither parent. Participants lived in households that had between 2 and 10 people living there ($M = 4.01$, $SD = 1.11$) with 42.3% having a single child in the household, 38.1% having two children, 13.6% having three children, and 6.0% having four or more children. The majority of the sample (93.4%) came from households where English was the primary language, followed by Spanish (3.3%) and “other” (2.8%).

Participants’ ages ranged from 6 to 17 ($M = 12.11$, $SD = 3.45$), although it should be noted that age was provided as age in years, meaning the average age is a slight underestimate of the true average of the sample. The sample was mostly male (52.1%) and White, non-Hispanic (69.5%). 11.8% of the sample were Hispanic, 6.7% were Black, non-Hispanic, 4.8% were Asian, non-Hispanic, and 7.2% were coded as multiple races or “other.” Most of the participants (95.6%) were born in the United States. Of the 1629 who were not born in the U.S., 96.5% had lived in the country for at least a year. Similarly, the majority of adults who filled out the survey (85.2%) were born in the U.S., and 92.5% had been living in the U.S. since 2000. Therefore,
while this sample includes participants from all across the U.S., it is not representative of the global population.

The ages of the caregivers who filled out the survey ranged from 18 to 75 \((M = 45.00, SD = 8.63)\). The majority of the caregivers who completed the survey were female (68.3%), the child’s biological or adoptive parent (90.6%), married (75.9%), had at least a college education (52.5%), and were employed during the previous year (78.0%).

The caregivers who filled out the survey were asked to identify their relationships to the children as well as any secondary caregivers’ relationships to the children. To answer the research question related to structural differences across those living with and without their parents, the sample was divided into two groups based on the answers to this question. If either caregiver was identified as the biological or adoptive parent, the child was coded as living with a parent. 40,428 participants fell into this category, while 2,031 (4.8%) were coded as not living with a parent.

Of the 2,031 who were not living with their parents, 811 (39.9%) were living with two grandparents, 423 (20.8%) were living with one grandparent only, 132 (6.5%) were living with two “other” relatives, 104 (5.1%) were living with one “other” relative only, and 70 (3.4%) were living with two foster parents. 104 (5.1%) had responses for caregiver one but were missing responses for caregiver two. The distribution of relationships with caregivers is described in Table 15.
Table 15. Caregiver relationships with youth living without their biological or adoptive parent

<table>
<thead>
<tr>
<th>Caregiver 2</th>
<th>Step-parent</th>
<th>Grandparent</th>
<th>Caregiver 1</th>
<th>Foster Parent</th>
<th>Other Relative</th>
<th>Other Non-relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step-parent</td>
<td>42</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Grandparent</td>
<td>7</td>
<td>811</td>
<td>2</td>
<td>27</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Foster Parent</td>
<td>0</td>
<td>3</td>
<td>70</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Other Relative</td>
<td>7</td>
<td>60</td>
<td>1</td>
<td>132</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Other Non-Relative</td>
<td>2</td>
<td>26</td>
<td>3</td>
<td>21</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>No Second Caregiver</td>
<td>49</td>
<td>423</td>
<td>20</td>
<td>104</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

**Sampling Procedures**

Surveys were randomly either mailed to participants or participants were sent instructions to complete the survey online. In the 2018 survey, 71,000 completed a screener survey. Of these, 38,140 were considered eligible, and 30,530 completed the survey. In the 2019 survey, 68,500 completed the screener survey. Of these, 36,196 were considered eligible, and 29,433 completed the survey. Of the 59,963 who completed the survey across the two years of data collection, 16,750 children were removed from the sample because they were under the age of 6, leaving 43,213 children in the study. 21,954 (50.8%) came from the 2018 survey, while 21,259 (49.2%) came from the 2019 survey.

**Measures and Covariates**

The full NSCH questionnaire includes 830 items related to child and family health and well-being. The items used in the current study are those related to each child’s relationship with parents, family strengths, and parent-child involvement as well as their mental health and wellbeing. The factors in this study are based on a principal component analysis conducted by Lutz et al. (2021) using the 2016 version of the NSCH. Five factors were used, including two
predictors, one moderator, and two outcomes. The composition of each factor is described in the sections below:

**Family Strengths**

This factor is made up of five items related to the family’s reaction to problems, problem solving skills, and quality time (i.e., eating meals together). Families with high levels of involvement include the whole family in problem solving. These families prioritize activities like mealtime and utilize their families, of which their children are members, as resources to solve problems. The first four items in this factor were measured using a Likert scale where 1 indicated ‘None of the time’ and 4 indicated ‘All of the time’ (note that this is a reverse-coding from what is in the NSCH). The ‘Eats meals together’ item was re-coded so that ‘0 days’ was a ‘0,’ ‘1-3 days’ was a ‘2,’ ‘4-6 days’ was a ‘5,’ and ‘Every day’ was a ‘7.’ In the 2016 survey, Cronbach’s alpha was 0.62 for the five items related to family strengths, and it is 0.82 in the 2018-2019 survey. Table 16 summarizes factor loadings for each item in both the 2016 and 2018-2019 surveys.

Table 16. Factor loadings for each item on the 2016 and 2018-2019 NSCH for the family strengths factor (FAM)

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Works together to solve problems (WRK)</td>
<td>.863</td>
</tr>
<tr>
<td>Talks together about problems (TLK)</td>
<td>.845</td>
</tr>
<tr>
<td>Draws on strengths to solve problems (STR)</td>
<td>.804</td>
</tr>
<tr>
<td>Stays hopeful in the face of problems (HOP)</td>
<td>.704</td>
</tr>
<tr>
<td>Eats meals together (MEL)</td>
<td>.438</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2018-2019 NSCH. In the confirmatory factor analysis, the model
had a scaled chi square of 1505.86 with 5 degrees of freedom. The model had a robust RMSEA of 0.042, an SRMR of 0.032, a robust CFI of 0.995, and a robust TLI of 0.990. All loadings were statistically significant with p values less than .001. The weights of each item's loading are shown in Figure 21.

