EFFECTS OF A BEHAVIORAL INTERVENTION WITH FOSTER FAMILIES:
A RANDOMIZED CONTROLLED TRIAL

by
Christine Rae Platt

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As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Christine Rae Platt, titled Effects of a Behavioral Intervention with Foster Families: A Randomized Controlled Trial and recommend that it be accepted as fulfilling the dual degree dissertation requirements for the Degrees of Doctor of Nursing Practice and Doctor of Philosophy.

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Final approval and acceptance of this dissertation is contingent upon the candidate’s submission of the final copies of the dual degree dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dual degree dissertation requirements.

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DEDICATION

I dedicate this to my husband and children who were instrumental in this journey as a scholar.

First to my husband, who has been with me every step of the PhD journey.

_Brennan, you are the wind to my sails. You give direction to my journey and are the force behind my wild dreams and ideas._

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ABSTRACT

**Background:** Children in foster care are highly vulnerable populations with poor health outcomes. Key protective factor is having a safe, consistent environment in which to adapt and heal from past traumas, which often comes in form of consistent and nurturing foster homes.

**Study Aims:** Current study is aimed to investigate technology delivered family (Sibling inclusive) intervention titled The Connected Family Series – For Foster Families. Emphasis was on increasing family hardiness, preparation to care for children in foster care particularly those with disabilities and special needs. Aims included: (1) establish feasibility of technology-based intervention, (2) explore effects of intervention on stress and relational quality outcomes among family member participants, and (3) determine feasibility of in-home saliva collection to assess diurnal cortisol rhythm (objective, stress-related physiological outcome).

**Methods:** This study employed randomized control trial design of behavioral interventions. Stress and relational quality outcomes among members were measured (pre- and post-intervention) using concepts of family hardiness, preparedness, and relationship development through self-report questionnaire which included Family Hardiness Index (FHI), portions of Casey Foster Applicant Inventory (CFAI), and Sibling Inventory of Behavior (SIB), respectively. Additionally, objective indicators of stress-related biology, saliva diurnal cortisol rhythm was measured before intervention, after completion of intervention, and 1-month post intervention over course of a day, for three consecutive days at each time point.

**Results:** The Connected Family Series intervention was successfully adapted for foster families. Families in intervention group (n= 59 dyads) participated in online videos and activities at rate of 78% for those who stayed in study. Statistically significant increases in family hardiness in
intervention group ($p<0.001$, Cohen’s $d=0.97$) compared to control group. Measures of positive sibling relationship scores also increased significantly in intervention group compared to control group ($p<0.002$, Cohen’s $d=0.76$), accounting for approximately 32% of increase in FHI score. Salivary collection to assess diurnal cortisol rhythm was found challenging, but possible within population before and after intervention.

**Discussion:** Providing fostering families an online behavioral intervention increased sibling and foster child relationships and improved overall family functioning. Future research should focus on long-term impact possibly on placement stability and outcomes for children in foster care.
CHAPTER I: INTRODUCTION

Background and Significance

Children in foster care, particularly those with disabilities, are a highly vulnerable population experiencing poor placement stability and high health risks throughout the lifespan (Gypen et al., 2017; Seltzer et al., 2018; Slayter, 2016; Slayter, 2016a). Interventions to improve the health and placement stability of children in foster care (CFC) continue to fall short (Bergström et al., 2020). Little research has been done recognizing the high rates of children with disabilities in foster care and the added or specialized care they need. Placement stability—when the placement remains intact—is associated with improved foster child outcomes, such as economic wellbeing (Trejos-Castillo et al., 2015), improved social, emotional, and behavioral wellbeing (Unrau et al., 2008), and educational achievement (Pecora, 2012). Having a disability is associated with higher rates of placement disruptions (Platt, & Gephart, 2022), compounding vulnerabilities and long-term health risks (Slayter, 2016a). A placement disruption is when a child is moved from setting to setting or home to home while in foster care. Children who experience frequent placement disruptions have a higher likelihood of negative outcomes including substance abuse in adulthood (Long et al., 2017), homelessness (Shah et al., 2017), and unemployment (Dworsky, & Gitlow, 2017). Placement disruptions lead to increased attachment disorders (Strijker et al., 2008), educational disruption (Pears et al., 2015), externalizing behaviors (Leathers et al., 2019), cost to the system in childhood and over the life span (Vanderfaeillie et al., 2018), morbidity and mortality (Bruskas, & Tessin, 2013).

Children with disabilities often require higher levels of complex care and resources, adding burden and parental stress, which in turn can result in placement disruption when a child
with disability in foster care is relocated. The challenge of integrating a new child with special needs into the family can negatively affect functioning of the other children residing in the home. Research indicates that positive sibling relationships improve overall family functioning when one child requires complex care (Gypen et al., 2020; Platt et al., 2014; Wojciak et al., 2018). Improved family functioning can result in higher levels of placement stability and decreased placement disruptions. Interventions targeting foster family functioning, stress, and placement stability have historically focused on parenting skills, instead of a family centered approach (which would include siblings in the home). Particularly among CDFC, behaviors exhibited or special medical requirements (such as monitors or feeding tubes) may intimidate or scare children in the home who are unfamiliar with why they are occurring or how to appropriately respond. To the best of our knowledge, interventions involving relationship development with foster siblings (defined as permanent children in the foster home) have not yet been tested. Providing education and fostering a sense of control may improve overall family functioning and outcomes for CDFC.

**Definition of Terms**

Common terminology used throughout the study included the following:

- **Children in Foster Care (CFC):** Children who have been placed in protective custody and have been placed in out-of-home care or what is commonly referred to as foster care in the United States (US).

- **Connected Family Series (CFS):** Created and tested by Dr. Jenna Hunsley of the Karyn Purvis Institute of Child Development (KPICD). The CFS is a series of online modules and classes focused on the health relationship development of
biological and adopted siblings in a home. The Connected Family Series – For Foster Families (CFS-FF) was adapted specifically for foster families and was the intervention used for this study.

- Foster Family: An entity defined by the state that cares for a foster child and typically consists of other members who are considered to have long term relationships (as opposed to a group setting or licensed facility).
- Permanency: When a foster child leaves the system either due to reunification, adoption, or permanent guardianship.
- Placement Disruption: When a child is moved from a home not due to reunification with biological family.
- Placement Stability: Achieving minimal movement from home to home or setting for a child. Goal is typically one placement before permanency is determined.
- Pre-service Training: Classes and educational requirements needed before a family can become licensed to take in foster children.
- Karyn Purvis Institute of Childhood Development (KPICD): A program of the Department of Psychology in the TCU College of Science & Engineering in Fort Worth, Texas. Their mission is research, education, training, and outreach to improve the lives of children who have experienced abuse, neglect, and/or trauma. Established the Trust-based Relational Intervention (TBRI)®.
- Trust-based Relational Intervention (TBRI)®: An accepted program used to educate and train foster and adoptive parents of children who have experienced trauma.
• Theory of the Adapting Foster Family (TAFF): A nursing mid-range theory which incorporates Family Systems Theory and Transition Theory with an emphasis on the unique constructs found within fostering (Platt et al., 2022).

**Incidence and Economic Impact**

The long-term health of children requiring out-of-home care is a global concern. Abuse, neglect, poverty, war, drug abuse, and illness may all lead to a child requiring care by individuals other than their biological parents. In 2019, over 423,000 children were in the United States (US) foster care system (Children’s Bureau, 2020). The combined federal, state, and local costs of foster care in the US approaches $15 billion annually (Font, & Gershoff, 2020). For many children in foster care, foster families provide the preferred environment in which to help children under these circumstances. A stable foster care placement—establishing a foothold in education and having a steady figure (mentor) who supports youth after they age out of care—appears to be the most important factor to improve outcomes (Gypen et al., 2017). Unfortunately, placement disruptions occur in foster care in which a child is moved from home to home, or to a more restrictive and less ideal environment, such as group homes or institutions. The negative effects of placement instability on children's well-being continues to be a major issue in foster care (Rubin et al., 2007a) and results in higher costs to the child and system (Vanderfaeillie et al., 2018).

**Literature Review**

**Children with Disabilities in Foster Care (CDFC) are Vulnerable to Placement Disruption**

Children with disabilities in foster care (CDFC) have compounded vulnerabilities with additional needs (e.g., more negative behaviors, physical & emotional dysregulation) requiring
skilled foster care, and often experience more placement disruptions than those without disabilities (Geenen, & Powers, 2006; Geenen et al., 2007; Helton, 2011; Platt, & Gephart, 2022). Negative externalizing behaviors exhibited by CDFC could be misinterpreted by caregivers as choices, when they are more directly a product of the underlying disability experienced by the CDFC. This is problematic because behavioral problems in foster care children are a strong predictor of placement instability (Konijn et al., 2019), and behavioral problems negatively affect integration into a foster family and adoption (permanency) (Leathers et al., 2012).

**Pathways to Placement Disruptions**

Caring for CDFC can be a daunting task; most interventions for CDFC have focused on classes to teach parenting skills. Even so, the impact of foster parent trainings is mixed in regards to foster child behavioral outcomes (Solomon et al., 2017). One pathway that has not been studied is how permanent children (biological or adopted) in the home can enhance efficacy of fostering. Permanent sibling attitudes and efforts could potentially improve placement success. The literature available, while limited, indicates that the permanent child’s positive fostering experience predicts a higher likelihood that the foster child is “accepted” into the family and experiences a successful placement (Gypen et al., 2020). In non-foster families, a positive sibling relationship between children with disabilities and typically developing siblings (TDS) was a protective factor that decreased the impact of parental burden and poor parenting practices on TDS outcomes (Platt et al., 2014). Providing education to the permanent siblings regarding specialized care and needs of a CFC could result in decreased stress to the foster family unit and improved integration of the foster child into the family.
Impact on Health Equity

Improving relationships between foster and permanent siblings could decrease parental burden and increase placement stability. As placement stability increases, the foster child has less risk of associated maladaptive outcomes. This has the potential to promote greater adaptability and hardiness within the foster family, thereby increasing placement stability. An intervention that specifically includes and promotes positive relationships between foster and permanent siblings has the potential to improve clinical outcomes, thus we propose the Connected Family Series – For Foster Families (CFS-FF).

Gaps in the Literature and Preliminary Studies

*Children with Disabilities have More Placement Disruptions and are in Foster Care the Longest*

Building on a project in the first semester PhD Healthcare Informatics course, the PI completed a secondary data analysis of the Foster Care Analysis and Reporting System (AFCARS). This analysis included 680,611 children, of which 21.94% of children in foster care had a disability with a mean of 4.00 disruptions. Children without a disability had a mean of 2.37 disruptions (p<0.001, d = .51). Children with a disability spent an average of 915 days in foster care compared to 514 days for children without a disability (p<0.001, d = .59). Predictive risk factors for disruptions were increased child age, race (American Indian or Black), and increased foster parent age (Manuscript 1 [Table 4]). This will be the first manuscript to comprise the three-manuscript option of the dissertation and has been accepted at *The Journal of Pediatric Nursing*. 
Positive Sibling Relationships Help Reduce Caregiver Burden

In families raising a child with disabilities, positive sibling relationships may help negate the effects of caregiver burden and are more predictive of typically developing sibling outcomes than some parenting practices and parental burden (Platt et al., 2014). Platt et al. (2014) examined whether parenting style, caregiving burden, and sibling relationships (in homes raising a child with a disability and a typically developing sibling simultaneously) were associated with certain types of positive or maladaptive behaviors for the typically developing sibling. The authors found that authoritative parenting was related to externalizing behaviors and multi-level models revealed that when caregiver burden was high, so were externalizing behaviors. The addition of sibling relationships to the model reduced the impact of caregiver burden, especially when there was a cooperative sibling relationship. Multilinear regression analysis revealed that sibling relationship was a key predictor in outcome behaviors, such that when the sibling relationship indicators were high, parental stress and poor parenting practices became insignificant in the model.

Foster parents report high levels of caregiver burden, particularly when fostering children with special needs (Murray et al., 2011). Siblings in the home may help to buffer burden and stress related to fostering the way they do within biological families. Permanent siblings in the home, or the children of those who foster, are highly involved in the fostering experience (Hojer, 2007). Their contributions are often overlooked and undervalued. Research indicates these siblings play an important role in the caregiving of foster children and that specific strategies are needed to support them in their caregiving (Raineri et al., 2018; Targowska et al., 2016). Providing support and tools to fostering siblings may improve placement success and stability.
This may particularly be true if the child in foster care has a disability. Research is needed that investigates how to provide such support and what interventions can support children in their fostering capacity.

**Navigating Through Placement Stability**

Reunification with the biological or primary parent is the top priority after a child has been removed from their family to ensure the child’s safety, followed by placement with kinship (Children’s Bureau, 2022). However, when this is not possible, a foster family must contemplate their willingness to provide permanency or an adoptive home. Navigation through placement stability and permanency is not a simple task. Adoption from foster care often means assuming the responsibility and liability for a child with a significant history of trauma and mental health concerns. To further investigate the process of navigating through placement stability, a grounded theory project involving foster family interviews was conducted. The psychosocial process of foster parents deciding on placement stability occurred in three phases (Figure 1). These were *recognition of limits* (antecedents), *weighing options* (the process itself), and *resulting transitions* (consequences).
Conclusions from a preliminary study highlighted that once a foster parent realized they were at a critical point in considering the placement of a child, the actual process, defined as *weighing options*, occurred. Some parents sought professional counseling, consensus with family members was investigated, and pressures from outside forces (such as requests of biological family or case workers) were considered. One informant discussed her decision process to provide a permanent home (adoption) in spite of extra challenges. She stated, “He just belonged.” In comparison, another stated, “I had to think about how it was affecting my permanent kids. She (referring to daughter) was scared of him (the foster child).” After the decision was made, foster parents described the process involving several transitions (*resulting transitions*). Specific individuals needed official notification via the correct forms that the parent...
wanted the child moved to a different setting. Informants reported feeling loss and inability to advocate for the child once the decision was made. This grounded theory project helped to inform and develop the Theory of the Adapting Foster Family (TAFF). It further illustrates the importance and influence that the fostering sibling has on potential permanency outcomes for the child in foster care.

The Intervention: The Connected Family Series for Foster Families (CFS-FF)

Collaboration with the Karyn Purvis Institute of Child Development

A behavioral intervention was adapted from the Connected Family Series (CFS) by Dr. Jana Hunsley at the Karyn Purvis Institute of Child Development (KPICD). The CFS was initially developed using concepts and strategies from the nationally accepted Trust-Based Relational Intervention (TBRI) (Purvis et al., 2013). Three strategies included in the intervention designed to interrupt negative causal mechanisms were (1) trauma-informed sibling education (to increase preparedness), (2) positive attachment behavior adoption (to improve relationship development), and (3) stress reduction techniques (to increase family hardiness). A goal is that behavioral changes of the caregivers and children in the home will facilitate healing from relationship-based trauma and its associated symptoms. Activities to increase preparedness will improve sibling understanding of factors that influence behavior and needs of children with complex trauma histories through an educational module. Information provided includes an explanation of what foster care is, why kids come into care, and what special needs or behaviors might they see. Children in the home will then be prompted to reflect on their experiences and readiness for being a foster family/sibling. Relationship development will come through modeling activities that promote cooperation, with the goal of nurturing greater attachment.
These activities are adapted to children from caregiver TBRI training, previously used by state foster care agencies. The intervention’s content and structure are novel approaches for an intervention with foster families as it is an accessible, online, self-paced format involving all family members. The KPICD will be working as a partner for this research study and intervention (Appendix D).

**Harnessing Technology for Expanded Access**

The intervention harnesses technology to access families in remote regions and families that may not have easy transportation to in-person care coordination and therapy. This work will contribute the foundation of a program of research and future studies aimed at improving healthcare delivery and quality across transitions of care for CDFC and addressing health disparities that they are likely to experience.