Figure 21. Confirmatory factor analysis of the family strengths factor

**Child Activities**

In previous work (e.g., Lutz, 2021), the child activities factor was made up of five items related to the child’s participation in activities including sports, clubs and organizations, the arts, and community service. This factor also included the parents’ level of participation in these activities. In the 2016 survey, Cronbach’s alpha was 0.71 for the five items related to child activities. For the purposes of this study, the child activities themselves are less important, and the level of parent involvement is more related to the research questions. Only the item related to parent involvement will be used in this study. The item ‘Parents attend activities’ was measured using a 1 to 4 Likert scale where 1 indicated ‘Never’ and 4 indicated ‘Always.’
**Caregiver-Child Relationship Quality**

This factor is made up of five items related to caregivers sharing ideas with their children, feeling confident about handling the demands of raising children, and caregivers’ levels of frustration or anger with their children. Because these items are completed by the caregiver, they tap into the caregiver’s perception of their relationship with the child. The items with a negative valence (i.e., ‘Child bothers parent,’ ‘Child is hard to care for,’ ‘Angry with child’) were measured using a 1 to 4 Likert scale where 1 indicated ‘Never’ and 4 indicated ‘Always.’ The items with a positive valence (i.e., ‘Shares ideas with child’ and ‘Can handle demands of raising children’) were measured using a Likert scale where 1 indicated ‘Not at all’ and 4 indicated ‘Very well.’ In the 2016 survey, Cronbach’s alpha was 0.79 for the five items related to the caregiver-child relationship, and it is 0.79 in the 2018-2019 survey. Table 17 summarizes factor loadings for each item in both the 2016 and 2018-2019 surveys.

Table 17. Factor loadings for each item on the 2016 and 2018-2019 NSCH for the caregiver-child relationship factor (PCR)

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016</td>
</tr>
<tr>
<td>Child bothers caregiver (BTH)</td>
<td>.818</td>
</tr>
<tr>
<td>Child is hard to care for (HRD)</td>
<td>.788</td>
</tr>
<tr>
<td>Angry with child (ANG)</td>
<td>.725</td>
</tr>
<tr>
<td>Shares ideas with child (SHR)</td>
<td>-.535</td>
</tr>
<tr>
<td>Can handle demands of raising children (HDL)</td>
<td>-.511</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2018-2019 NSCH. In the confirmatory factor analysis, the model had a scaled chi square of 3170.16 with 5 degrees of freedom. The model had a robust RMSEA of 0.072, an SRMR of 0.053, a robust CFI of 0.977, and a robust TLI of 0.955. All loadings were
statistically significant with p values less than .001. The weights of each item's loading are shown in Figure 22.

**Figure 22. Confirmatory factor analysis of the caregiver-child relationship factor**

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**Internalizing Symptoms**

This factor is made up of three items related to parent-rated severity of child anxiety, child depression, and child somatic symptoms (i.e., headaches). Parents were asked about each item in three parts. First, they were asked whether the child had ever experienced symptoms. Then, they were asked whether the child was experiencing symptoms at the time the survey was completed. Finally, they were asked the current severity of the child’s symptoms. If they answered ‘no’ to either of the first two questions, they were marked as a ‘0’ on the scale (i.e., no symptoms ever and no current symptoms were both treated as ‘0’). Each item was rated on a 0-3 scale, with ‘0’ indicating no symptoms, ‘1’ indicating mild symptoms, ‘2’ indicating moderate symptoms, and ‘3’ indicating severe symptoms. In the 2016 survey, Cronbach’s alpha was 0.55
for the three items related to internalizing symptoms, and it is 0.58 in the 2018-2019 survey.

Headaches, which represent somatic symptoms that often accompany child internalizing symptoms, had a lower loading than the other two items. Table 18 summarizes factor loadings for each item in both the 2016 and 2018-2019 surveys.

Table 18. Factor loadings for each item on the 2016 and 2018-2019 NSCH for the internalizing symptoms factor (INT)

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings 2016</th>
<th>Loadings 2018-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety (ANX)</td>
<td>.931</td>
<td>.861</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td>.712</td>
<td>.849</td>
</tr>
<tr>
<td>Headaches/Migraines (HED)</td>
<td>.267</td>
<td>.465</td>
</tr>
</tbody>
</table>

Additionally, a confirmatory factor analysis using diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was conducted for the 2018-2019 NSCH. Because there are only three items in this factor, this analysis is just-identified, and all fit statistics indicate perfect fit. The weights of each item's loading are shown in Figure 23.

Figure 23. Confirmatory factor analysis of the internalizing symptoms factor
**Externalizing Behaviors**

This factor is made up of two items related to parent-rated severity of ADHD and behavioral or conduct problems. Each item was rated on the same 0 to 3 scale as the internalizing symptom items. In the 2016 survey, Cronbach’s alpha was 0.72 for the two items related to externalizing behaviors, and it is 0.71 in the 2018-2019 survey. Table 19 summarizes factor loadings for each item in both the 2016 and 2018-2019 surveys.

Table 19. Factor loadings for each item on the 2016 and 2018-2019 NSCH for the externalizing behavior factor (EXT)

<table>
<thead>
<tr>
<th>Item</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016</td>
</tr>
<tr>
<td>ADHD (ADD)</td>
<td>.936</td>
</tr>
<tr>
<td>Behavioral/Conduct problems (BEH)</td>
<td>.719</td>
</tr>
</tbody>
</table>

A confirmatory factor analysis could not be conducted for this factor, since it only has two items and is therefore under-identified. This factor will still be a part of the larger analysis. Two-item factors can be used in SEM analysis, given that there are two or more factors where each has two or more indicators (Kline 2016).

**Data Collection**

Invitations to participate in the NSCH were sent to households by mail. A screener questionnaire was completed by web or mail by an adult who is “familiar with the child’s health and healthcare,” which was typically a parent or guardian of the child. The screener asked for information about all children ages 0-17 who lived in the household. If a child was identified, parents who were completing the screener online were immediately directed to the age-appropriate detailed questionnaire about their child. If there was more than one child, one of the identified children was randomly selected. If parents completed the screener by mail, the full questionnaire was mailed to them at a later date. For the 2018 NSCH, 71,000 screeners were
completed between June 2018 and January 2019, and 30,530 completed the questionnaire. For the 2019 NSCH, 68,500 screeners were completed between June 2019 and January 2020, and 29,433 completed the survey. In sum, 59,963 families completed the survey, and 43,213 children were within the desired age range (6-17) and were included in the study.

Table 20 describes the pattern of missingness for each factor as well as for the overall dataset. Many of the factors had a large proportion of missingness that came from individuals who skipped entire sections of the questionnaire (i.e., participants who were “completely missing” and skipped all items within a factor). Overall, 40,109 (92.8%) of the participants had no missing data.

Table 20. Missingness across factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Complete Data (%)</th>
<th>Cases with any missing (n)</th>
<th>Completely missing (n)</th>
<th>Completely missing (% of any missing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Symptoms</td>
<td>98.6%</td>
<td>620</td>
<td>24</td>
<td>3.87%</td>
</tr>
<tr>
<td>Ext. Behaviors</td>
<td>98.1%</td>
<td>812</td>
<td>24</td>
<td>2.96%</td>
</tr>
<tr>
<td>Fam. Inv.</td>
<td>97.2%</td>
<td>1196</td>
<td>458</td>
<td>39.62%</td>
</tr>
<tr>
<td>Caregiver Inv.</td>
<td>98.9%</td>
<td>479</td>
<td>479</td>
<td>100.00%</td>
</tr>
<tr>
<td>C-C Relation.</td>
<td>97.7%</td>
<td>1013</td>
<td>348</td>
<td>34.35%</td>
</tr>
<tr>
<td>Overall</td>
<td>92.8%</td>
<td>3104</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics was used for the analysis. This strategy was employed using the command “estimator = "WLSMV"” in the lavaan package in R (Rosseel 2012). This estimator replaced missing data using robust WLS estimation. No patterns of missingness were detected to suggest the data were missing not at random.

**Analytic Strategy**

Structural Equation Modeling (SEM) was used to examine the moderating effect of the caregiver-child relationship on the association between family strengths and mental health...
outcomes as well as on the association between caregiver-child involvement and mental health outcomes. Child sex and child age were included as covariates. In addition, structural invariance was examined across youth living in homes with at least one biological or adoptive parent and those living without any parent in the home. Through evaluating differences in pathways across these two subsamples, this study addresses research questions related to nuances for youth in in-home (i.e., with a biological or adoptive parent) and out-of-home living situations. Figure 24 shows the conceptual and full structural models for the moderation.

Figure 24. Conceptual and structural models for the proposed analysis
Results

Statistics and Data Analysis

Bivariate Correlations

Prior to conducting the SEM analysis, bivariate Spearman correlation analyses were conducted for each pair of variables that were used in the full model. Figure 25 shows a visualization of the relationships between these variables. Dark black boxes are used to separate the factors.

Figure 25. Bivariate correlations among items used in the analysis
Correlations ranged from -0.37 to 0.84. Of the 171 correlations, 24 were greater than 0.25, while 10 were greater than 0.5. Only 5 of the correlations were less than -0.25, while 0 were less than 0.5. The 15 strongest and 15 weakest correlations are shown in Figure 26.

Figure 26. Strongest positive and strongest negative bivariate correlations
The twelve strongest positive correlations came from items within the same factor. The thirteenth, fourteenth, and fifteenth strongest correlations came from parent-child relationship items being correlated with an externalizing behavior item and two family strengths items. The only items with negative valence in the dataset were the ones in the parent-child relationship factor, and the mental health outcomes, so it is expected that many of the strongest negative correlations would come from these factors. The six strongest negative correlations were all from items within the parent-child relationship factor (all of the possible negative relationships within that factor). While some insights can be gained from evaluating the bivariate correlations between items, the structural equation model allows for the measurement of underlying latent factors and relationships between those factors.

**Structural Equation Models**

The structural equation model shown in Figure 4 represents the hypothesized model. In all analyses, diagonally weighted least squares estimation with robust standard errors and scale-shifted mean- and variance-adjusted test statistics were used. All SEM analyses were conducted using the lavaan package in R (Rosseel, 2012).