**Diurnal Cortisol Rhythm**

Diurnal cortisol rhythm (DCR) is an objective indicator of stress-related biology and can be measured through collection of salivary cortisol at specific timepoints throughout the day. Salivary cortisol is a well-established and accepted biomarker for mapping the DCR and determining hypothalamic-pituitary-adrenal (HPA) axis function (Smyth et al., 2013). The HPA axis is an important pathway in the regulation of the physiological stress response. Dysregulation of the HPA axis has been linked to adverse health outcomes, making it an important therapeutic target and a useful objective measurement within randomized control trials (Ryan et al., 2016). Salivary cortisol collection within the foster family is a key interest. It is non-invasive and allows for testing within a combined adult and pediatric population. Foster families are tasked with caring for children with complex histories of trauma abuse, and neglect, which could cause
significant stress and burden. While psychometrically validated survey tools exist to measure family functioning, biological indicators of stress can simultaneously help determine if the intervention produces objective improvements to well-being and health for multiple members of the family.

**Problem Statement and Purpose of the Study**

The goal of the intervention is to empower foster families (parents or caregivers & foster siblings) of CFC with (1) improved preparedness through education for children with disabilities and/or medically fragile, (2) tools for relationship development, and (3) psychosocial hardiness as a family unit. Foster children enter unfamiliar homes carrying complex developmental trauma, resulting in dysfunctional coping behaviors, and altering brain chemistry (Bremner, 2003; Carrion, & Wong, 2012). Dysfunctional coping as a result of trauma can lead to barriers in developing healthy relationships and behaviors, which are needed for healing. Consistent with the theoretical model, the CFS-FF will include three pathways (improving preparedness, hardiness, & promoting positive relationships/attachment) to improve placement stability, thereby improving outcomes for children with complex trauma.

Exposure to complex trauma is a causal mechanism for poor lifelong outcomes, as it disrupts a child’s sense of self and trust for others (Lawson, & Quinn, 2013). Symptoms of exposure to complex trauma include impairments of attachment, disrupted regulation of stress-related biology, impaired affect regulation, dissociation, and poor behavioral control and cognitive function (Cook, 2005). As a result of prolonged abuse, neglect, and stress, neurological maladaptation leads to dysfunctional behaviors that create barriers to placement stability. The intervention tested sought to disrupt the cycle of maladaptation by providing behavioral
modification within the family unit that will support foster children. Experts note that relationship-based trauma can be resolved through the causal mechanism of loving, stable relationships (Purvis et al., 2013). Hence, a stable family environment — with siblings also prepared to encourage safe attachment — will affect behavior and further promote willingness to keep a placement intact.

The dissertation study was informed by a new synthesized theoretical framework, the “Theory of the Adapting Foster Family (TAFF).” The second dissertation manuscript, a theory paper which describes the TAFF model, was accepted by *Nursing Science Quarterly* on March 13, 2022 (Appendix B). Concepts and relationships in the TAFF help researchers, therapists, nurses, and child advocates in achieving healthy outcomes, because TAFF integrates Roy’s Adaptation Model and Family Systems Theory (FST) with specific constructs unique to fostering (Platt et al., 2022). The individual, in this case the foster care child, employs coping mechanisms which are biological, psychological, and social in origin (Roy et al., 2009). Family systems theory (FST) further stresses the impactful role on sibling relationships for regulation of behavior during childhood and throughout the lifespan (Cox, 2010). Children within foster care have greater long-term health-related disparities than peers (Turney, & Wildeman, 2016), and the TAFF’s propositions help elucidate which variables hold the greatest promise for changing current trajectories such as sibling interactions and relationship development. We propose that the TAFF is uniquely suited and helpful, providing precise relationships and definitions. Such a model brings further understanding of healthy adaptation both within the individuals and the unit as a whole, providing a framework for interventional designs targeted at improving health
outcomes throughout the lifespan. Key concepts affecting outcomes are (1) member diversity, (2) hardiness, (3) preparedness, and (4) relationship development.

**Specific Aims**

The central hypothesis of the dissertation was that the intervention would lead to improved sibling relationships and increased hardiness/coping in families, thereby providing a potential pathway for improved CDFC placement stability. To test the central hypothesis, the following three specific aims were addressed:

**Aim 1: Establish the Feasibility and Acceptability of the Technology-based, Family-Centered Intervention**

The community-based participatory research team consisting of the PI, a TBRI licensed trainer/educator, social worker, foster care liaison, and foster parent(s) met to adapt, gain feedback, and review implementation of the intervention.

**Study Aim 1 Question**

Can the Connected Family Series be successfully adapted for foster families caring for children with special needs?

**Hypothesis**

Feasibility will be achieved with at least 70% of participants completing the intervention. The acceptability will be based on feedback from participants and community-based participatory research team.
Aim 2: Explore in a Preliminary Manner the Effects of the Intervention on Relational Quality Outcomes Among Family Member Participants

Relational quality will be examined via the Family Hardiness Index (FHI), Casey Foster Applicant Inventory Sibling Subsection, and the Sibling Inventory of Behavior (SIB).

Study Aim 2 Question

What is the effect size of the intervention on relationship quality outcomes?

Hypothesis

The intervention will have an effect size using Cohen’s d of at least 0.2 versus the control.

Exploratory Aim 3: Determine the Feasibility and Preliminary Efficacy of the Intervention on Diurnal Salivary Cortisol Rhythm Within the Foster Family Population

Collection of salivary cortisol was done at baseline, after intervention, and 1-month post intervention on both the caregiver and a permanent sibling in the home identified as being most influenced by the foster placement. Future analysis will include the expectation that preliminary data collected will show a change in diurnal cortisol rhythm, suggestive of improved HPA-axis function, as measured from before to after the intervention is completed. These results will be compiled in a separate manuscript post-dissertation, as diurnal cortisol rhythm changes were not part of the present study results which focused on feasibility.

Exploratory Study Aim 3 Question

Is salivary cortisol collection feasible within this population?
Feasibility Hypothesis

Feasibility would be achieved through 70% or more of saliva samples being collected and completed, according to the study protocol.

By integrating strengths of the foster family into future studies, as opposed to the current literature which focuses on foster child risk factors, researchers and child advocates may find novel avenues to increase hardiness within the foster family unit. The risk-focused approach excludes potentially effective resiliency-based research designs. Below is a figure of the overview of the aims of the current study and how they influence future studies (Figure 2).

Figure 2

Overview of Aims and Research Agenda

- **Members**
  - Caregiver
  - Foster Child
  - Children in Home

- **Intervention**
  - Family Hardiness
  - Preparation
  - Relationship Development

- **Study Aims**
  - Feasibility of Intervention (Connected Family Series - For Foster Families)
  - Effects of Intervention
  - Feasibility of Biomarker Collection

- **Future Research**
  - Accessible Intervention to promote positive adaptation
  - Placement Stability for Foster Child
  - Reduced Stress and Improved Functioning

- **Long Term Goal**
  - Improved Health Outcomes for Children in Foster Care
Summary

In this chapter, the background and foundational literature have been presented indicating the need for additional studies to improve outcomes for CDFC. We hypothesized that focusing on preparation and improving relationships of the whole family (sibling inclusive) through the intervention will improve family hardiness among family members, thereby potentially improving placement stability. As placement stability increases, the foster child will have a decreased risk of associated maladaptive outcomes. Three aims have been discussed. Aims 1 and 2 focus on the adaptation of the intervention and its effects. Exploratory Aim 3 examines the feasibility of collecting biomarkers (i.e., salivary cortisol) to measure stress and HPA-axis function within this population.
CHAPTER II: PRESENT STUDY

Chapter II is a summary of the methods and most important findings to answer the aims and research questions for the present study. The central hypothesis was that the intervention would lead to improved sibling relationships and increased hardiness/coping in families, thereby providing a potential pathway for improved CDFC placement stability. To test the central hypothesis, three specific aims were addressed.

Aim 1: Establish the Feasibility and Acceptability of the Technology-based, Family-Centered Intervention

The community-based participatory research team consisting of the PI, a TBRI licensed trainer/educator, social worker, foster care liaison, and foster parent(s) met to adapt, gain feedback, and review implementation of intervention.

Study Aim 1 Question

Can the Connected Family Series be successfully adapted for foster families caring for children with special needs?

Hypothesis

Feasibility will be achieved with at least 70% of participants completing the intervention. The acceptability will be based on feedback from participants and community-based participatory research teams.

Aim 2: Explore in a Preliminary Manner the Effects of the Intervention on Relational Quality Outcomes Among Family Member Participants

Relational quality will be examined via the Family Hardiness Index (FHI), Casey Foster Applicant Inventory Sibling Subsection, and the Sibling Inventory of Behavior (SIB).
Study Aim 2 Question

What is the effect size of the intervention on relationship quality outcomes?

Hypothesis

The intervention will have an effect size using Cohen’s d of at least 0.2.

Exploratory Aim 3: Determine the Feasibility and Preliminary Efficacy of the Intervention on Diurnal Salivary Cortisol Rhythm Within the Foster Family Population

Collection of salivary cortisol was done at baseline, after intervention, and 1-month post intervention on both caregivers and a permanent sibling in the home identified as being most influenced by the foster placement. Future analysis will include the expectation that preliminary data collected will show a change in diurnal cortisol rhythm, suggestive of improved HPA-axis function, as measured from before to after the intervention is completed. These results will be compiled in a separate manuscript at a future time, as diurnal cortisol rhythm changes are not part of the present study results as the focus was on feasibility.

Exploratory Study Aim 3 Question

Is salivary cortisol collection feasible within this population?

Feasibility Hypothesis

Feasibility would be achieved through 70% or more of saliva samples being collected and completed, according to the study protocol.

Manuscript Option for Dissertation

The three-manuscript option was chosen as opposed to the five-chapter dissertation format. This option allowed the PI to prepare the dissertation into manuscripts conducive to publishing, as will be expected by the positions she is seeking in academia post-graduation. The
manuscripts presented here represent the scholarship comparable in breadth, depth, and scope to the traditional scope of the five-chapter dissertation. All research was conducted and manuscripts completed while the PI was enrolled as a dual DNP/PhD student at the University of Arizona College of Nursing.

The methods, results, and conclusions of this study are presented in the papers appended to this dissertation. Prior to the PI’s final dissertation defense, two papers were submitted and accepted for publication (one accepted at *Journal of Pediatric Nursing* and the second at *Nursing Science Quarterly*), and the third publishable manuscript was completed and made ready for journal submission. The PI was the primary author for all three manuscripts. Appendices A to C contain the three published or publishable manuscripts. The manuscripts include a background and secondary data analysis of the population of interest (Appendix A), a theoretical foundation paper (Appendix B), and a data-based results paper (Appendix C). A fourth manuscript will be completed post-dissertation defense on the feasibility of the collection of salivary cortisol levels within this study population. For the background and secondary data analysis manuscript, the editorial review was provided by the dissertation chair. For the theoretical foundation paper, expert content input was provided by an outside coauthor and the dissertation committee chair. For the results paper, both the dissertation committee chair and all committee members provided editorial review and expert input. Additionally, this chapter highlights the approach, methods, results, discussion, and conclusion of the dissertation.
Manuscript 1: Background and Secondary Data Analysis

The first manuscript titled “Placement Disruption of Children with Disabilities in Foster Care” was submitted to Journal of Pediatric Nursing, and accepted May 5, 2022 (Appendix A). It presents a secondary analysis that was completed in year 1 of PhD-DNP studies.

Manuscript 2: Theory Paper

The second manuscript titled “Theory of the Adapting Foster Family (TAFF): Development of a Middle-Range Theory with Mathematical Modeling in Nursing Science” was accepted by Nursing Science Quarterly March 13, 2022. It is an interdisciplinary paper coauthored with an external colleague in addition to the committee chair (Appendix B). It presents the theoretical underpinning for this dissertation and provides a theoretical foundation for future studies.

Manuscript 3: Data-based Results Paper

The third manuscript was a coauthored data-based results paper titled “Effects of a Behavioral Intervention with Foster Families: A Randomized Controlled Trial” (Appendix C). This manuscript was based on the results from our randomized control trial of an online intervention for foster families that included the siblings in the home. This manuscript will be submitted to Developmental Science or the Journal of Nursing Scholarship. It addresses Aims 1 and 2.

Study Methods

The purpose of this study was to investigate a technology-delivered behavioral intervention designed to improve foster family functioning and stability for children with disabilities in foster care (CDFC). The goal of the Connected Family Series – For Foster
Families is to empower foster families with (1) improved preparedness through education and resource utilization, (2) tools for relationship development, and (3) psychosocial hardiness as a family unit. Foster children enter unfamiliar homes carrying complex developmental trauma, resulting in dysfunctional coping behaviors, and altering brain chemistry. The intervention tested sought to disrupt the cycle of maladaptation by providing behavioral modification within the family unit that supported CFC. Experts note that relationship-based trauma can be resolved through the causal mechanism of loving, stable relationships. Hence, a stable family environment — with siblings also prepared to encourage safe attachment — will affect behavior and further promote willingness to keep a placement intact.

Design

This study employed a randomized control trial design of a behavioral intervention with foster families caring for a CDFC as well as a permanent child in the home. The intervention tested was self-paced and delivered via technology to include foster families in rural and underserved locations. Behavioral changes of caregivers and children in the home were predicted to improve family functioning and facilitate healing from relationship-based trauma and its associated symptoms. Stratified randomization was used to assign participants into the experimental or control group. Blinding of the two groups to participants was not done (participants knew whether they received the video intervention). However, the team blinded the statistical analysis to group with the use of a statistician. Families assigned to the control did have the opportunity to participate in the intervention post-data collection and analysis and outside of the research protocol. The intervention was titled the Connected Family Series – For Foster Families (CFS-FF) (further referred to as the intervention) and was created/adapted in
partnership from the Connected Family Series (CFS) by psychologists at the Karyn Purvis Institute of Childhood Development (KPICD). A letter of support from the KPICD is available in Appendix D. Adaptation was needed as the original intervention was geared toward adoptive families and excluded foster families. This process was done with the original creator (Dr. Jana Hunsley) and with members of the research team and fostering community.

**Sample**

Convenience sampling via recruitment through social media platforms was employed. The study followed rigorous guidelines to recruit and screen participants to aid in the study’s reproducibility and appropriate application (Friedman et al., 2015). The defined study population was foster families with both a permanent and a foster child in the home. Eligibility criteria ensured that sibling interactions and how they affected family hardiness were captured. Families were recruited through the Karyn Purvis Institute of Childhood Development (KPICD) and the Utah Foster Care Foundation social media pages over seven days during January of 2022.

**Inclusion Criteria**

1. Licensed foster families
2. Must have at least one permanent child (biological or adopted) living in the home before the foster or newly adopted child entered the home
3. At least one foster or foster-to-adopt child placed in the home
4. All participants other than the foster or foster-to-adopt child must have English as their primary language

**Exclusion Criteria**

1. Non-English speaking
2. No permanent sibling between the ages of 7 at 17
3. No current foster placement living in the home
4. Designated as a group home
5. Greater than six children living in the home

Sample Size Calculations

The total sample size for the study (N=130) of families was estimated for 80% power for t-test and ANOVAS, $\alpha<.05$ using G*Power software. Although the exact effect size of the intervention was unknown, results from the randomized control trial by Schoemaker et al. (2020) were used in which a video intervention to improve parenting among foster families was used. This online intervention had an effect size of 0.34 for differences of the intervention on parenting sensitivity measures using the adapted Ainsworth scales for sensitivity and non-interference. Consistent with Shoemaker et al. (2020), a similar sample size was found to be sufficient to detect significant results for the intervention for the original CFS. Collection of salivary cortisol to achieve the exploratory aim was done with a smaller sample size of 30, consistent with previous similar feasibility studies for hypothalamic–pituitary–adrenal (HPA)-axis function (Pace et al., 2022).

Procedures

The study spanned six months; one month for recruitment and collection of baseline data, one month for the intervention, one month for post intervention data collection, and three months for data analysis. After Institutional Review Board (IRB) approval (STUDY00000382) from the University of Arizona (Appendix E), the recruitment flyer (Appendix F) was posted on the
official Karyn Purvis Institute of Child Development website. The study was also registered with clinicaltrials.gov (clinical trials registration identifier: NCT05405972).