Prior to conducting the analyses, all items that loaded onto the predictors and the moderator were mean centered by subtracting each item’s mean from all values within that item. Interaction terms were then created using the indProd function from the semTools package in R (Jorgensen et al., 2022) using the unconstrained approach (Marsh et al., 2004). This resulted in 5 interaction term items for the interaction of the parent-child relationship with parent attendance at events (i.e., caregiver involvement) and 25 interaction term items for the interaction of the parent-child relationship with family strengths.
In the SEM analysis, the model had a scaled chi square of 29,861.34 with 1061 degrees of freedom. The model had a robust RMSEA of 0.033, an SRMR of 0.083, a robust CFI of 0.889, and a robust TLI of 0.883. The model had $R^2$ values of 0.192 and .287 for internalizing symptoms and externalizing behaviors respectively. The full model was plotted using the semPlot package in R (Epskamp, 2015) and is shown in Figure 27.
Figure 27. Full structural equation model to test moderation hypotheses
The regression weights for each outcome, internalizing symptoms and externalizing behaviors, are shown in Table 21. In the analysis of the effects on internalizing symptoms, all main effects were significant ($p < .001$). Additionally, the interaction between family strengths and the parent-child relationship was significant ($p < .001$). However, the interaction between caregiver involvement and the parent-child relationship was not significant ($p = .427$).

In the analysis of the effects on externalizing behaviors, all main effects except age were significant with $p < .001$, and age was significant with $p = .003$. Interaction effects were significant for both the interaction between family strengths and the parent-child relationship ($p = .023$) and the interaction between caregiver involvement and the parent-child relationship ($p = .026$).

Table 21. Regression effects for internalizing symptoms and externalizing behaviors

<table>
<thead>
<tr>
<th>Internalizing Symptoms</th>
<th>Predictor</th>
<th>Estimate</th>
<th>SE</th>
<th>Z</th>
<th>p</th>
<th>Standardized effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Strengths (FAM)</td>
<td>0.038</td>
<td>0.006</td>
<td>6.066</td>
<td>0.000</td>
<td>0.049</td>
<td></td>
</tr>
<tr>
<td>Caregiver Involvement (ATT)</td>
<td>-0.048</td>
<td>0.004</td>
<td>-10.836</td>
<td>0.000</td>
<td>-0.084</td>
<td></td>
</tr>
<tr>
<td>Parent-child Relationship (PCR)</td>
<td>-0.453</td>
<td>0.015</td>
<td>-31.205</td>
<td>0.000</td>
<td>-0.383</td>
<td></td>
</tr>
<tr>
<td>FAM x PCR interaction</td>
<td>0.097</td>
<td>0.016</td>
<td>5.901</td>
<td>0.000</td>
<td>0.068</td>
<td></td>
</tr>
<tr>
<td>ATT x PCR interaction</td>
<td>0.011</td>
<td>0.013</td>
<td>0.795</td>
<td>0.427</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.024</td>
<td>0.001</td>
<td>30.861</td>
<td>0.000</td>
<td>0.177</td>
<td></td>
</tr>
<tr>
<td>Sex (m = 1, f = 2)</td>
<td>0.056</td>
<td>0.005</td>
<td>10.506</td>
<td>0.000</td>
<td>0.061</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Externalizing Behaviors</th>
<th>Predictor</th>
<th>Estimate</th>
<th>SE</th>
<th>Z</th>
<th>p</th>
<th>Standardized effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Strengths (FAM)</td>
<td>0.113</td>
<td>0.006</td>
<td>19.776</td>
<td>0.000</td>
<td>0.164</td>
<td></td>
</tr>
<tr>
<td>Caregiver Involvement (ATT)</td>
<td>-0.045</td>
<td>0.004</td>
<td>-11.158</td>
<td>0.000</td>
<td>-0.087</td>
<td></td>
</tr>
<tr>
<td>Parent-child Relationship (PCR)</td>
<td>-0.597</td>
<td>0.016</td>
<td>-38.437</td>
<td>0.000</td>
<td>-0.563</td>
<td></td>
</tr>
<tr>
<td>FAM x PCR interaction</td>
<td>0.032</td>
<td>0.014</td>
<td>2.268</td>
<td>0.023</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>ATT x PCR interaction</td>
<td>0.028</td>
<td>0.012</td>
<td>2.226</td>
<td>0.026</td>
<td>0.028</td>
<td></td>
</tr>
<tr>
<td>Predictor</td>
<td>Estimate</td>
<td>SE</td>
<td>Z</td>
<td>p</td>
<td>Standardized effect</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>----------</td>
<td>-----</td>
<td>-------</td>
<td>-------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.002</td>
<td>0.001</td>
<td>-2.976</td>
<td>0.003</td>
<td>-0.016</td>
<td></td>
</tr>
<tr>
<td>Sex (m = 1, f = 2)</td>
<td>-0.113</td>
<td>0.005</td>
<td>-23.918</td>
<td>0.000</td>
<td>-0.138</td>
<td></td>
</tr>
</tbody>
</table>

In order to further understand the interaction effects and their relationships with the outcomes, the `lavPredict` function was used in R (Rosseel, 2012) to extract factor score estimates for each of the participants in the study. These estimates could then be used to plot the estimated interaction effect of the parent-child relationship on the association between each predictor and each outcome.

Figure 28 shows the estimated relationship between family strengths and each outcome (internalizing symptoms on the left and externalizing behaviors on the right), separated using various levels of the parent-child relationship factor (e.g., 2 SDs below average, 1 SD below average, etc.). This plot helps to illustrate the interaction effect that was detected in the larger model. It should be noted that this illustration is not perfect and is limited by the data. Even though the sample was large, there were no cases where the parent-child relationship was greater than 2 SD above the mean in which family strengths were estimated to be below 0 (i.e., the mean value). This limitation may be leading to challenges in detecting interaction effects at lower levels of family strengths. For the interaction that was detected, Figure 8 shows that there is a positive relationship between family strengths and both outcomes at lower levels of the parent-child relationship. That is, when parents and children have poor relationships, and their family units still solve problems together, eat meals together, and are high on general family strengths, children tend to experience higher levels of both internalizing symptoms and externalizing behaviors.
Figure 28. Estimated interaction effects between family strengths and the parent-child relationship

![Graph showing interaction effects between family strengths and outcomes.]

Figure 29 shows the estimated relationship between caregiver involvement (or parent attendance) and each outcome. In this case, the interaction effects are not as clear. For internalizing symptoms, the full model suggested there was no interaction ($p = .427$), so it is unsurprising that only main effects are evident in the plot on the left. The full model did detect an interaction effect when externalizing behaviors was the outcome, however ($p = .026$). The plot on the right does not highlight a clear interaction effect, although it is possible that the line representing one standard deviation below the average parent-child relationship has a slightly negative slope, while the others are close to zero or are even slightly positive.
Differences Across Home Status

To evaluate the exploratory hypothesis related to differences in these relationships across children living with their biological parents and children living with non-biological parent caregivers, multigroup invariance SEM methods were utilized. First, three models were created, one with identical factor structure across both groups (i.e., configural invariance), one with factor loadings constrained to be equal across both groups (i.e., weak invariance), and one with factor loadings and intercepts constrained to be equal across both groups (i.e., strong invariance). Using the anova function in R, both weak invariance ($\Delta X^2(39) = 41.39 \ p = .367$) and strong invariance ($\Delta X^2(79) = 90.17 \ p = .183$) were supported, suggesting the way the items load onto the factors does not differ across the two groups, and the latent constructs can be compared across children in the homes of their biological parents and those who are not.

Next, an additional model was created with the regression pathways allowed to be freely estimated across groups. When comparing this model to the one in which all paths were
constrained to be equal across groups, a statistically significant difference was detected ($\Delta X^2(14) = 48.67 \ p < .001$). This suggests that the associations among the factors are different depending on whether a child lives with their biological parents or not. Table 22 displays the standardized loadings and $p$ values across each group as well as the difference in standardized loadings between the two, sorted by the absolute value of the difference.

Table 22. Regression loadings across children living with biological parents and those living with non-biological caregivers

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Biological Parent</th>
<th></th>
<th>Non-biological Caregiver</th>
<th></th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized Path</td>
<td>$p$</td>
<td>Standardized Path</td>
<td>$p$</td>
<td></td>
</tr>
<tr>
<td>INT~FAM.PCR</td>
<td>0.078</td>
<td>0.000</td>
<td>-0.046</td>
<td>0.331</td>
<td>0.124</td>
</tr>
<tr>
<td>INT~PCR</td>
<td>-0.375</td>
<td>0.000</td>
<td>-0.493</td>
<td>0.000</td>
<td>0.117</td>
</tr>
<tr>
<td>EXT~PCR</td>
<td>-0.557</td>
<td>0.000</td>
<td>-0.671</td>
<td>0.000</td>
<td>0.114</td>
</tr>
<tr>
<td>EXT~FAM.PCR</td>
<td>0.034</td>
<td>0.004</td>
<td>-0.054</td>
<td>0.171</td>
<td>0.088</td>
</tr>
<tr>
<td>INT~ATT</td>
<td>-0.077</td>
<td>0.000</td>
<td>-0.145</td>
<td>0.000</td>
<td>0.068</td>
</tr>
<tr>
<td>EXT~sex</td>
<td>-0.135</td>
<td>0.000</td>
<td>-0.202</td>
<td>0.000</td>
<td>0.067</td>
</tr>
<tr>
<td>EXT~ATT.PCR</td>
<td>0.015</td>
<td>0.250</td>
<td>0.076</td>
<td>0.098</td>
<td>-0.061</td>
</tr>
<tr>
<td>INT~sex</td>
<td>0.064</td>
<td>0.000</td>
<td>0.006</td>
<td>0.836</td>
<td>0.058</td>
</tr>
<tr>
<td>EXT~ATT</td>
<td>-0.078</td>
<td>0.000</td>
<td>-0.132</td>
<td>0.000</td>
<td>0.054</td>
</tr>
<tr>
<td>INT~FAM</td>
<td>0.046</td>
<td>0.000</td>
<td>0.091</td>
<td>0.023</td>
<td>-0.046</td>
</tr>
<tr>
<td>EXT~FAM</td>
<td>0.161</td>
<td>0.000</td>
<td>0.198</td>
<td>0.000</td>
<td>-0.037</td>
</tr>
<tr>
<td>EXT~age</td>
<td>-0.013</td>
<td>0.025</td>
<td>-0.042</td>
<td>0.099</td>
<td>0.029</td>
</tr>
<tr>
<td>INT~age</td>
<td>0.177</td>
<td>0.000</td>
<td>0.197</td>
<td>0.000</td>
<td>-0.020</td>
</tr>
<tr>
<td>INT~ATT.PCR</td>
<td>0.005</td>
<td>0.662</td>
<td>0.020</td>
<td>0.717</td>
<td>-0.014</td>
</tr>
</tbody>
</table>

Discussion

Support of Original Hypotheses

The study aimed to evaluate the moderating role of the parent-child relationship on associations between family strengths and mental health outcomes as well as between caregiver
involvement and mental health outcomes as well as how these relationships differed based on whether a child lived with their biological parents. The study evaluated the following aims, each of which is explored in the subsequent sections:

1. Understand the main effect of the caregiver-child relationship on child mental health outcomes
2. Understand the main effect of family strengths on child mental health outcomes
1. Understand the main effect of caregiver involvement on child mental health outcomes
2. Understand the interaction between family strengths and the caregiver-child relationship on mental health outcomes
3. Understand the interaction between caregiver-child involvement and the caregiver-child relationship on mental health outcomes
4. Explore differences in the above relationships across children living with their biological parents and children living with non-biological parent caregivers

**Caregiver-Child Relationship Quality**

Across all analyses, the quality of the caregiver-child relationship was consistently the strongest predictor of mental health outcomes. As a main effect, the caregiver-child relationship quality was strongly negatively associated with the severity of both internalizing symptoms and externalizing behaviors. This relationship existed in the full model, which controlled for family strengths, caregiver involvement, age, sex, and the two interaction effects. This effect held across children who were living with their biological parents and those who were not.