**Participant Recruitment**

Once a family was recruited, they were connected (within one week) with a study team member and screened for inclusion and exclusion criteria. If appropriate, the family was enrolled in the study. Information was given about the study and informed consent was collected. An independent statistical team ensured stratified random assignment to study groups. Participating families received a $25 gift card after completion of the pre-intervention assessment and an additional $25 gift card after completion of the post-intervention assessment. Families who completed salivary cortisol collection received an additional $25 gift card. Families in the control (or current practice group) were given the opportunity to participate in the intervention after final collection of data and comparison of both groups had been achieved.

**Human Subjects Protection**

Institutional Review Board (IRB) approval for this study (STUDY00000382) was received on January 14, 2022 from the University of Arizona. The sample had the intersecting vulnerabilities of being children and being in foster care, but risks of the study were minimal, and offers potential impact to improve participants lives. Online platforms, particularly those intended to facilitate effective parenting of children with special needs, have been shown to strengthen current training programs (Kaasbøll et al., 2019). Including children in the study increased the success of parental trainings. Without studying the whole family, we would have lost the family-centered potential to improve long-term outcomes for foster children. We also were likely to improve the functioning and mental health of the children who participated in the
training/intervention. The control group (receiving no intervention) was given the opportunity to participate in the intervention after the initial trial.

**Intervention and Control**

The study consists of two groups: (1) the intervention group, which received the behavioral intervention, and (2) the control group which was waitlisted. The control group received the link to the modules one month after the intervention group finished the intervention and after follow-up data was collected from both groups. The behavioral intervention tested is titled the Connect Family Series—For Foster Families (CFS-FF). It was adapted from the original Connected Family Series (CFS) geared toward adoptive families, which was created by Dr. Jana Hunsley. The original CFS was developed using concepts and strategies from the nationally accepted Trust-Based Relational Intervention (TBRI) (Purvis et al., 2013). Adaptation of the intervention for foster families was done in partnership with Dr. Hunsley and a community-based participatory research team with foster parents, social workers, and nurses. The adaptation of the intervention included the following strategies designed to interrupt negative causal mechanisms: 1) trauma-informed sibling education (to increase preparedness), 2) positive attachment behavior adoption (to improve relationship development), and 3) stress reduction techniques (to increase family hardiness). The behavioral intervention provides tools for relationship development, aims to improve psychosocial hardiness as a family unit, and strategies to increase connection between members.

The intervention’s content and structure are novel approaches. The CFS-FF is in an accessible, online, self-paced format involving all family members. The intervention harnesses technology to access families in remote regions and families that may not have easy
transportation to in-person care coordination, therapy, or educational classroom. The CFS-FF consists of four modules separated by a week for each module. The four-week intervention/program was available to participants online and was self-paced, although modules were opened at the beginning of each week. Each weekly module contained a caregiver/parent video and a separate child video. Each module also included ideas for family communication and connection activities. Families were asked to choose one each week. Examples included a 15-minute connect time lead by the child, baking cookies together, a family nature walk, coloring as a family, writing a poem together, or character praise letters written by parents. The intervention added components to help prepare families for caring with children with special needs, disabilities, medical treatments, and histories of trauma, abuse and neglect. Such information was designed to help children already in the home feel more comfortable around medical equipment or care they may not have experienced or seen before. Such information was included to help normalize and gain acceptance of the CFC by siblings already living in the home.

**Measures**

**Sources of Materials**

Research material was obtained in the form of online surveys and point-of-care saliva collection. Surveys and saliva were collected before the intervention (T1) and after the intervention (T2). Additional saliva collection at 1-month post-intervention (T3) also occurred. Survey tools included the Sibling Inventory of Behavior (SIB), the Family Hardiness Index (FHI), and a modified version of the Casey Foster Applicant Inventory-Applicant Version. Data gathered was coded using a unique identifier for each participant. Saliva specimens were collected by the participants with only the identifying number on the collecting tubes.
Pre-Intervention Assessment

Participants screened and deemed to fit inclusion and not exclusion criteria filled out a demographic survey (Appendix G). Families were also asked about their willingness to participate in salivary cortisol collection. Caregivers then completed the three-pronged battery of assessments containing a total of 52 questions with an approximate time to complete of 15 to 20 minutes on Qualtrics. The three questionnaires included the Family Hardiness Index (FHI), the Sibling Inventory of Behavior (SIB), and the Modified Casey Applicant Inventory.

Hardiness – Family Hardiness Index (FHI)

Measurements for family hardiness were done using the Family Hardiness Index (FHI). The FHI instrument is a 20-item Likert-type scale with a 4-point response scale ranging from false to true about the family situation (McCubbin et al., 1987). Higher scores indicate higher family hardiness. Validity and reliability have been established through positive correlations with family function measures, with a Cronbach’s alpha coefficient of .82 with test-retest reliability of .86 (McCubin et al., 1996). Studies have employed the FHI to accurately indicate hardiness levels within foster families and those raising children with special needs (Hendrix & Ford, 2003; Roberts et al., 2017).

Relationship Development – Sibling Inventory of Behavior (SIB)

The Sibling Inventory of Behavior (SIB) was developed to assess sibling relationships between a typically developing sibling and a child with a disability using a 28-item questionnaire (Schaefer, 1981) and was used here to assess relationship development. The measure assesses four aspects of sibling relationships: kindness (nine items), avoidance (six items), involvement (seven items), and empathy (six items). Validity of the SIB scales was demonstrated in previous
studies using correlational and observational data with Cronbach alphas ranging from .64 to .81 for each item, indicating that these items are closely related and thus internally consistent (Volling & Blandon, 2003). Responses were tallied in two categories: those indicating a positive sibling relationship (SIB+) and those indicating a negative sibling relationship (SIB-).

**Family Preparedness – Modified Casey Foster Applicant Inventory**

A modified version of the Casey Foster Applicant Inventory—Applicant version—a psychometrically validated self-report tool used to assess the potential readiness and ability to foster parent successfully (Buehler et al., 2006)—was used to assess family preparedness. Data from previous studies involving foster parents have shown internal consistency and reliability (ranging from 0.64 to 0.96) (Orme et al., 2007). The Integrating Foster Children subscale includes the ability to integrate a foster child into a foster family with birth or adopted children (Orme et al., 2006). Questions are based on a Likert scale from ‘1’ (strongly disagree) to ‘4’ (strongly agree). Example statements include, “My children want to have a foster brother or sister” and “My children are able to deal with a foster child with serious problems.”

**Exploratory Objective Biological Measure of Stress**

To measure the exploratory aim for objectively measuring an indicator of family stress and hypothalamic-pituitary adrenal (HPA)-axis function, the psychobiological maker of diurnal cortisol was tested. The concentration of cortisol in saliva over the course of the day is normally high in the morning, peaks 30-60 minutes after wakening (cortisol awakening response/CAR), and is low at night, indicating healthy HPA-axis function (Adam et al., 2017). Relative disruptions in diurnal cortisol rhythm (e.g., high bedtime levels, a flatter diurnal slope from waking to bedtime, and high overall concentration across the day) have been associated with
self-reported stress, as well as other aspects of psychological well-being (e.g., depression) (Adam et al., 2017; Juarez Garcia et al., 2016). This study employed the same methods and analysis as employed by Pace et al. (2022) and the protocol used from Pace was done with permission. Collection, processing, and data analysis are further described below.

Salivary Cortisol

Saliva was gathered for two consecutive days before the intervention (days 1 & 2) and after the intervention (days 31 & 32). On each sampling day, participants provided a waking sample, another 30 minutes after waking, and a bedtime sample. Participants passively drool through a straw into a 2mL polypropylene tube and labeled each tube with the time and date. Participants were instructed not to eat, drink, or brush their teeth 30 minutes before each sample, and to keep completed samples in the refrigerator throughout the study period. Participants shipped saliva samples to the lab and samples were then stored at -20°C. Saliva samples were batch assayed in duplicate according to manufacturer instructions for cortisol concentrations using an enzyme immunoassay (EIA) kit (Salimetrics, State College, PA). Inter- and intra-assay coefficients of variability in previous studies by the Pace research team were 8.16% and 7.74%, respectively. In line with prior work (Zeiders et al., 2014), the following cortisol parameters were assessed: waking level (Sample 1), bedtime level (Sample 3), the CAR (the difference between Sample 2 – Sample 1), the diurnal slope (the difference between Sample 3 - Sample 1), and the area under the curve (AUC) to assess total cortisol output across the day. AUC was calculated using the trapezoidal method. For this present study, participation included 30 families for salivary cortisol collection, with collection occurring from the primary caregiver and the permanent sibling closest in age to the foster child, but above the age of 7 years. If two
permanent children were the same age difference away from the foster child, the permanent sibling with whom the foster child interacted with most was selected.

**Data Collection and Analysis**

Survey data were collected through Qualtrics and downloaded into STATA statistical software. Items were scored per directions by the scale authors. These scales and scoring had been previously psychometrically validated and shown to be reliable and valid. STATA was used to calculate descriptive statistics, t-tests, correlations, and regressions to examine prediction and address the study aims. Potential mediation analysis and multi-level modeling to identify relationships of the concepts and individual characteristics nested within families were also analyzed.

**Missing Data**

Little data was missing for the pre- and post-intervention parent surveys and was deemed missing at random (MAR). A data management strategy of pairwise deletion was employed to address the missing data when the salivary cortisol slopes were analyzed. Pairwise deletion is a method of data deletion that uses the available data to estimate parameters (Figueroedo et al., 2000). A small sample size can inaccurately create a matrix that is highly skewed. Therefore, while this study explored the feasibility and the results are presented with missing data accounted for, internal validity and generalizability should be confirmed and tested with larger sample sizes.

**Data Management Privacy**

The identity of participants remained anonymous and confidential. The following safeguards were put in place: a) unique identification numbers were used for computerized data
entry, b) data was and will only be released in aggregate form, c) names or other identifying
variables will be absent from written communication or presentations.

**Results**

**Participant Demographics**

The Karen Purvis Institute of Child Development is a global organization located in the
US. For the purpose of this study, we focused on families residing within the US that were also
currently licensed foster families. They also had to currently have at least one foster child living
in the home and at least one permanent sibling living in the home with an age between 7 and 17
years. Of the main caregivers participating in the study, all (100%, n=95) were female, 98%
(n=93) were white, 6% Hispanic (n=6), 1% Black (n=1), and 1% (n=1) Native American. Most
participants were from married households (84%), and the main caregivers were mostly between
the ages of 35 to 44 (51%). Most caregivers had obtained their bachelor’s degree or higher
(81%). The average time that families in this study had been licensed as foster families was 4.91
years (SD 3.89). When assessing the needs of the foster child, 61% of families had a foster child
living in the home who was categorized as a high-needs child (meaning the child displayed
developmental or behavioral problems that required additional resources or had a diagnosed
disability). See Table 1 for sample demographics.
### Table 1

**Sample Demographics (N=95 Dyads)**

<table>
<thead>
<tr>
<th>Foster Parent</th>
<th>N (%) or Mean (Std Dev)</th>
<th>Child</th>
<th>N (%) or Mean (Std Dev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>95 (100%)</td>
<td># of Permanent Children</td>
<td>2.52 (1.56)</td>
</tr>
<tr>
<td>White</td>
<td>93 (98%)</td>
<td>Permanent Child Age</td>
<td>8.97 (3.32)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>6 (6%)</td>
<td># of Foster Children</td>
<td>1.93 (0.99)</td>
</tr>
<tr>
<td>Married</td>
<td>80 (84%)</td>
<td>Foster Child Age</td>
<td>6.4 (4.66)</td>
</tr>
<tr>
<td>Age 25-34</td>
<td>33 (34%)</td>
<td>Foster Child High Needs</td>
<td>58 (61%)</td>
</tr>
<tr>
<td>Age 35-44</td>
<td>48 (51%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s or higher</td>
<td>77 (81%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time employed</td>
<td>32 (34%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income of $42-126k/yr.</td>
<td>69 (73%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years Licensed</td>
<td>4.91 (3.89)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Notes: Table reports summary statistics for enrolled adult participants (left) and the participating permanent child or foster child (right).*

### Aim 1 Results

Research Aim 1 was to establish the feasibility and acceptability of the technology-based, family-centered intervention. The community-based participatory research team consisting of the PI, a TBRI licensed trainer/educator, social worker, foster care liaison, and foster parent(s) met to adapt, gain feedback, and review implementation of intervention. The intervention was successfully adapted, and videos were recorded for the foster care population. Of the original 59 participating families (59 adults and 59 children) in the intervention group, 64% (n=37 dyads) remained in the study long enough to complete the post-intervention follow-up survey. Of these 37 families, 78% (n= 29) of both the parent and child viewed at least three of the four videos. Of the control group families, 82% (n=51) completed the post-intervention or T2 follow-up survey assessments.
Aim 2 Results

Research Aim 2 was to explore in a preliminary manner the effects of the intervention on relational quality outcomes among family member participants. Relational quality was examined via the Family Hardiness Index (FHI), Casey Foster Applicant Inventory Sibling Subsection, and the Sibling Inventory of Behavior (SIB).

For each measure, the mean change between the initial survey and one-month follow-up was computed. These changes in means were compared between the intervention and control groups. The intervention group had significantly higher average scores than the control after the intervention period for mean FHI, with Cohen’s d reporting an effect size of 0.97. The SIB+ and SIB− measures also exhibited a significant beneficial difference between the intervention and control, with Cohen’s d of 0.76 and 0.71, respectively. The intervention CFAI measure did not show a significant difference between groups, with Cohen’s d of 0.06. Our hypothesis that the intervention would have an effect size using Cohen’s d of at least 0.2 was supported for family hardiness and sibling relationships.

The pre-intervention questionnaire showed that when a CFC had a higher “difficult behaviors” score as measured in the pre-intervention assessment, the negative aspects of the sibling relationship (SIB−) were more pronounced. A higher “difficult behaviors” score for the CFC did not affect positive aspects of the sibling relationship (SIB+), and the ages of the foster child or permanent child had no significant impact on either measure (Table 2).
Table 2

Predictors of Sibling Inventory of Behavior (SIB) Scores in Initial Family Survey

<table>
<thead>
<tr>
<th></th>
<th>N = 93</th>
<th>SIB+ Pre</th>
<th>SIB- Pre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Child Age</td>
<td>-0.14</td>
<td>0.704</td>
<td>0.11</td>
</tr>
<tr>
<td>Foster Child Age</td>
<td>-0.19</td>
<td>0.478</td>
<td>0.17</td>
</tr>
<tr>
<td>Foster Child High Needs</td>
<td>-1.87</td>
<td>0.463</td>
<td>3.77</td>
</tr>
<tr>
<td>Constant</td>
<td>43.2</td>
<td>0.000</td>
<td>10.6</td>
</tr>
<tr>
<td>R^2</td>
<td>0.012</td>
<td></td>
<td>0.063</td>
</tr>
</tbody>
</table>

Notes: Table reports regression results (coefficients) of child characteristics on the SIB measure of relationship quality (whether positive relationship aspects in SIB+, or negative relationship aspects in SIB-). p-values for each coefficient are reported in italics.