These findings are in line with previous research, which suggests associations among parental aggravation with negative mental health outcomes (Suh & Luthar, 2020), parent confidence and idea sharing with positive outcomes (Rueter & Koerner, 2008), and insecure
attachment with negative mental health outcomes (Burmariu & Kerns, 2010; Groh et al., 2012; Fearon et al., 2012). It is also in line with the multiple theories that support the importance of the caregiver-child relationship (Bowlby, 1969; Ainsworth, 1989; Lebow & Gurman, 1998; Bronfenbrenner, 1986) and the importance of targeting this relationship in interventions (Kaminski et al., 2008). As supported by this large body of literature, the current study indicates the impact of the caregiver-child relationship on child mental health.

**Family Strengths**

**Main Effects.** The main effects of family strengths on both internalizing symptoms and externalizing behaviors had mixed results depending on the model being used. In models without the caregiver-child relationship included, family strengths consistently had a significant negative effect on both internalizing symptoms and externalizing behaviors, even when controlling for age and sex. The incorporation of the caregiver-child relationship resulted in this effect diminishing, or in some cases becoming a positive effect (i.e., more family strengths leading to more severe mental health symptoms). These results suggests that, without considering the strength of the caregiver-child relationship, more family strengths typically result in positive mental health outcomes for children. When the quality of the caregiver-child relationship is taken into account, however, these interactions among family members may not play a protective role above and beyond the role that the caregiver-child relationship plays. When considering the interaction, additional patterns emerge.

**Interaction Effects.** The interaction effects were significant for both internalizing symptoms and externalizing behaviors. For both outcomes, when the caregiver-child relationship was average or above average, mental health symptoms remained low across all levels of family interaction. When the caregiver-child interaction was one or two standard deviations below the
mean, however, higher levels of family interaction were associated with a higher level of mental health severity. This suggests that family strengths, which involve problem solving and spending quality time (i.e., meals) together, may lead to more severe internalizing symptoms and externalizing behaviors in cases when caregivers have negative relationships with their children (i.e., feeling bothered or frustrated by their child, lacking confidence in parenting, or lacking a willingness to share ideas and talk with their child). While this interaction effect was significant for children living with their biological parents, the interactions were not significant in the analysis of structural invariance for children who were living with a non-biological parent caregiver, which is discussed further in a later section.

These findings are in line with previous research. The main effects of family strengths on mental health symptoms are consistent with literature supporting relationships between mental health outcomes and quality time (Elgar et al., 2013), family resilience (Gomez, 2021; Bethell et al., 2019), and discussing problems as a family (Rebicova et al., 2020). Additionally, the interaction effects detected are in line with family communications pattern theory (Koerner & Fitzpatrick, 2002). Caregivers who have high quality relationships with their children are likely to solve problems using a conversation orientation, while those who have lower levels of relationship quality may utilize the conformity orientation, which has been associated with negative mental health outcomes (Rueter & Koerner, 2008).

**Caregiver Involvement**

**Main Effects.** The main effect of caregiver involvement was consistent across all models, but it was small in each case. All effects were negative, suggesting that more caregiver involvement was associated with fewer mental health symptoms. This relationship held across children who were living with their biological parents and those who were not.
**Interaction Effects.** The interaction effects were significant for externalizing behaviors but not for internalizing symptoms. When probing the interactions, there was not a clear pattern that emerged. While it may be possible that the caregiver-child relationship does interact with caregiver involvement in predicting mental health outcomes, the effect is not clear in the current data. Neither of the interactions were significant in the analysis of structural invariance across children living in homes of their biological parents and those who are not.

The findings related to the main effects are in line with previous research, which suggests caregiver participation in activities has a positive effect on child mental health (Renaud & Mannoni, 1997). Previous research has supported the idea that general relationship quality may moderate the association between involvement and various outcomes (Kaul & Lakey, 2003; Lutz, 2020), but this relationship had not been examined in the caregiver-child context. The measurement of the caregiver involvement variable may have impacted the ability to detect an effect, which is discussed further in the limitations section.

**Differences across Home Status**

The results of the analyses suggest that strong measurement invariance exists across children living in the homes of their biological parents and those who are not. This indicates that the measurement of the constructs is consistent regardless of home status, and the underlying constructs are directly comparable in this study.

Differences do exist, however, in the way these latent constructs are related to one another. The largest difference was in the strength of the interaction effect between family strengths and the caregiver-child interaction and its association with internalizing symptoms. This interaction, which was significantly positive for children in homes of their biological parents, was not significant for children in non-biological caregivers’ homes. The same pattern
existed when evaluating this interaction’s effect on externalizing behaviors, albeit to a smaller
degree. The main effects of the parent-child relationship on both internalizing symptoms and
externalizing behaviors were stronger for those in homes of non-biological caregivers. Similarly,
the main effects of caregiver involvement were stronger for both outcomes for this group. Sex
effects were stronger for the non-biological caregiver group for externalizing behaviors (i.e.,
boys having higher externalizing behaviors) but were stronger for the biological parent group for
internalizing symptoms (i.e., girls having more internalizing symptoms, an effect that did not
exist in the non-biological caregiver group). In the structural invariance analysis, the interaction
between caregiver involvement and the parent-child relationship was not significantly associated
with either outcome. The main effects of family strengths and age were similar across the two
groups and represented the lowest differences.

These findings were part of an exploratory analysis, but they are in line with previous
research in some ways. For example, previous research has supported the idea that
communication patterns have different impacts on mental health across children in foster homes
and those in biological family homes (Vuchinich et al., 2002). These differences in
communication patterns may be driving the differences in interaction effects between family
strengths and caregiver-child relationship quality. Additionally, both caregiver-child relationship
quality and caregiver involvement in child activities played larger protective roles against mental
health symptoms for children not in the homes of their biological parents. These protective
factors may be even more important for these children, who typically exit the care of their
biological parents for negative reasons (USDHHS, 2020) and may be at higher risk for mental
health problems.
Limitations and Generalizability

One of the greatest strengths of the survey used in the study, the NSCH, is its size and its thorough recruitment strategies. In the 2018-2019 combined survey, every state in the United States was represented by 600 or more families, and the sample was mostly representative of the population at large. One of the survey’s weaknesses, however, is that it is given once annually, and participants are not tracked over time. While it is possible that the same individuals are represented across samples, there is no way to link individuals across different years of the survey. This reduces any researcher’s ability to detect truly causal relationships, as temporal precedence cannot be established. This is one of the greatest limitations of the current study. The model was specified to suggest mental health outcomes were caused by the predictors, but it is possible that certain items that loaded onto the factors were caused by child mental health problems. In particular, the caregiver-child relationship items, which included items related to parent frustration and confidence in parenting, could reasonably have been caused by high levels of child mental health symptoms. Similarly, family strengths, which involved items related to solving problems together, may have been impacted by the severity of a child’s mental health symptoms.

The way caregiver involvement was measured may have impacted the ability to detect effects related to this construct. The single item that loaded onto this factor was the Likert scale item ‘Parents attend activities,’ which captures only one dimension of caregiver involvement. It also requires the child to be involved in an activity that encourages parent attendance and a caregiver who has the ability to attend events. There are undoubtedly several other ways a caregiver could be involved in a child’s life that are not captured by this one item (e.g., spending quality time, helping with homework, transporting children to school, etc.).
The sampling methods also included over-sampling children with special healthcare needs, a method that may have introduced a small level of bias into the study. Parents who completed the survey had to be “familiar with the child’s health” and also had to be willing to fill out a lengthy survey. This may have led to parents self-selecting into the study who would have had higher ratings on certain factors (e.g., parent-child relationship, family strengths) than those who would have declined to participate. As mentioned in the participant characteristics section, this sample is restricted to children living in the U.S. and is not representative of the global population. While some relationships may exist across countries and cultures, future work is needed to evaluate these relationships in samples of children located outside of the U.S.

**Implications and Future Directions**

Broadly, the results of this study underline the importance of the caregiver-child relationship, as measured by low levels of parent frustration, high levels of confidence in parenting, and willingness to share ideas with a child. The quality of this relationship is directly related to mental health outcomes above and beyond all other predictors, including child age, child sex, family strengths, and caregiver involvement. Additionally, when the caregiver-child relationship is below average, increases in family strengths such as discussing problems and spending quality time are associated with worse mental health outcomes. The main effects of the caregiver-child relationship, family strengths, and caregiver involvement exist across children in the homes of their biological parents and those who are not. For children living with non-biological parent caregivers, these factors may be even more important in protecting against negative mental health outcomes. This is particularly important for youth in out-of-home placements, who may be at a higher risk of developing more severe mental health problems.
Future work should continue to explore the interactions between the caregiver-child relationship and various predictors of mental health. For children in particular, the relationships they have with their caregivers play an important role in development across multiple areas and particularly in a child’s mental health. To detect causal relationships, future studies should incorporate longitudinal designs and methods capable of determining causality. While the use of secondary data analysis in the current study allowed for a large random sample of the U.S. population that likely could not have been achieved in an experimental design, use of experimental methods could further disentangle the relationships evaluated in this study. Additionally, the measures used in the current study were designed for purposes unrelated to the hypotheses at hand. Designing surveys and measures with hypotheses related to the moderating effect of the caregiver-child relationship will aid future work. Specifically, attempting to use comprehensive measures (e.g., more than one item that measures caregiver involvement) will help to capture a richer understanding of each factor. Additionally, when developmentally appropriate, measures should be given to children to understand dyadic effects of the caregiver-child relationship. Structural equation models should continue to be used in future work related to this topic. These methods not only have the advantage of allowing the use of latent constructs, but they also can be used to evaluate longitudinal outcomes, simultaneously test multiple mediation pathways, and examine invariance.

The findings from this study suggest that the caregiver-child relationship is a worthy avenue for future research. Across children in in-home and out-of-home placements, this relationship emerges as one of the fundamental pathways by which researchers, clinicians, and other stakeholders can understand and improve child mental health.
CHAPTER FIVE

GENERAL DISCUSSION

Integrated Findings

Broadly, this dissertation aimed to investigate how the relationships that children have with adult family members impact mental health outcomes, including internalizing symptoms and externalizing behaviors. Using a child-welfare-involved sample of children in Illinois and two larger samples of children across the United States, this bundled dissertation evaluated engagement of the extended family, the importance of the parent-child relationship in the context of other factors, nuances in the way social support is measured, and how these relationships differ across children who do and do not live in the homes of their biological parents.