When re-evaluated one month later, the SIB+ measure showed some mean reversion, with higher scores tending to fall. The SIB+ measure also improved for older permanent children (by 0.7 points per year older). The SIB+ of intervention families increased by an additional 5.5 points. Indeed, these two effects appeared to be connected: when the intervention status was interacted with the permanent child age, all the improvement occurs through the interaction. The SIB+ relationship improved by 0.86 points (with a p-value of 7.2%) for each year older if they received the intervention; but neither the permanent age nor the intervention status was significant on its own. This suggests that the intervention is especially effective for older kids (Table 3, Columns 1 & 2).
Table 3

Predictors of Relationship Change in Follow-up Sibling Inventory of Behavior (SIB)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>(1) SIB+ Improve</th>
<th>(2) SIB+ Improve</th>
<th>(3) SIB- Improve</th>
<th>(4) SIB- Improve</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIB+ Pre</td>
<td>-0.40</td>
<td>0.000</td>
<td>-0.36</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>SIB- Pre</td>
<td></td>
<td>0.35</td>
<td>0.000</td>
<td>0.33</td>
<td>0.000</td>
</tr>
<tr>
<td>Permanent Child Age</td>
<td>0.72</td>
<td>0.003</td>
<td>0.37</td>
<td>0.221</td>
<td>0.25</td>
</tr>
<tr>
<td>Foster Child Age</td>
<td>-0.24</td>
<td>0.155</td>
<td>-0.22</td>
<td>0.188</td>
<td>0.02</td>
</tr>
<tr>
<td>Foster Child High Needs</td>
<td>-0.78</td>
<td>0.628</td>
<td>-0.47</td>
<td>0.769</td>
<td>-0.39</td>
</tr>
<tr>
<td>Intervention</td>
<td>5.50</td>
<td>0.001</td>
<td>-2.35</td>
<td>0.611</td>
<td>2.90</td>
</tr>
<tr>
<td>Permanent Child Age * Intervention</td>
<td></td>
<td>0.86</td>
<td>0.074</td>
<td></td>
<td>0.42</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.80</td>
<td>0.092</td>
<td>-1.98</td>
<td>0.536</td>
<td>-2.23</td>
</tr>
<tr>
<td>R^2</td>
<td>0.421</td>
<td>0.445</td>
<td>0.310</td>
<td>0.325</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Table reports regression results of child characteristics, initial sibling inventory of behavior (SIB) score (de-meaned), and intervention status on the improvement in the SIB score (increase in SIB+ or decrease in SIB-). p-values for each coefficient are reported in italics.

The SIB- measure showed similar mean reversion, with worse (larger) scores showing more improvement. The intervention also improved the SIB- score by an average of 2.9 points. The age of the permanent child also had a positive impact (though with a p-value of 12%) and thus the interaction of age and intervention was also insignificant (Table 3, Columns 3 & 4).

The pre-intervention questionnaire showed that a positive sibling relationship and younger foster child age were positive predictors of the initial Family Hardiness Index (FHI) scores. Negative relationship issues were not significant, nor was the age of the permanent child (Table 4).
Table 4

Predictors of Family Hardiness in Initial Family Survey

<table>
<thead>
<tr>
<th></th>
<th>N = 93</th>
<th>FHI Pre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Child Age</td>
<td>-0.06</td>
<td>0.733</td>
</tr>
<tr>
<td>Foster Child Age</td>
<td>-0.23</td>
<td>0.091</td>
</tr>
<tr>
<td>Foster Child High Needs</td>
<td>-1.11</td>
<td>0.393</td>
</tr>
<tr>
<td>SIB+ Pre</td>
<td>0.17</td>
<td>0.006</td>
</tr>
<tr>
<td>SIB- Pre</td>
<td>-0.05</td>
<td>0.649</td>
</tr>
<tr>
<td>Constant</td>
<td>41.94</td>
<td>0.000</td>
</tr>
<tr>
<td>R^2</td>
<td>0.178</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Table reports regression results of child characteristics and initial SIB measure of relationship quality on initial Family Hardiness Index measure. p-values for each coefficient are reported in italics.

When re-evaluated after four weeks, the FHI score showed moderate mean reversion: for each additional point in the initial score, the post-intervention score was 0.3 points lower.

Families who received the intervention, in contrast, significantly increased by 4.3 points.

Improved sibling relationships contribute to the increase in family hardiness. In the second regression specification, a 1-point increase in the SIB+ measure results in a significant 0.25 point increase in the FHI. The intervention still has a significant direct effect on family hardiness, though reduced from 4.3 to 3.1 points. The difference of 1.2 points change in FHI (or 28% of the total effect) occurs because of the impact of the intervention on sibling relationships (Table 5).

Table 5

Predictors of Family Hardiness Index (FHI) Change in Follow-up Survey

<table>
<thead>
<tr>
<th></th>
<th>N = 86</th>
<th>FHI Improve</th>
<th>FHI Improve</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHI Pre</td>
<td>-0.30</td>
<td>0.000</td>
<td>-0.24</td>
</tr>
<tr>
<td>Intervention</td>
<td>4.31</td>
<td>0.000</td>
<td>3.14</td>
</tr>
<tr>
<td>SIB+ change</td>
<td>0.25</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>SIB- change</td>
<td>-0.11</td>
<td>0.240</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-1.09</td>
<td>0.070</td>
<td>-1.03</td>
</tr>
<tr>
<td>R^2</td>
<td>0.310</td>
<td>0.441</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Table reports regression results of initial FHI score (de-meaned), intervention status, and change in SIB scores on the improvement in the FHI score. p-values for each coefficient are reported in italics.
The pre-intervention CFAI measure of family preparedness was not significantly related to any of the characteristics of child age or needs, and only weakly positively related to a higher SIB+ score. When re-evaluated after four weeks, the intervention predicted a small but not significant improvement in CFAI. When changed in sibling relationship were also included, however, the intervention has no effect, but SIB+ is positively significant (with a p-value of 1.5%) (Table 6).

**Table 6**

*Predictors of Change in Casey Foster Applicant Inventory (CFAI) in Follow-up Survey*

<table>
<thead>
<tr>
<th>N = 86</th>
<th>CFAI Improve</th>
<th>CFAI Improve</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFAI Pre</td>
<td>-0.43</td>
<td>0.000</td>
</tr>
<tr>
<td>Intervention</td>
<td>0.54</td>
<td>0.285</td>
</tr>
<tr>
<td>SIB+ change</td>
<td>0.08</td>
<td>0.015</td>
</tr>
<tr>
<td>SIB- change</td>
<td>0.05</td>
<td>0.374</td>
</tr>
<tr>
<td>Constant</td>
<td>0.61</td>
<td>0.068</td>
</tr>
<tr>
<td>R^2</td>
<td>0.357</td>
<td>0.448</td>
</tr>
</tbody>
</table>

Notes: Table reports regression results of initial CFAI score (de-meaned), intervention status, and change in SIB scores on the improvement in the CFAI score. p-values for each coefficient are reported in italics.

**Exploratory Aim 3 Results**

Exploratory research Aim 3 was to determine the feasibility within the foster family population of salivary cortisol collection. The question posed was: Is collection of saliva samples to assess diurnal cortisol rhythm feasible within this population? We hypothesized that feasibility would be achieved through 70% or more of saliva samples being collected and completed, according to the study protocol.

Planned total recruitment was 30 families. Of the 192 families that expressed interest in participating in the broader study, 175 families were willing to collect saliva samples. After receiving consent and demographic survey forms and determining that 154 were eligible for the
study, 30 families were randomly selected for participation in the salivary cortisol collection. These families were contacted via text or a phone call and were then shipped the saliva collection kits. Of the 30 families, 50% (n=15) withdrew from the study. Of those 15 families that withdrew, the majority (n=9) cited family emergencies, including two in which the caregiver was hospitalized, and one family member death. This study was conducted during the COVID-19 pandemic. Only five families who withdrew cited challenges with sample collection.

After accounting for and removing the nine families who withdrew due to family emergencies, 71% of families recruited completed the study and returned saliva samples (15 out of 21). The families that stayed in the study (n=15) collected and returned 93.5% of the samples (n=758 saliva samples out of 810) (Table 7). The rate for parent and child saliva collection was identical at 93.6%. The samples missed by either a parent or child were not correlated (meaning that if a parent missed, it did not mean that the child of the same parent missed), except for in the case of one family who was vacationing during the one-month follow-up and thus both missed collecting the sample.

Due to potential difficulties complying with passive drool saliva collection procedures, it was expected that a higher percentage of parent samples would be successfully collected than child samples. Of the three families that withdrew from the study and cited difficulty with samples, one had a child that was not able to fully understand the collection process (age = 13), one family lost the tubes (were accidentally thrown out by another family member), and the third caregiver reported that they “forgot to freeze the samples.” One shipping issue arose in which the family notified the research team that they had dropped the sample off to a FedEx drop box.
However, the barcode for shipping was never scanned into the FedEx tracking system and the sample (both for parent and child) was deemed “lost.”

Table 7

Summary of Cortisol Sample Participants

<table>
<thead>
<tr>
<th>Sample</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initially Enrolled</td>
<td>30</td>
</tr>
<tr>
<td>Dropped Out</td>
<td>15</td>
</tr>
<tr>
<td>Family Emergencies</td>
<td>9</td>
</tr>
<tr>
<td>Difficulty with Sample Process</td>
<td>4</td>
</tr>
<tr>
<td>Unknown (did not give reason)</td>
<td>2</td>
</tr>
<tr>
<td>Number of Family Samples Received</td>
<td>15</td>
</tr>
<tr>
<td>% parent samples completed</td>
<td>93.6%</td>
</tr>
<tr>
<td>% child samples completed</td>
<td>93.6%</td>
</tr>
</tbody>
</table>

Notes: Table reports the number of participant families enrolled in salivary cortisol collection and those who were dropped from or completed the study.

Results Summary

The online intervention titled “The Connected Family Series – For Foster Families” was successfully adapted and implemented. The four-week, online intervention was feasible for foster families caring for both a foster child and a permanent sibling in the home. The intervention resulted in a significant increase in family hardiness and positive sibling relationship. The increase in a positive sibling relationship between the foster child and permanent sibling accounted for approximately 30% of the increase in family hardiness. Passive salivary cortisol collection in this population was possible and feasible. However, family health and emergencies in this population were higher than expected. Only 15 of the initial 30 families chosen for salivary cortisol collection stayed in the study (with several reporting health issues as the reason for withdrawing from the study). Of the families who stayed in the study, we successfully collected over 90% of the required samples.
**Discussion**

To summarize, the adaptation of the Connected Family Series for use within the foster care population was successful and resulted in significant increases in family hardiness and sibling relationships. Passive salivary cortisol collection in this population was challenging, but feasible. All three aims of the study were met, which supported the central hypothesis of the intervention leading to improved sibling relationships and increased hardiness/coping in families.

Aim 1 was to establish the feasibility and acceptability of the technology-based, family-centered intervention. A total of 121 families or parent/child dyads fit inclusion criteria and were randomized to either the control or intervention group. Of the 59 dyads randomized to the intervention group, 37 completed the pre- and post-intervention surveys. Of these, 78% (n=29) completed at least 75% of both the child and parent videos. Feedback received from study participants included the following quotes: “I love that you all are focusing on the connection for the in-between. Our foster son will be here until he goes off to college but I love that our kids have bonded to him for life” and “I have never felt that anyone understood what our family lives every day until now. She nailed it down to one adopted child that everything seems to revolve around. I love my kids, crazy behavior and all, however, some days are overwhelming, and I want to crawl in my closet with Oreos for a few hours. Really looking forward to seeing how we can change and grow as a family. I am excited to write letters to my kids!” The participants validated the need to view the family as a whole and one wrote, “Just the acknowledgment that my family has six people, not just the parents and foster child. I felt seen as a whole unit.” This is consistent with findings from the literature equating the fostering sibling to the “invisible child” and that parents feel their children need to be recognized (Hojer, 2007; Raineri et al., 2018).
Foster families see the contributions and sacrifices children already residing in the home make on behalf of foster children. This can be by choice or by necessity, but the professional community and government entities have not traditionally recognized or supported them. These children experience grief and loss when a foster child leaves the home and are integral in the acceptance process of a foster child (Gypen et al., 2020). This intervention supports and aligns with the current recommendations in the literature, yet few interventions choose to include the permanent siblings.

After reviewing the results of the study, the community-based participatory research team consisting of the PI, a TBRI licensed trainer/educator, social worker, foster care liaison, and foster parents), deemed the intervention acceptable and a positive move forward in supporting the fostering family. Areas for improvement in the intervention included improving the child videos to better hold the attention of younger viewers. One participant noted “My kiddos thought the child videos were boring, although I enjoyed them and thought they were very relevant. I think they are just used to more animation and transitions in educational videos.” This also may be reflected in the results showing the intervention had a higher impact if the sibling participating was older in age. The adapted intervention varied from the original adoptive family intervention in that it included fostering terminology and information specific to fostering, including caring for children with special needs (medical, developmental, & psychological).

The Theory of the Adapting Foster Family (TAFF) was used during the adaptation process to account for variables such rapid transitions and the experiences unique to the fostering family. Additionally, both the theory and the intervention looked at fostering as a family whole, which is particularly important as expressed by these families (Targowska et al., 2016). While
the original Connected Family Series - for Adoptive Families had promising and positive results, the FHI and SIB were not measured during the initial study. Therefore, an exact comparison between the two populations cannot be made. However, the adaptation was shown to be acceptable and successful. Furthermore, including the children in the home appears to be a strong component of family functioning.

Aim 2 was a quantitative aim in which the effectiveness of the intervention to impact specific family measures was investigated. The three measures were the FHI, SIB, and the CFAI-Sib. The CFAI-Sib showed no significant changes were noted pre- and post-intervention nor between control and intervention groups, although the intervention may have had an indirect effect by increasing SIB+ scores, which did lead to higher CFAI scores. The CFAI survey was very short and may not have been an ideal measurement tool for this study. This could be due to numerous reasons. First and foremost, the families participating in the current study had a mean level of 4.9 years as experienced foster families. To measure “preparedness” is challenging, particularly when we did not investigate the preparation prior to the families becoming foster families. These families were already deep into the fostering experience. Additionally, the CFAI-sib is a standardized self-report measure designed to assess the potential to foster parent successfully. While its construct validity and psychometric properties are promising to measure the potential for successful foster parenting, it may not successfully capture the preparedness for or characteristics of foster-sibling caregiving. A more thorough review of measurement tools and potential adaption of new tools is needed to address preparedness to foster for a family as a whole as opposed to only parenting.
The FHI and SIB proved to be useful and accurate tools for measurement within this study population and experimental design. Not only did the tools capture the concepts that were being taught, but they quantified the concepts into numerical data. Both tools demonstrated construct validity (how well a tool can detect significant differences) and content validity (how accurately a tool taps into the various aspects of the specific construct in question) when applied to the foster family population. To ensure that the FHI and SIB were indeed accurate tools for measurement within this population, we compared results to published research articles in other populations that included children. For example, we compared our bell curve for foster families against the bell curve for mothers of children with cardiac illness. We found that the family hardiness bell curve for foster families and for mothers of chronically ill children were indeed similar (McCubbin et al., 1987). This helped to gauge if the tool was being used correctly and was translatable to our specific population. Our findings also supported the reliability of these two measurement tools - that is that the measuring procedure yields the same results on repeated trials. The SIB results were compared with other studies of families raising one typically developing child and another child with disabilities. Both these measurement tools, when compared to the theoretical framework, appear to have theoretical and face value validity, accurately capturing the concepts in a quantitative way as would be expected by the theoretical modeling.

Aim 3 investigated the feasibility of collecting salivary cortisol samples within the foster family population. Collection of saliva to assess concentrations of cortisol is accepted as a safe, non-invasive way of measuring hypothalamic-pituitary-adrenal axis functioning. Salivary cortisol is a specific measure of unbound and biologically active cortisol (Granger et al., 2012).
As such, it is an indicator of hypothalamic-pituitary-adrenal (HPA) axis activity as the body secretes cortisol under normal and stressful conditions (Jessop, & Turner-Cobb, 2008). By incorporating objective biological measures, clinicians gain a multilevel understanding of how the mind and body function together and are affected by stress.

Feasibility of salivary cortisol collection has been investigated in the pediatric population and adult caregiving population (Condon, 2016; Pu et al., 2020). The current study investigated the feasibility and acceptability of collecting this indicator of biological stress for both the child and the parent at similar time intervals and in a complex family structure. Collection periods included before the intervention, after the intervention, and one-month post-intervention three times a day for three days. While challenging, the study aimed to test the feasibility of collecting samples at the ideal times for a rigorous study that would also be acceptable to the scientific community. Each family was tasked with collecting 54 samples during the study. We found feasibility of salivary cortisol collection was at higher levels within the foster family population than individuals with chronic pain and dementia (Pu et al., 2020). Of the families that remained in the study, collection was highly successful. Similar to previous studies with healthy adults, this study also found higher than 90% compliance to the study protocol in collecting samples (Sarensen et al., 2021). Attrition in our foster family population was challenging, because of the family emergencies reported before the post-interventions assessment. These families withdrew from the study, meaning they did not complete the post intervention assessment nor the saliva collection.