The first study utilized a sample of 133 children in DCFS custody in Illinois and their 495 family members who provided varying levels of support during each child’s time in custody. Importantly, this study highlighted the need to understand children’s levels of satisfaction with these relationships. The study found that the impact of the provision of support on internalizing symptoms may differ as a function of relationship satisfaction. Simply increasing levels of support is not beneficial and may actually be detrimental for children who have lower levels of satisfaction with relatives. Decision makers in the child welfare system, therefore, should work to engage kin with whom children have existing positive relationships. Additionally, efforts should be made to improve relationship satisfaction with kin who are already involved.
The second study evaluated the importance of the parent-child relationship using a sample of 15,438 children from the National Survey of Children’s Health (NSCH), a nationwide U.S. study of child health. The study found that the parent-child relationship was the variable most strongly associated with mental health symptoms across all analyses. Further, the parent-child relationship mediated the relationship between all five other predictors and both of the mental health outcomes. This study places the parent-child relationship in the center of the associations between contextual factors and mental health outcomes, supporting its status as a proximal process. This relationship should be considered one of the primary targets for improving child mental health. By supporting parent confidence, encouraging willingness to share ideas with their children, and reducing negative aspects of parenting, one can support overall child mental health.

The final paper used a two-year combined version of the NSCH that included 43,213 children from across the U.S. This study was a blend of the ideas in papers one and two; it used the factors from paper two to understand how caregivers’ perceptions of the relationships they have with children moderate the impacts of family strengths and caregiver involvement on mental health outcomes. The study resulted in significant interaction effects between the parent-child relationship and family strengths, suggesting family strengths (e.g., working together to solve problems, spending quality time, etc.) are associated with more mental health symptoms when children and parents have conflictual relationships. As was suggested in the first paper, this study found that negative outcomes may come from simply encouraging families to engage children in problem solving or to spend time together without ensuring positive relationships exist between children and their caregivers. This study did not result in a clear interaction
between caregiver involvement and the caregiver-child relationship, but this factor was measured by a single item that may not have captured this relationship in its entirety. This study also compared these relationships across children in the homes of their biological parents and in non-biological-caregiver homes. Findings suggested the items loaded onto the factors in the same way across both groups, meaning the underlying latent constructs existed and could be measured in the same way for these groups. However, the relationships among latent constructs did differ across groups. For children not in the care of their biological parents, the caregiver-child relationship and caregiver involvement both had stronger standardized effects on mental health outcomes, suggesting strong relationships with caregivers are especially important when children are not in the care of their biological parents. This study suggests this relationship is important for all children, but special attention should be paid to the caregiver-child relationship when children are in the homes of non-biological-parent caregivers.

Implications

Broadly, these papers add to the large body of literature supporting the presence of caring adults in the lives of children. Whether it is an extended family member, a biological parent, or a non-biological-parent caregiver, all of these individuals can have positive effects on the mental health of children. The most important of these relationships is the caregiver-child relationship, and this relationship continues to emerge as a worthy target of intervention to reduce child mental health problems. This dissertation supports the idea that perceptions of relationships are important both from a caregiver’s perspective and a child’s perspective. Helping children to perceive positive relationships with the adults in their lives and helping caregivers to be
confident and effective in their parenting are two routes by which clinicians and other stakeholders can aid child psychopathology.

**Future Directions**

These studies, while informative, are just the tip of the iceberg in terms of understanding the myriad of ways caring adults can have impacts on child mental health. To continue to evaluate these relationships, longitudinal studies that measure support from children’s immediate and extended family members and how these relationships impact mental health should be conducted. While this dissertation supported the idea that positive relationships, both in terms of level of involvement and individual perceptions of relationships, are important, it did not investigate exactly how these relationships have impacts on child mental health. Additionally, it did not outline the ways relationship quality can be bolstered. Further investigations of interventions that can target the parent-child relationship and engagement of extended family members are warranted. These studies did not incorporate an understanding of how these relationships differed across demographic factors, and it is likely that various intersectionalities (e.g., gender, race, sexuality, religion/spirituality, etc.) may result in differential impacts of these relationships on child mental health. While this dissertation has revealed multiple insights in understanding the impact of children’s relationships, the work in this area is just beginning, and the best is yet to come.
REFERENCE LIST


Child and Adolescent Health Measurement Initiative (CAHMI) [(Publication Year)]. [Year and name of survey], [(SAS/SPSS/Stata)] Indicator Data Set. Data Resource Center for Child and Adolescent Health supported by Cooperative Agreement from the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA), Maternal and Child Health Bureau (MCHB). Retrieved from www.childhealthdata.org


Kingsbury, M., Clayborne, Z., Colman, I., & Kirkbride, J. B. (2020). The protective effect of neighborhood social cohesion on adolescent mental health following stressful life events. *Psychological Medicine, 50*(8), 1292–1299. https://doi.org/10.1017/S0033291719001235


VITA

Dr. Nathan Lutz was born and raised in Columbus, Ohio. Prior to attending Loyola University Chicago, Dr. Lutz attended Miami University in Oxford, Ohio, where he earned a Bachelor of Arts in Psychology with a minor in Neuroscience in 2015. From 2015-2017, he worked at Cincinnati Children’s Hospital Medical Center as a clinical research coordinator. Dr. Lutz began graduate school at Loyola in August 2017. He earned his Master of Arts in Clinical Psychology in 2020 and his Master of Science in Applied Statistics in 2022. While at Loyola, Dr. Lutz won the annual Graduate Student Teaching Award for his work teaching undergraduate statistics and undergraduate research methods. He completed his predoctoral clinical internship at the University of Tennessee Health Science Center in Memphis, Tennessee. He will return to Cincinnati Children’s Hospital Medical Center to begin his postdoctoral fellowship in August 2023, where he will continue to pursue research related to improving mental health outcomes for youth in the child welfare system.