The direct cost to purchase salivary cortisol assay trays was roughly $260 per tray, which covered 36 saliva samples. Each family in the study was asked to collect 54 saliva samples (1.5
trays). Aside from the cost of the saliva sample tubes, material costs for 30 families were $100. Shipping the saliva collection kits to families was approximately $10 for 3-day shipping, and the overnight return shipping of samples to the lab cost approximately $55 per family. Families who participated in the saliva collection also received an additional $25 gift card. Total costs per family to collect, return, and run salivary cortisol levels was approximately $485 per family. This does not include the cost of the physical lab work that was conducted by the research team to run the assays. Additionally, all 130 participants (including the saliva sample group) were offered a $25 gift card for completing the pre-assessment surveys and another $25 for the post-assessment surveys. Total direct expenses paid out thus far for this study (including the incentives for the survey only families) were approximately $10,598. This does not include travel expenses to the lab, personnel expenses, statistical support costs, saliva tubes and six salivary assay kits donated by the research lab. These numbers however present an economical approach for testing objective biological markers.

**Study Strengths**

**Design**

The current study successfully employed a randomized control trial of a behavioral intervention that included children. Retrospective and descriptive studies are commonly employed with this population due to the challenges and costs of working with this population and with biomarkers. This study was able to demonstrate a successful adaptation of an accessible intervention to improve family functioning and increase positive relationships within families. The importance of having a control group was demonstrated. As shown previously in Table 5, the average family experiences mean reversion in their FHI over the course of the four-week
study period. Despite this, intervention families had a 4.3 point increase in their FHI. Thus, the randomized trial allowed us to more confidently conclude that the intervention did have a significant impact on FHI.

**Using Theory Specific to the Population**

The current study and adaptation of the intervention was grounded in a mid-range theory, which was specifically developed for use in designing studies of and assisting fostering families. The unique nursing perspective and holistic approach required factoring the environment and complex family system dynamics into what was included in the intervention and how it was incorporated.

**Sibling Inclusive**

The intervention tapped into a previously undervalued and poorly understood source of resilience, the siblings in the home. To our knowledge, an RCT with foster siblings has never previously been conducted. The results were consistent with the theoretical assertions that the relationship between the children in the home may provide a source to buffer stress, improve connection, and assist in improving family hardiness.

**Study Limitations**

**Measuring Family Preparedness**

The CAIS did not appear to capture the concept of sibling or family preparedness for fostering. It's possible the intervention did not change family preparedness, but it is also possible that a different or improved tool is needed. The CAIS is meant to measure foster parenting preparedness and did not translate over to “family preparedness” in a meaningful way for this study. Additional tools or how the CAIS is applied need to be rethought. A longitudinal study of
new foster parents also may be more useful in measuring the construct of preparedness. In this study, the majority of the families were experienced foster care providers.

**Generalizability to Fostering Families Outside the United States (US)**

The study included foster families across the US. It did not include families from other countries. The intervention is generalizable to foster families within the US who have access to technology or the internet. It is likely generalizable to English speaking. Industrialized countries with similar foster care systems. It is unlikely that the intervention, in its current form would be useful, for families in countries that are not as developed. Additionally, the main presenter of the videos is a therapist who is Caucasian. To better represent and connect with families globally, the intervention should be adapted to have individuals in the videos who more closely represent the ethnicities of participating families.

**Implications for Advanced Practice Nursing**

Nursing is uniquely positioned to influence and affect health outcomes for children in foster care. Many state agencies employ nurses for intake assessments and insurance enrollment for foster children. The professional nursing scope and knowledge could greatly influence a family’s ability to properly care for children at risk for poor health outcomes. Child welfare agencies should include nurses on placement committees and in educator roles during prelicensure training for foster parents. The essentials of doctoral education for advanced nursing practice (DNP essentials) includes “Health Care Policy for Advocacy in Health Care” and “Interprofessional Collaboration for Improving Patient and Population Health Outcomes (American Association of Colleges of Nursing, 2006).” Welfare nurses can monitor, influence, and promote training for families that focuses on the unique needs of children with disabilities as
they work in tandem with other professions. Nurses also are highly influential, through case management, in improving care for patients that need lifelong care (Joo, & Liu, 2019). School nurses, if allowed greater coordination with the foster care team, can evaluate needs and connect families to education and healthcare resources within their community, particularly for families who are unfamiliar with accessing early intervention programs or individualized education plans that federal regulation provides for persons with disabilities (McClanahan, & Weismuller, 2015; Pufpaff et al., 2015).

The recently released and updated essential competencies for professional nursing education for advanced practice nursing education includes applying theory and research-based knowledge from nursing and other disciplines (American Association of Colleges of Nursing [AACN], 2021). Under Domain 4, “Scholarship for Nursing Discipline,” this dissertation sought out knowledge and integration of interdisciplinary practices in the development of the nursing theory manuscript as well as the design of the randomized controlled trial. The generation of knowledge as presented in the TAFF, the synthesis of the interventions, and the findings of the study will be translated into accessible tools to promote improved family functioning and health among a vulnerable population. Equitable population health outcomes, as describe by domain 3 of the DNP essentials, includes the partnership of both traditional and non-traditional entities. This research required the collaboration of several groups to advance science surrounding a population with historically large health disparities.

**Siblating: A Term to Recognize the Active Caregiving Role Siblings Play**

This research study also suggests the act of being a sibling is not passive or isolated to one person. Children in the home need to be recognized for their contributions to the foster
caregiving. A sibling is not an inanimate noun. Similar to the word parenting, the act of being a sibling is indeed an action and needs verbiage to indicate it as such. The English language appears to be missing a word that describes the act of being a sibling in shaping and influencing the lives of other children in the family. I propose that parent is to parenting as sibling is to a new term, “siblating.” Just as a parent makes conscious decisions that affect the whole, a sibling does so as well. Siblings are not merely acted upon, but also act with and influence others. They have the potential and ability to improve outcomes for the family and other children in the home. Siblings, including those fostering, should be recognized for the active role they play. Furthermore, they should be provided with recognition and developmentally appropriate education to support them in the healthy development of their role. This study sheds light on the potential foster siblating and how a behavioral intervention is a feasible way to improve sibling relationships and daily hardiness within foster families. Regardless of the term used, siblings and the development of the relationship between sibling in the home and foster children should be appreciated by child advocates and researchers. These relationships have the potential to improve child outcomes, attachment, and placement stability. How fostering affects biological children and they support hey are given impacts parents decisions to disrupt a placement or offer permanency (Tonheim, & Iversen, 2019). Research has emphasized the effects that siblings have on each other in enhancing the development of care and concern for others (Jambon et al., 2019). Additionally, a positive sibling relationship functions as a buffer between poor parenting practices and externalizing behaviors (Platt et al., 2014). A positive sibling relationship has a protective effect on child adjustment.
during stressful or adverse life events (Gass et al., 2007). Improving and promoting a positive relationship within foster siblings may have similar protective and influential effects.

**Implications for Future Research**

This is the first step in a long-term research trajectory involving children in protective custody and families trying to meet the needs of children with disabilities. It is expected that this research will aid in the further development of healthcare delivery and support via technology to assist in reaching at-risk children who might otherwise not have access to the care they need. Going forward, the focus will be on developing new strategies to improve health equity of a population that is often marginalized and frequently experiences long-term, poor health outcomes throughout the lifespan. Consent for the current study included willingness to be contacted for future research after the current study has been completed. This may provide an opportunity to later assess information such as intent to provide permanency or if the placement was disrupted. Future adaptations of the behavioral intervention should also seek to include diverse presenters and input from foster communities outside the US.

Future endeavors and research involving foster families would be strengthened and would benefit from incorporating a nursing perspective, particularly through use of the original new theory, the TAFF. Research into why certain placement settings are chosen over others would prove valuable. Studies examining foster parents’ perceptions, skills, and support needs may promote family hardiness and decrease disruptions. Healthy foster families in turn could provide consistent, long-lasting support, thereby decreasing poor health outcomes. By integrating the strengths of the foster family into future studies, as opposed to the current literature which focuses on foster child risk factors, researchers and child advocates may find novel avenues to
increase hardiness within the foster family unit. The risk-focused approach excludes potentially effective resiliency-based research designs.

**Conclusion**

The contribution made by this study was the provision of a behavioral intervention that successfully increased positive measurements of family hardiness and sibling relationships. The behavioral intervention has strengths in that it is self-paced, low cost to distribute, and accessible online. Siblings or children permanently living in the home can have a significant effect on the family. Because of the potential and active role they play in caregiving, the fostering siblings should be included and supported. The study also contributes to our knowledge regarding the feasibility of collecting biomarkers for stress within this population. Findings regarding the passive salivary cortisol collection techniques will aid in the development of future studies. Currently, self-report tools have been psychometrically validated. However, collecting biological markers of stress and analyzing how interventions might improve HPA-axis function could prove valuable in improving the overall health of foster family members. This study was rigorous and novel in several dimensions, thus increasing our knowledge about improving foster family functioning.
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APPENDIX A – MANUSCRIPT 1:

PLACEMENT DISRUPTION OF CHILDREN WITH DISABILITIES IN FOSTER CARE

(ACCEPTED BY JOURNAL OF PEDIATRIC NURSING)
Placement Disruption of Children with Disabilities in Foster Care

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Abstract

Purpose: To investigate and describe available data on children with disabilities in the United States (US) foster care system and examine placement disruptions.

Design: This quantitative descriptive study was a secondary data analysis of the Adoption and Foster Care Analysis and Reporting System (AFCARS) and included 680,611 children.

Methods: Descriptive and regression analyses were conducted.

Findings: Of 680,611 children in the US foster care system in 2017, 22% had a medical or disability diagnosis, requiring additional or specialized care. Children with disabilities in foster care (CDFC) had a mean of 4.0 disruptions—significantly higher than the mean 2.37 disruptions among those without a disability ($p<.001$, $d = .51$). CDFC spent an average of 915 days in foster care compared to 514 days for children without a disability ($p<.001$, $d = .59$). Predictive risk factors for disruptions were increased child age, race (American Indian or Black), and increased foster parent age. Protective factors against disruptions included married foster parents and a child being placed outside of the child’s initial state of residence.

Conclusions: CDFC have significantly more disruptions and longer stays in foster care. While risk and protective factors affect all foster children similarly, they have significantly greater effect on foster children with disabilities.

Practice Implications: Increased disruptions compound the vulnerability of CDFC as relationships and support systems are broken. Understanding the extent to which childhood disabilities play a role allows school nurses, healthcare providers, and child advocates to better design interventions to improve lifelong health outcomes.

Key Words: Children, Disabilities, Foster Care, Placement Disruption
**Introduction**

Disability status may have implications for children entering foster care, including the type of setting in which they are likely to be served, the stability of the setting, and length of time before permanency. Many times, foster families are tasked with providing for the complex physical and emotional needs of children with disabilities, but little is known about the extent to which those disabilities affect the long-term stability and outcomes for such vulnerable children (Bruskas, 2008; Gypen et al., 2017; E. M. Slayter, 2016a). Foster families are culturally diverse by nature, often combining parents and children from different races, socioeconomic backgrounds, religions, and gender/orientation identities (Austin et al., 2021; Zinn, 2009). Parents, siblings, and new foster children must adapt to new traditions, expectations, and communication styles. The traumatic experiences and disabilities that accompany many children as they enter the foster care system compound the complex dynamics of such diverse family units. Without adequate experience, training, and resources required to care for the unique medical and educational needs of a child with disabilities, a foster family may feel unprepared for and stressed by unexpected challenges, such as medication management, healthcare navigation, and participation in special education programs (Brown & Rodger, 2009). These events could result in a placement disruption, moving the child to another foster home and further compounding the child’s vulnerability.

When a child is deemed to be in an unsafe situation requiring agency intervention, they may be removed from their current living situation and, by court order, placed in a licensed home. These homes are typically called foster care homes or foster families. Ability (licensing requirements by state and federal regulations), willingness, and vacancy are all required to be an
eligible foster family. Geographical location plays a role in the agency’s ability to place a child in a foster home close enough to facilitate reunification services and visitation with biological parents. Initial placement into a foster home does not guarantee a stable environment. Several types of and causes for placement disruptions exist. Current literature compared three types of disruptions (placement mismatch, substandard care, and child initiated), noting age and race as associated factors, as well as an increased risk of substandard care and disruptions in kinship care compared to non-relative care (Font, 2015; Font et al., 2018; Koh et al., 2014; Sattler et al., 2018). Across these studies, disability status was not investigated, yet it could be an influence in placement disruption decisions due to the increased level of care required for a child with special needs, particularly in disruptions labeled as placement mismatch.

Children in the US foster care system frequently experience health disparities (Blakeslee et al., 2013), some of which may stem from higher prevalence of disabilities and their associated risk factors. Children in foster care have poorer mental and physical health compared to children in the general population, even when compared to family type (such as single parents) and children in economically disadvantaged families (Turney & Wildeman, 2016). They are more likely to have been exposed to alcohol and drugs in-utero, leading to worse outcomes in several areas such as academic success, behavior, cognition, and hospitalizations (Arter et al., 2021).

Far less is known about the experiences of children with disabilities in the foster care system compared to those without a disability. However, children who are in foster care with learning disabilities have what researchers call “synergistic factors” compounding health disparities and leading to greater vulnerability (Grabovschi et al., 2013). Researchers
documented concerns of foster parents and their challenges in caring for children with disabilities such as obtaining specialized professional services, incurring higher costs due to fostering a child with a disability, arranging appropriate educational services, addressing behavioral challenges, and navigating the healthcare system (Brown & Rodger, 2009).

When a foster family is unable to adequately care for a child, the child may be moved to a different home. These disruptions create greater barriers and significant health care challenges for an already vulnerable population. For example, a child’s support at school can be greatly affected when disruptions lead to poor communication between parents and teachers and a lack of historical knowledge by teachers when a child must transfer schools. This is especially notable when the child also has a disability (Mires et al., 2018). A change in geographical location due to a placement disruption can create a need for a new healthcare provider. This transition may lead to the loss of valuable information and specific knowledge regarding the child’s needs. Furthermore, disruptions and changes in healthcare providers can sever caring connections, and these lost connections are associated with higher levels of unmet healthcare needs during and after foster care (Collins, 2016). The more disruptions, the higher the cost to the child’s well-being (educational, physical, and mental) and the higher the cost to the system (Vanderfaeillie et al., 2018). Strong associations exist between externalizing behavioral problems and the number of placements a child experiences (Jedwab et al., 2019; Vreeland et al., 2020). However, developmental needs secondary to a disability may be perceived as behavioral problems if not cared for by families or caregivers with specialized training.
Theoretical Background for Study

Two theories (Schlossberg’s Transition Theory and Meleis’ Transition Theory) were used to inform this research. Both theories were needed as neither theory alone encompassed all the concepts unique to fostering and placement stability. Schlossberg's Transition Theory has been used extensively within health disparities research and research pertaining to foster children, whereas Meleis’ transition theory addresses family transitions and parenthood (Meleis et al., 2000; Schlossberg, 1981; Winter, 2014). Concepts from both theories aided in the operationalization of the variables and the analysis. For example, Schlossberg’s concepts — such as situation (type of placement), self (type of disability), and social support (caregiver characteristics) — guided the investigation. A transition is any event that changes relationships, routines, assumptions, and roles. For children in foster care, such an event can also include a “non-event” where they expected a transition to occur (e.g., to biological parent’s home) but it did not and they must adjust to it not happening as planned. Meleis et al. (2000) noted that people in transition tend to be more vulnerable and have greater risks that may affect their health. This is particularly true for children in foster care (Bruskas, 2008). An individual’s ability to cope and move through the transition depends upon assets and liabilities, which this study attempts to examine. By using both transition theories to guide the search for potential concept relationships, we examined placement disruption or transitions in the context of disability and fostering.

Purpose and Aims

The purpose of the study was to investigate and describe available data on children with disabilities in the US foster care system and examine placement disruptions. Understanding the
extent to which disability status may play a role in increased vulnerability allows healthcare workers and child advocates to better understand and design interventions to improve lifelong outcomes. Within the data set, disability was defined as being clinically diagnosed with a disability including mental retardation (sic; i.e., more appropriately referred to as a person having a cognitive, developmental, or learning disability), visual or hearing impairment, physical disability, emotionally disability, and/or another medical diagnosis requiring special care. The aims of the study were to: 1) determine how many children in foster care during 2017 had at least one disability; 2) ascertain the number of disruptions in placements to foster homes for children with a disability; 3) compare the average duration that a child is in foster care between children with a disability versus children in foster care without a disability; 4) investigate type of placement settings for CDFC; and 5) identify risk and protective factors associated with disruptions.

Methods

Design

A cross-sectional descriptive secondary analysis of the Adoption and Foster Care Analysis and Reporting System (AFCARS) 2017 dataset, obtained through the National Data Archive on Child Abuse and Neglect, was conducted. Institutional Review Board approval was received through the University of Arizona’s Human Subject’s Protection Program. The protocol, using de-identified data, was determined to not be human subject research. The investigators retrieved the AFCARS data set, which is publicly available, and downloaded it into STATA to address variables in the aims. AFCARS was chosen because it includes all 50 states and contains the most accurate/large scale statistical data on foster care in the United States.
However, data from the state of Colorado was excluded from this study because they did not report on disability status. We examined all children in the United States foster care system for any part of 2017, providing a snapshot of children in care.

**Sample**

The sample included 680,508 children in the United States foster care system during 2017, of which 51.58% were male. Race of foster children was predominantly white (68.5%), followed by black (30.8%). Also, 22.2% reported a Hispanic origin. Among CDFC, there was a slightly higher percentage of black children (33.8%). The average child’s age at the time of removal was 6.5 years, though this average is higher (8.0 years) among CDFC. This United States sample included children and families from all U.S. states except Colorado, in addition to the District of Columbia and Puerto Rico. The District of Columbia had the fewest active foster care cases at n=1,131 (0.16%), followed by Delaware with n=1,190 (0.17%). California had the highest number of foster care cases with n=80,408 (11.81%), followed by Texas at n=50,333 (7.40%). See Table 1 for demographics of children and Supplemental Table B for foster family structure based on disability status.

**Variable Selection and Analysis**

The data report the number of placement settings in which the child lived during their current foster care episode. Temporary living conditions, such as hospitalization or respite care from another foster family, are not counted as additional placements, nor are placements back in the original home, such as a home visit or a trial home placement. This was particularly important, because children with disabilities may experience more temporary out-of-home care than the general foster care population, and the study focus was on actual caregiver and long-
term setting changes. The number of placements is used to represent disruptions; effectively, the first placement after initial removal from the biological home is counted as a disruption.

A child with a disability was defined as a child with one or more of the following diagnoses using the data set definitions: vision impairments, hearing impairments, mental disabilities, emotional disabilities, physical disabilities, or mental retardation [sic] (Children’s Bureau, 2020). Other medical diagnoses factored into the definition of disability included epilepsy, fetal alcohol syndrome, shaken infant syndrome, and encephalopathy. Care was taken to only count a child once and to group their multiple diagnoses as one “disability.” Many disabilities are found in conjunction with other medical and developmental abnormalities, particularly in children who had experienced abuse, neglect, or substance exposure. For example, a child with cerebral palsy who had vision impairments, hearing impairments, physical disabilities (bone developmental abnormalities), and developmental delays was only counted once. Inclusion of specific diagnoses was determined based on the disability typically requiring substantially more care and level of expertise by the foster family. Children in the process of receiving a diagnosis were excluded from the analysis, but the separate medical, mental, and physical diagnosis variables were aggregated into a single dummy variable. This was done using STATA software. Descriptive statistics were calculated to characterize the population, and t-tests were employed to compare mean foster care experiences across disability status. A probability model of regression was used to examine relationships between the child’s disability status and various causes for initial removal from their parents’ home.

Results
Question 1: How many children in the United States foster care system had at least one diagnosed disability during 2017?

There were 151,666 foster children with a medical diagnosis or disability in 2017, in contrast to 528,842 without a diagnosis in the U.S. foster care system. This equates to 22% of children in foster care with a medical or disability diagnosis that requires additional or specialized care.

A probability model of regression was used to examine relationships between the child’s disability status and various causes for initial removal from their parents’ home (see Table 2). If removal was partly motivated by the child’s own problematic behaviors, they were 42% more likely to have a diagnosed disability ($p<.001$). A child removed due to parental substance abuse was 30% less likely to have a disability ($p<.001$). Among children without a diagnosed disability, 4,583 (or 0.9%) had disability listed as the initial removal reason.

Question 2: Do children in foster care with a disability have a greater number of disruptions than those without a disability?

Children with a disability in foster care (CDFC) have a mean of 4.00 disruptions whereas children in foster care without a disability have a mean of 2.37 disruptions (see Table 3). Children with a disability are more likely to be moved from home to home. A 2-sample t-test was conducted to determine significance. The analysis revealed significantly more disrupted placements for children in the foster care system with disabilities than for those without disability, with a moderate effect size ($p<.001$, Cohen’s $d = .51$).

Question 3: Does the average length of time that a child is in foster care differ between children with disabilities vs. children without?
CDFC spent an average of 915 days in foster care compared to children without a
disability who spent an average of 514 days in foster care. This is a significant difference with a
somewhat stronger effect size ($p<0.001$, Cohen’s $d = .59$). Results of this analysis are shown in
Table 3.

**Question 4: Are children with disabilities more likely to be placed in more restrictive settings?**

Placement categories included: pre-adoptive home, kinship (relative) foster home, non-relative foster home, group home, institution, supervised independence, trial home, runaway, and reported missing. The category with the highest percentage caring for CDFC was non-relative foster home (37.76%) followed by a foster home of a relative (19.55%). CDFC are less likely to be placed with a relative compared to children without a disability (31.96%); CDFC are more likely to be found in pre-adoptive homes, group homes, or institutions (Supplemental Table C).

**Question 5: What are the predictive risk or protective factors affecting the number of disruptions for children with disabilities vs. children without?**

Predictive risk factors were defined as the characteristics of foster children associated with more disruptions and included foster child age (older) and race (American Indian or Black), as computed in a linear regression reported in Table 4. The regression includes interaction effects of disability with age and race, and in each case, the interaction effect significantly amplified the direct effect. For example, a foster child who is Black had 0.332 more disruptions than one who is white, and a foster child with disabilities had 1.247 more disruptions than one who does not. But a foster child who is Black and with a disability has an additional 0.270 disruptions—1.849 more than a foster child who is white without disabilities. Similar analysis on foster parent characteristics is reported in Table 5, showing that foster parent age is also a risk factor, while
foster parents who are married or live in a different state than the biological family are protective factors. Again, these direct effects are significantly amplified when interacting with foster child disability. Of note, the R-squared value in both regressions is low, indicating considerable variance and modest explanation for the cause of disruptions among CDFC.

**Discussion**

This study adds to scientific knowledge by illustrating that CDFC do indeed have significantly higher placement disruptions. Placement stability appears to be one of the most important factors to improve outcomes for children in foster care, as it establishes a foothold in education and provides a consistent support figure (Gypen et al., 2017). As a CDFC is moved from home to home, or to a more restrictive and less ideal environments, such as group homes or institutions, they fall further behind as medical and educational services are fragmented. Each year, over 400,000 children find themselves in the United States foster care system (Children’s Bureau, 2020). Expenses to care for these children is estimated to be roughly $15 billion annually (Font & Gershoff, 2020).

According to our findings, during 2017, 22% of children in foster care had diagnosed disabilities. In the broader United States population in 2017, only 0.4% of those under 5 years old and 7.3% of those ages 5-17 had disabilities (Kraus, 2018). These findings illustrate a disparity between the number of children in foster care who have disabilities compared to the general pediatric population. Disabilities may be a key driver in poor outcomes and the high costs to children and the system, particularly if these diagnoses are poorly understood and families are ill prepared. For example, negative externalizing behaviors exhibited by CDFC could be misinterpreted by caregivers as choices, when they are more directly a product of the
underlying disability experienced by CDFC. This is problematic, because behavioral problems are a strong predictor of poor placement stability (Konijn et al., 2019), and behavioral problems negatively affect integration into a foster family and adoption (permanency) (Leathers et al., 2012).

Predictive risk factors that increased the number of disruptions were similar for children without disabilities. However, these risk factors (such as child age, race, and foster parent age) had an even stronger effect on children with disabilities. Protective factors that might decrease the number of disruptions for CDFC are consistent with Meleis’ and Schlossberg’s theoretical concepts (such as resources and supports) which support healthy transitions (Winter, 2014). For example, a foster family with a married couple increases the potential for partner support. If a child has increased medical and emotional needs, the dual parenting and support they give to one another can act as a cushion protecting against parental burden. Designation as an out-of-state placement was a positive predictive factor for placement stability. The theoretical concept of network logically connects to why this factor is protective. A child is not typically moved out of state unless kinship (family) or an adoptive home is located (Sankaran, 2006). Moving out of state indicates the potential for permanency before the child is placed into the home.

Untangling the multifaceted correlations versus causes of health disparities in this population can be challenging. Health disparities are avoidable differences in health outcomes (higher burden of disease) experienced by socially disadvantaged populations (Centers for Disease Control and Prevention, 2013). CDFC have several factors which are associated an inequitable burden of disease that follows them into adulthood (Gypen et al., 2017). Children who require high levels of care, such as those with disabilities, might be more likely to enter the
foster care system, but it is also possible that conditions such as drug abuse and neglect impacted
development and caused higher levels of disability. Further investigation is warranted to
determine these links and associations. These subtle interactions may also contribute to the low
R-squared values and very modest explanation of the models for predictors of placement
disruption. Interestingly, among children without a diagnosed disability that entered foster care in 2017, 4,456 (or 0.7%) had disability listed as the initial removal reason. It is possible that children were removed due to a disability but did not have an official diagnosis, or this could be due to data error. A lack of official diagnosis can lead to an absence of needed support such as early intervention or special education programs through schools. These government funded programs require documentation of specific disabilities in order to qualify for support and interventions. It also may imply that the number of children with disabilities in foster care may be underreported or that parental/caseworker perceptions of disability status differ from the medical or legal diagnosis of disability. Furthermore, terminology used to report disability status within the foster care system is outdated and offensive. For example, the term “mentally retarded” is a specific term used within the data set. This term lacks a true medical diagnosis and further labels vulnerable children. Even the term “foster child” is still used within the literature. Reporting agencies should focus on revising data entry options to have medically accurate options for describing a child’s unique needs. Focusing on person-first language as opposed to identity-first language reduces stigma and recognizes individuals first instead of disabilities (Flink, 2021).

Another area of inequality for CDFC might also be availability of kinship compared to those without a disability. This study found that CDFC are less likely to be placed with known
family or kinship compared to children who enter the foster care system without a disability. This could be due to the complexity of care required but may also be due to underreporting or lack of assessments for children in kinship care compared to youth in group or clinical settings. Current research indicates that foster children placed with kinship statistically have improved adult outcomes, such as increases in employment and education, with a reduction in homelessness, public assistance, and incarceration (Lovett & Xue, 2020). Yet, CDFC were more likely to be placed in restrictive settings such as group homes. It is possible that given the disabled child’s extra needs, caseworkers look for foster homes that have medical backgrounds or training compared to non-trained relatives. More research into the reason that CDFC are more likely to be placed in particular settings is needed.

Children with disabilities have higher vulnerabilities within foster care as demonstrated by their increased disruptions and length of stay in the system. CDFC require a higher level of care, for which few foster parents are trained or prepared (Vasileva & Petermann, 2018). Especially among children who have developmental disabilities, moving from home to home and, as a result, school to school can cause fragmented educational instruction (Mires et al., 2018). A stable family environment with members prepared to meet the diverse needs of children with disabilities may be key in promoting resiliency. Education of foster parents through the child welfare system is not consistent and may fall short when preparing families to care for children with special needs. Healthcare providers should participate in educating foster parents regarding typical responses to trauma and placement in foster care (Taussig et al., 2016). Professions such as nursing have unique skills and access to these families and
could be key in promoting stable families with skills and knowledge regarding care for children with developmental delays and/or disabilities.

**Implications for Nursing Practice and Future Research**

These results show that CDFC experience more disruptions than other children and spend significantly more time in the foster care system. The next steps will be to undertake studies that address the causes for placement disruption, create interventions to decrease disruption, and examine impacts on foster care length of stay. The potential impacts on patient outcomes from this research are multifaceted and profound. Being a child in foster care correlates with poor determinants of health. The combination of high adverse childhood experience (ACE) scores, the loss of family and continuity of care, and the lack of a consistent community or family place these children at great risk. With tailored interventions targeting known risk factors, the integrity of a placement may be strengthened, providing resiliency and support to the child. Improved health and wellbeing could impact health outcomes through adulthood. The financial and social impact are far reaching and illustrate the need for further research to investigate underlying causes, develop interventions, and produce improved outcomes for such a vulnerable population.

Nursing is uniquely positioned to influence and affect health outcomes for CDFC. Many state agencies employ nurses for intake assessments and insurance enrollment for foster children. The professional nursing scope and knowledge could greatly influence a family’s ability to properly care for children at risk for poor health outcomes. Child welfare agencies should include nurses on placement committees and in educator roles during prelicensure training for foster parents. Child welfare nurses can monitor, influence, and promote training for families that focuses on the unique needs of children with disabilities. Nurses also are highly influential,
through case management, in improving care for patients that need lifelong care (Joo & Liu, 2019). School nurses, if allowed greater coordination with the foster care team, can evaluate needs and connect families to education and healthcare resources within their community, particularly for families who are unfamiliar with accessing early intervention programs or individualized education plans that federal regulation provides for persons with disabilities (McClanahan & Weismuller, 2015; Pufpaff et al., 2015).

Future endeavors and research involving foster families would be strengthened and would benefit from incorporating a nursing perspective, particularly through strengthening theoretical concepts and assumptions distinct to foster families. The use of Schlossberg's Transition Theory and Meleis’ Transition Theory was valuable because their concepts were consistent with variables for protective factors within this study (Meleis, 2010; Schlossberg, 1981). Research into why certain placement settings are chosen over others would prove valuable. Studies examining foster parents’ perceptions, skills, and support needs may promote family hardiness and decrease disruptions. Healthy foster families in turn could provide consistent, long-lasting support, thereby decreasing poor health outcomes for CDFC. By integrating strengths of the foster family into future studies, as opposed to the current literature which focuses on foster child risk factors, researchers and child advocates may find novel avenues to increase hardiness within the foster family unit. The risk-focused approach excludes potentially effective resiliency-based research designs.

**Study Strengths and Limitations**

This study involved secondary analysis of population-level data. While many foster care studies focus on individual regions or states, this study provides a more comprehensive view of
CDFC across all regions of the United States. The study illustrates a disproportionate number of children with disabilities in foster care. It provides solid prevalence and incidence data, showing increased instability and disruptions for an already vulnerable population. The study also provides information on removal reasons associated with a child’s disability. It also provides direction for potential interventions to strengthen both biological and foster families by shedding light on the reasons for removal.

While results provide valuable descriptive data on CDFC, several limitations of this study are noted. Limiting the analysis to 2017 provided a snapshot that could be compared to placement disruptions from other years. Spanning several years and following specific cases would provide a better understanding of the phenomena. Looking at the data from a longitudinal perspective or a several-year period is challenging because definitions of disability have changed greatly over the last decade, particularly relating to in-utero drug exposure which can lead to learning disabilities and mental health disorders (Ross et al., 2015). How states report disability status has also changed over time. Comparing case numbers and state reporting over time would be complex but, if feasible, would likely provide additional insight or reinforce the knowledge gained from this study.

Using administrative data to determine disability status is not without shortcomings. It is very possible that disability status is highly underreported due to lack of information given to state caseworkers and whether or not the state requires specific details in their reporting. Youth in institutional or congregate setting are more likely to be connected to assessment screenings. Kinship and in-home foster care may experience a longer lag in diagnosis or underdiagnosis.
Yet, using large data sets such as the AFCARS does provide valuable information, shedding light on the issues even if the precise numerical extent of the problem is not currently available.

Additionally, transitions theory helped to guide the questions that were asked. Children and families involved in foster care go through numerous changes and choices lending to the appropriateness of the theory. However, the current theoretical basis does not distinguish between foster families and a typical family unit. The complex adaptive systems (the child, the governmental systems, and the multiple family systems) interact with and influence the foster placement substantially. Research designs investigating interventions to decrease disruptions may need a more specific and robust theoretically-informed design to factor in unique characteristics of foster care. For example, in a foster home, a child may gain and lose a sibling several times during a year, causing an experience of loss and grief on a much more frequent scale than a child in a typical home. Such a design might potentially include a mix of concepts gleaned from family systems theory, complex systems theory, and transition theory built together to better guide studies unique to the fostering experience.

**Conclusion**

This study contributes to our knowledge regarding CDFC: the prevalence of CDFC was described, the number of disruptions analyzed, and the length of time spent in foster care for children with disabilities was compared to their non-disabled peers. Demographics of children in foster care, reasons for removal, and foster family structure were statistically analyzed. This study informs scholars, policymakers, concerned citizens, advocates, and professional practitioners by assessing the disparities in outcomes for CDFC. By integrating this information into practice, school nurses, public health
nurses, social workers, and other providers better position themselves to assist families. Researchers should consider the complexities involved in caring for a child with disabilities and test interventions to decrease disruptions, thereby helping families provide stable environments for CDFC. Future explorations into reasons for removal could inform design of interventions to strengthen the stability of placements and foster family systems to optimize health for CDFC.
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https://doi.org/10.1016/j.chiabu.2018.07.024


Appendix 1: Tables

Table 1
Demographic Characteristics of Foster Children

<table>
<thead>
<tr>
<th>Foster child disability</th>
<th>Without</th>
<th>With</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Mean age at first removal (SD)</td>
<td>6.1 (5.6)</td>
<td>8.0 (5.6)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>265,996 (50)</td>
<td>84,352 (56)</td>
</tr>
<tr>
<td>Female</td>
<td>262,846 (50)</td>
<td>67,314 (44)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>356,083 (69)</td>
<td>97,537 (67)</td>
</tr>
<tr>
<td>Black</td>
<td>154,447 (30)</td>
<td>49,571 (34)</td>
</tr>
<tr>
<td>Hispanic Origin</td>
<td>108,002 (22)</td>
<td>34,162 (24)</td>
</tr>
<tr>
<td>Native American</td>
<td>26,926 (5)</td>
<td>6,769 (5)</td>
</tr>
</tbody>
</table>

Table 2
Predictors of removal reasons on disability status (n = 687,406)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>b</th>
<th>[95% CI]</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Behavior</td>
<td>.415</td>
<td>[.404, .426]</td>
<td>74.4***</td>
</tr>
<tr>
<td>Parental Substance Abuse</td>
<td>-.297</td>
<td>[-.304, -.290]</td>
<td>78.87***</td>
</tr>
<tr>
<td>Physical/Sexual Abuse</td>
<td>.031</td>
<td>[.021, .040]</td>
<td>6.36***</td>
</tr>
<tr>
<td>Neglect</td>
<td>-.022</td>
<td>[-.031, -.013]</td>
<td>-5.25***</td>
</tr>
<tr>
<td>Parental Absence</td>
<td>-.009</td>
<td>[-.019, .001]</td>
<td>-1.79</td>
</tr>
<tr>
<td>Child Disability</td>
<td>1.074</td>
<td>[1.051, 1.096]</td>
<td>91.78***</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td></td>
<td>0.038</td>
</tr>
</tbody>
</table>

***p < .001

Table 3
Placement disruptions and days in care by disability status

<table>
<thead>
<tr>
<th>Placement disruptions</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>No disability</td>
<td>2.37</td>
<td>2.55</td>
<td>2.36 2.37</td>
</tr>
<tr>
<td>With disability</td>
<td>4.00</td>
<td>4.85</td>
<td>3.98 4.03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Days Spent in Foster Care</th>
<th>No disability</th>
<th>With disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No disability</td>
<td>514</td>
<td>513</td>
</tr>
<tr>
<td>With disability</td>
<td>915</td>
<td>916</td>
</tr>
</tbody>
</table>
### Table 4
Predictors of child characteristics on number of placement disruptions (n = 670,097)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>b</th>
<th>[95% CI]</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.850</td>
<td>[1.836, 1.864]</td>
<td>252.47***</td>
</tr>
<tr>
<td>Foster Child with Disability</td>
<td>1.247</td>
<td>[1.212, 1.282]</td>
<td>69.97***</td>
</tr>
<tr>
<td>Age at Removal</td>
<td>.069</td>
<td>[.068, .071]</td>
<td>86.31***</td>
</tr>
<tr>
<td>Age at Removal × Disability</td>
<td>.022</td>
<td>[.018, .025]</td>
<td>12.54***</td>
</tr>
<tr>
<td>Black</td>
<td>.332</td>
<td>[.313, .352]</td>
<td>34.18***</td>
</tr>
<tr>
<td>Black × Disability</td>
<td>.270</td>
<td>[.230, .310]</td>
<td>13.31***</td>
</tr>
<tr>
<td>Am. Indian</td>
<td>.248</td>
<td>[.209, .288]</td>
<td>12.37***</td>
</tr>
<tr>
<td>Am. Indian × Disability</td>
<td>.317</td>
<td>[.229, .404]</td>
<td>7.06***</td>
</tr>
<tr>
<td>Asian</td>
<td>-.179</td>
<td>[-.256, -.101]</td>
<td>-4.50***</td>
</tr>
<tr>
<td>Asian × Disability</td>
<td>-.666</td>
<td>[-.835, -.496]</td>
<td>-7.69***</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td></td>
<td>0.0628</td>
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</tbody>
</table>

***p < .001

### Table 5
Predictors of foster parent characteristics on number of placement disruptions (n = 662,748)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>b</th>
<th>[95% CI]</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>3.056</td>
<td>[2.944, 3.167]</td>
<td>53.94***</td>
</tr>
<tr>
<td>Foster Child with Disability</td>
<td>.994</td>
<td>[.777, 1.210]</td>
<td>9.00***</td>
</tr>
<tr>
<td>Married Foster Parents</td>
<td>-.296</td>
<td>[-.313, -.278]</td>
<td>-33.02***</td>
</tr>
<tr>
<td>Married × Disability</td>
<td>-.687</td>
<td>[-.726, -.648]</td>
<td>-34.85***</td>
</tr>
<tr>
<td>Foster Parent Age</td>
<td>.037</td>
<td>[.036, .038]</td>
<td>84.66***</td>
</tr>
<tr>
<td>Age × Disability</td>
<td>.030</td>
<td>[.028, .032]</td>
<td>34.01***</td>
</tr>
<tr>
<td>Out-of-State</td>
<td>-.931</td>
<td>[-.985, -.878]</td>
<td>-34.06***</td>
</tr>
<tr>
<td>Out-of-State × Disability</td>
<td>-.208</td>
<td>[-.311, -.104]</td>
<td>-3.94***</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td></td>
<td>0.0761</td>
</tr>
</tbody>
</table>

***p < .001
APPENDIX B – MANUSCRIPT 2:

THEORY OF THE ADAPTING FOSTER FAMILY (TAFF): DEVELOPMENT OF A MIDDLE-RANGE THEORY AND MATHEMATICAL MODELING IN NURSING SCIENCE

(ACCEPTED BY NURSING SCIENCE QUARTERLY)
Theory of the Adapting Foster Family (TAFF): Development of a Middle-Range Theory and Mathematical Modeling in Nursing Science

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Abstract

Nursing science has the epistemic advantage of using nursing practice for developing middle-range theories to bridge abstract ideas with clinical research. The Theory of the Adapting Foster Family draws upon extant theories of both Family Systems Theory and Transition Theory while integrating experience from nursing practice. The new theory provides a framework for improving outcomes for children in foster care through greater placement stability. Theory development incorporated literature review, concept exploration, statement synthesis, and mathematical theory modeling to elucidate the interaction between concepts and provide insight to the unique fostering experience.

Key Words: family health, foster care, mathematical modeling, middle-range theory, theory development
Introduction

Children in foster care are a highly vulnerable population at risk for negative short- and long-term outcomes (Turney & Wildeman, 2016). They inherently have heavy burdens with high incidences of diagnosed disabilities, mental health issues, adverse childhood events scores, complex medical needs, and behavioral concerns. A stable and safe family environment (a placement) in which caregivers are able to meet the needs of the these children is known to improve outcomes (Font & Gershoff, 2020; Rubin et al., 2007b). Such an environment can be hard to achieve at times. Children, particularly those with disabilities, experience multiple foster placement settings compounding their vulnerability. Researchers have investigated risk factors for placement instability including behavioral problems and challenges with the system itself. However, these may not be the reasons why a foster parent decides to have a child removed from their home or forgo permanency. These complex factors make it challenging to develop systems or interventions to truly impact and change long-term health outcomes.

Established theories, while important, lack definition of key concepts and statements to inform studies testing interventions that reduce the unequal burden of disease and instability for children who are placed into the foster care system. While new theories may not be necessary to explain every variation in family form, foster families have unique challenges that are not accounted for currently. If they were, we would not so consistently fall short at improving outcomes. This is where the art and practice of nursing allows the profession to leverage abstract theories to inform the development of middle-range theories that are population specific and testable. While theories exist for family systems, none appear to capture the unique characteristics and dynamic interplay in the fostering experience. Previous foster
parent research (both qualitative and quantitative) arrives at different conclusions regarding current foster family training, practices, and expectations (Kaasbøll et al., 2019). However, a stable foster home environment appears to be a critical and predictive component to improve outcomes for children (Gypen et al., 2017). By understanding concepts integral to fostering through a parsimonious theory, researchers can better design theory-informed studies to support family environments for vulnerable children in foster care.

The purpose of this paper is to present the Theory of the Adapting Foster Family (TAFF) by describing the theory construction approach; explicating the theory including its assumptions, key concepts and relationships; and then applying a mathematical modeling approach to inform future testing. This approach transfers the non-linear foster family adapting process to a linear mathematical model, illustrating the potential of mathematical modeling as a knowledge development approach for nursing science.

**Methods: Theory Construction Approach**

The steps undertaken to construct the TAFF included a literature review, concept synthesis, and statement development. The TAFF was then modelled pictorially and mathematically. Retroduction, as explained by Walker and Avant (2019), was used as the theory construction approach, which uses both deductive and inductive approaches simultaneously. This theory development approach was appropriate because the process was iterative and required numerous reworking of concepts and relationships. Throughout the process, theory evaluation methods were intertwined to aid in producing internal consistency and parsimony. For example, content adequacy as described by Fawcett (2005) was considered to ensure the concepts and propositions were congruent and reflective of both the visual and mathematical model.
depictions. Philosophical adequacy was considered and reliance on observation and experience was necessary due to the lack of studies directly measuring placement decision-making factors. The pragmatic adequacy of the new theory was considered during the stages of development to help elucidate how and why a middle range theory was needed for this population.

**Literature Review**

Current literature regarding placement stability focuses on child risk factors. The risk-focused approach limits potentially effective resiliency-based research strategies. Challenging the status quo and focusing on the strengths of foster families is a novel approach.

Useful family-based theories exist in the literature as well as theories that address transitions and complex systems. Diving deeper into the literature, the philosophical perspective of intermodernism, a view that intersects modernism and postmodernism, became a guiding perspective. It reaches beyond the relativism of post-positivist constructionism and views that knowledge can be gained from both critical thinking of the observed and scientifically measurable phenomena (Reed, 2019). Intermodernism espouses a philosophical belief in a middle path for nursing’s ontological and epistemological views and is a pragmatic hybrid form of realism (Reed, 2018). Ethical knowledge, based on nurses’ obligation to protect and respect human life, is valued in an intermodernist approach. It asks what is right or wrong and is one of the fundamental ways of knowing in the nursing profession. Improving the health outcomes of child in foster care may, at times be more ethically driven, than measurably efficient.

Roy's Adaptation Model was used as a framework for investigating theories such as Meleis’ Transition Theory, Family Systems Theory, and Complex Systems Theory. Several concepts within these current mid-range theories overlap (see Table 1). In Family Systems
Theory, families are systems of interconnected individuals, none of whom can be understood in isolation from the system (Bowen, 1972). A child's behavior may seem erratic and unexplained on its own, but after observing family function as a whole, a breakdown in behavior or change in typical neural functioning becomes clearer to the outside observer. In Complex Systems Theory, health care organizations are commonly evaluated due to the wide array of influencers and systems both within the organization and positioned without. Complex Systems Theory, commonly associated with chaos theory, is a theory of survival, evolution, development, and adaptation (Lorenz & Martin, 1995). Foster families have members that come and go quickly. They are influenced and affected by governmental agencies, biological families, communities, healthcare organizations, and the individual health of members or “units.” In Meleis’ Transition Theory, transitions, although inevitable, are particularly stressful times for families. With healthy adaptation, foster families can progress to higher levels of complexity and utility (Meleis, 2010). However, if stretched too quickly or too much, they can fracture.

A theory specific to fostering needs unique assumptions, which the literature helped to mold. Assumptions are given statements explaining the nature of the concepts, definitions, purpose, relationships, and structure of a theory. While not testable, they are often “taken for granted” and can be refined through observation and logic (Meleis, 2011). Building upon previous literature, assumptions of the TAFF are:

1. Bio-psychosocial members influence each other, but are also influenced heavily by outside forces such as protective agencies, courts, and biological families
2. A foster family is an open entity where members move in and out of the system quickly and frequently (rapid transitions)
3. The system is not only dynamic but is forced to adapt for survival

4. Trauma, healing, and loss are key themes

5. Health, disease, and disability status affect group dynamics

**Concept Synthesis**

Concept mapping and concept reformulation were employed to synthesize meaningful concepts within this population. Concept synthesis, as described by Walker and Avant (2019), uses clinical experience as a starting point, then combines observation, quantitative evidence, and literature. Concept mapping is a way to schematically represent a set of concepts or meanings. Potential constructs from the literature were mapped, reformulated, and ultimately new ones synthesized. For example, mining Family Systems Theory was helpful for developing assumptions, but proved key in concept synthesis as it seeks to explain vertical and horizontal complex family dynamics. Concepts from Family Systems Theory included: individuals do not experience emotions separately, the actions and health of individuals affects members of the family, and each individual may contribute to and be affected by the emotions and actions of others. These concepts were reformulated to include additional outside forces including the concept of dynamic and quickly changing membership. Reformulation was also needed to include how the stability of the placement or family membership could be affected by their positive or negative relationship to one another. Concept reformulation—a product of pondering contemporary family structures, financial hardiness, knowledge, skill, and emotional preparedness—led to the idea of secure family environments and the need for an outcome variable of environmental consistency. This process elucidated the following key concepts within
the Theory of the Adapting Foster Family: preparedness, hardiness, relationships (also described as relationship development), capital, and membership.

**Concept I: Preparedness**

Foster family preparedness is the physical, emotional, mental, and peripheral (such as financial, time, and education) readiness for a family to care for a child in foster care and encompasses more than main caregiver education. Attributes of foster family preparedness include ability to navigate the healthcare system and readiness for sibling acceptance of a new child. Contributors to preparedness include educational classes, professional training, trauma-informed therapist-led family discussions, or skills obtained from one’s profession (such as feeling comfortable with oxygen monitors and feeding tubes). The concept of foster family preparedness has potential to promote resiliency and functions as a placement protective factor, thereby minimizing or decreasing placement disruptions.

Literature focuses on the perceived competency of foster parents after state licensing training (Cooley & Petren, 2011) but fails to report the preparedness of the family unit as a whole or when considering the family unit within the context of a child with disabilities in foster care. Research involving foster parent training (which included 16 weeks of training, supervision, and support in behavior management methods) did not show a significant difference in overall placement disruptions between the study and control groups (Price et al., 2008). This finding is potentially attributed to only preparing the main caregiver instead of a family-centered approach in which other members are involved in the preparation process. Family structure is becoming more diverse than ever. A foster family may include married or single head(s) of household along with biological, adopted, or foster siblings, or other adults in the home
(grandparents or non-blood-related adults considered part of the core family). The roles of individuals differ from family to family. Therefore, family preparedness must include preparing the family as a whole.

**Concept 2: Hardiness**

Hardiness is seen as a family characteristic, defined by a family's sense of control over life events and stressors, perception of change as beneficial, active orientation to adapting to stressors, and confidence that they can endure challenges. A family’s ability to cope with stress is affected by their available resources and how they manage these resources. Hardiness is a resource that can diminish the negative effects of stress and is correlated with increased use of social support. Attributes of hardiness include parenting style, health, and strength of parent and sibling relationships. Contributors include upbringing or available positive parenting mentors. A factor negatively affecting hardiness might be history of previous childhood trauma. By transforming concept of hardiness into variables or empirical indicators, it becomes less abstract and more measurable. The interrelatedness of the concepts of foster family hardiness and preparedness is poorly understood. However, both factors impact placement stability. Variables for family hardiness are measurable indicators such as sense of control, confidence in abilities, and belief that the family unit will survive hardships. The Family Hardiness Index (FHI) measures such variables with questions/statements such as, “We listen to each other’s problems, hurts, and fears” and “We strive together and help each other no matter what” (McCubbin et al., 1987).

**Concept 3: Relationships**
Relationships are the relative connectedness and influence that members have on each other. When positive relationships increase, so does attachment. In Family Systems Theory there is circular causality among and between members. This assumes that any behavior in an interaction is simultaneously influenced by and is an influence for other behaviors in the interaction. Therefore, challenges and struggles affecting one member influences others. Developing relationships and creating stronger supportive bonds between members allows for increased attachment and potentially improved outcomes for a child in foster care (Gardenhire et al., 2019).

**Concept 4: Capital**

Capital is the combination of the three previous concepts (preparation, hardiness, and relationships). A family’s capital is accumulated over time through effort in one of these domains. Capital can also be drawn down in times of need. This intertemporal nature of capital means that past family decisions and events affect future family decisions and opportunities.

**Concept 5: Membership**

Membership implies the individual people who comprise the family at any given time. Members within a foster family are diverse. They may have different skin color, traditions, and even languages—all within the same foster family. A family includes any member that the family is emotionally invested in and for which they are responsible. This is a key distinguishing feature in foster families versus group homes or institutions, because the new child is seen as a member instead of a resident. This mindset of being a member can aid in the acceptance and attachment between caregivers and siblings. However, in foster families, members still enter and exit the unit rather quickly, transitioning to new family dynamics and establishing a new
“normal.” These transitions are sometimes expected, but not predictable, causing an underlying feeling of instability and stress. For example, reunification (with a primary parent) and permanency (adoption) may be concurrent court goals. A foster family may be asked to prepare for adoption one week, but then the child is unexpectedly transferred to a kinship home the next week.

**Statement Development**

Statements regarding the relationship of the concepts (including their nature, direction, significance, and magnitude) within the TAFF were developed using the process of statement synthesis and derivation (discussed further in the mathematical modeling section). Statement synthesis clarifies phenomena of interest by specifying the relationship between concepts. The two operations of statement synthesis as described by Walker and Avant (2019) and employed for the TAFF were (1) moving from evidence to inferences and (2) generalizing from specific inferences to more abstract ones. The statements were iteratively revised by comparing them with the mathematical modeling and empirical evidence found via the literature. Information gathered from interviews during qualitative inquiries were also included in the process, helping to incorporate personal nursing knowledge of the subject matter. The desired outcome of the statement development process was to define clear statements of the relationship between the concepts with evidence arising from different sources.

Relational statements included in the TAFF are as follows: Family hardiness and family preparedness are positively correlated or associated (nature and direction of the relationship). They might also be sequential. For example, as hardiness increases, families will be better prepared for challenges that arise. This implies directionality such that hardiness influences
preparedness. Family relationships are also positively correlated with hardiness, as stronger connections increase the willingness to work through difficulties together. Preparedness may facilitate the development of relationships, which is harder when facing the unexpected. Capital is the family’s accumulation of preparedness, hardiness, and relationships. A family that has stored up more capital is sequentially related to family membership, as more capital enables a family to accept and keep more family members or family members with greater challenges.

**Theory Modeling**

Roy’s Adaptation Model served as a guide during literature review, concept development, and statement mapping phases. It was particularly useful during the theory modeling phase as it is a conceptual model within nursing which recognizes the person as a biosocial being, constantly interacting with their changing environment (Roy et al., 2009). In this model, relationships are interdependent and the adaptations are many times provided, or inhibited, by members of the family as they influence each other. Additionally, choices made by individuals, family members, and outside entities (such as primary/bio parents, caseworkers, the legal system, economic, or social) created forces that push foster families through the adaptation process, which is hypothesized will affect placement stability.

**Visual Depiction**

Figure 1 provides a visual depiction of the theory. Initial family units with their capital (K, indicating the combined resources available to a family) and members (M) are depicted on the left. As they go through transitions, family units work through placement stability and the choices and forces that are applied upon them. On the right, K prime and M prime represent that
in a foster family, choices and forces induce changes in capital and family composition. Members can enter and exit the group at fast rate with little preparation time. Hardiness, preparedness, and relationships change as they go through the transition process and time.

The construct of navigation through placement stability was informed by interviews that were analyzed using a grounded theory approach as part of a theory piloting project. The psychosocial process of foster parents deciding on placement stability occurred in 3 phases (see Figure 2). These were the Recognition of Limits (antecedents), Weighing Options (the process itself), and Resulting Transitions (consequences).
Conclusions from the qualitative pilot project revealed that once a foster parent realized they were at a critical point in considering the placement of a child, the actual process, defined as Weighing Options, occurred. Some parents sought professional counseling, consensus with family members was investigated, and pressures from outside forces (such as requests of biological family or case workers) were considered. One informant discussed her decision process to provide a permanent home (adoption) despite extra challenges. She stated, “He just belonged.” In comparison, another stated, “I had to think about how it was affecting my permanent kids. She (referring to daughter) was scared of him (the child in foster care).” After the decision was made, foster parents described the process involving several transitions (Resulting Transitions). Specific individuals needed official notification via the correct forms.
that the parent wanted the child moved to a different setting. Informants reported feeling loss and inability to advocate for the child once the decision was made.

**Mathematical Modeling**

Derivation was the strategy used for the mathematical modeling of the new theory because derivation allows theorists to transpose and redefine concepts, statements, or theory from one field to another (Walker & Avant, 2019). Although rare in nursing, economics routinely uses mathematical models to depict decision-making by individuals and to analyze how those decisions interact. We borrow these insights to represent TAFF mathematically, reflecting family decision making described in Figures 1 and 2. Reformulation, or modification, was used during this phase of theory development so as to align principles found within economics more closely with the perspectives valued within nursing. Future research is needed to test the theory and the modeling approach. Three guiding principles for economic modeling (Platt, 2014) are:

1. **Optimization subject to constraints.** People or families make decisions to best achieve their goals, within the limitations of their available resources and knowledge. Economists refer to these goals as *utility* (or happiness); in the nursing metaparadigm, the goal would be redefined as health or well-being. This goal is represented mathematically with a *utility function*, which represents the decision maker considering the effect of each alternative and rank them. The constraints indicate that resources are limited, requiring the decision maker to prioritize their use. These are depicted using a *budget constraint*, showing how the resources can be split across potential uses. In nursing, constraint may arise from stressors to well-being, such as disease processes. Optimal decisions mean choosing the best possible alternative, thus maximizing utility or well-being.
2. *Marginal analysis*. Decisions of how to allocate resources can be simplified by considering small adjustments. Rather than considering all the alternatives at once, the decision maker can ask whether doing a little bit more (i.e., *at the margin*) will raise utility. By repeating this process, the decision maker will reach the best alternative.

3. *Equilibrium*. Decisions by one individual can influence outcomes for others. The decisions made by the group are stable (i.e., in *equilibrium*) once all decision makers are secure in their individual decisions. After any change in resources, decision makers will re-evaluate their choices, eventually leading to a new equilibrium. *Comparative statics* are the comparison of the old and new equilibrium, and these are the main prediction of an economic model, which can be tested with data on how people react to changes in their environment.

As applied to represent TAFF, our decision maker is the family unit or head of household, whose goal is to maximize the combined well-being of family members. The family is constrained by its available resources (whether material, emotional, quality time, etc.). We refer to these collectively as *capital*. Capital is initially considered as a single variable that represents all resources (including hardiness, resilience, and relationships — the left triangle in Figure 1), but the model can be deconstructed to consider the three separately.\(^1\)

An individual’s well-being is affected by the amount of resources directed to that individual, labeled \(c_i\). Each individual also has a minimum resource requirement needed for

\(^1\) With three different resources, there will be three resource constraints. The key modeling decision is how interchangeable the resources are. If perfectly interchangeable (e.g., more hardiness exactly compensates for less resilience), the three constraints can be summed into a single constraint. In the other extreme, if the resources are limited by whichever is least available, then the constraints with relatively more resources can be ignored.
survival, labeled \( m_i \). Thus, each member needs at least \( c_i \geq m_i \). The individual’s well-being is represented by a function \( u_i(c_i - m_i) \). The individual is assumed to be healthier with additional resources, but with less additional impact as more resources are given, known in economics as diminishing marginal utility.\(^2\) Family well-being is the sum of individual well-being, known as \textit{utilitarian social preferences}.

The family can influence its well-being through three levels of family decisions: how to allocate resources among family members (Choices arrow in Figure 1), whether to accept additional members (M’ in Figure 1), and what resources to reserve for the future (K’ in Figure 1). These decisions are addressed in that order.

\textit{Resource Allocation}

First, consider a family with a specific set of members and \( k \) units of capital available. The family must decide how the capital should be allocated. For illustration purposes, consider two family members who differ in two ways. First, member 2 has a health disparity requiring a greater minimum allocation: \( m_2 > m_1 \). Thus, member 2 will need more resources to obtain the same well-being as member 1. Second, providing one unit of resources to member 1 requires one unit of capital, while doing so for member 2 requires \( t \) units of capital. This transfer cost \( t \geq 1 \) reflects that assisting some family members will be more challenging than others. Thus, the family’s resource budget constraint is written \( c_1 + t c_2 = k \).

After optimization,\(^3\) the mathematical model provides two key predictions. First, all else equal, the family will devote more resources to member with greater needs. Indeed, if the

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\(^2\) This is satisfied by \( \ln(c_i - m_i) \), for example. Formally, \( u_i'(c_i) > 0 \) and \( u_i''(c_i) < 0 \).

\(^3\) Utility maximization occurs when \( u'(c_2 - m_2) = t u'(c_1 - m_1) \). For example, the utility function \( \ln(c_i - m_i) \) yields: \( c_1 = (k + m_1 - m_2 t)/2 \) and \( c_2 = (k - m_1 + m_2 t)/2t \).
transfer cost were \( t = 1 \), the family would split the capital such that \( c_1 - m_1 = c_2 - m_2 \), meaning that both members get the same amount of resources beyond their minimum needs and hence end up with equal well-being. Second, if the transfer cost to member 2 is higher with \( t > 1 \), the family tilts the allocation more towards member 1 where the capital has more impact. In other words, worse outcomes for one family member occur not because of the higher needs per se, but because it is harder to transfer the necessary resources to that family member.

**Membership decisions**

Next, consider the decision of a family to change the composition of its membership (from M to M’ in Figure 1). In adding another family member (such as a child in need of foster care), the family benefits from the well-being of that individual — effectively, they decide to be emotionally invested in that person. At the same time, the family must rearrange the allocation of resources among the expanded set of family members. Thus, the family anticipates its optimal allocation under any family size, choosing whichever enables greater family well-being.

This process is most easily illustrated by comparing a family with one member to a family with two, though this can be repeated for any family size. Indeed, one can think of “member 1” as the existing family, while “member 2” is the potential addition to the family, such as a new foster placement. With the existing family, all resources are allocated there. In adding a member, the resources must be divided, but the family cares about the well-being of the added member.\(^4\) Thus, the family will accept a placement if optimized well-being with two members is

\[\ln(c_1 - m_1) < \ln(k - m_1 - m_2 t/2) + \ln((k - m_1 + m_2 t)/2)\],

which is equivalent to

\[(k - m_1 - m_2 t)^2 > 4t(k - m_1).\]

\(^4\) For the example function \( \ln(c_1 - m_1) \), the family accepts a placement if \( \ln(k - m_1) < \ln((k + m_1 - m_2 t)/2) + \ln((k - m_1 + m_2 t)/2t) \), which is equivalent to \( (k - m_1 - m_2 t)^2 > 4t(k - m_1) \).
larger than optimized well-being with one. Otherwise, the family will reject a placement offer (or disrupt one that was previously accepted).

The model predicts that a family is less willing to accept a placement when the disparity of the new addition is greater (larger $m_2$). Also, a lower family capital $k$ or greater transfer cost $t$ will typically reduce the willingness to accept a placement as well. Indeed, if $m_2$ or $t$ are higher or $k$ is lower than originally anticipated, a family may request to disrupt a placement that was previously believed to be optimal.

**Savings decisions**

The final aspect of the model is to consider the decision on how to allocate capital over time. That is, families can preserve or build up resources for future use (known as *saving* in an economic context), anticipating potential opportunities and preparing for random events that might occur. This can be illustrated in the following two-period extension of the model. The second period proceeds as described above, starting with capital $k'$, which is allocated fully among the optimally-accepted family members.

In the first period, the family makes the same allocation and membership decisions, but start with capital $k$, which can either be used today or amount $s$ of it can be saved for the next period. Thus, the family’s resource constraint becomes $c_1 + t c_2 + s = k$. Note that this means that the first period allocation and membership decisions can be solved as before, using capital $k − s$. Saving decisions will optimize family well-being, summed across the two periods.

The two time periods are linked in two ways. First, membership decisions in the first period will persist into the second period, though disruptions or additions can be made at that time. Second, savings for the first period adds to the amount of capital in the second period: $k' =
$s + r$. Here, $r$ is replenishment of capital that occurs regardless of savings. Beyond the family’s choices, outside forces can alter saved capital or family membership between time periods as well. Some outside forces may be predictable, but others may be random.

If family membership is unchanged between periods, the optimal savings decision ensures that the marginal utility is the same in both periods, setting $s = \frac{k-r}{2}$ so that the family has $\frac{k+r}{2}$ capital available in both periods. If $r > k$, this solution would require borrowing against future capital, but this is not typically feasible if capital takes the form of emotional reserves (and may be limited even for financial assets). In that case, all $k$ is devoted to the first period, while all $r$ is devoted to the second. This can cause a family to reject a placement in the first period while they are later willing to accept the same type of placement.

Note that the scenario does not play out in reverse, where a family accepts a placement but cannot afford to continue it. If the family anticipates a lower capital replenishment tomorrow, it preserves a portion of today’s reserves to make possible the same membership in both periods. Thus, the model predicts that a placement disruption always involves some element of surprise from outside forces: e.g., disparities or transfer costs were higher than anticipated, or replenishment was lower.

**Discussion and Application to Nursing Practice**

Nursing practice can and should influence theory development and interventions to improve the lives of each member in complex families. Foster families are benefitted by the guidance of nurses in the hospital and at home to care for medically complex children. These families are thrust into adapting to a new member, but also into managing complex equipment, medications, and medical regimens. The TAFF is a middle-range theory attempting to best guide
our efforts when working with these families and children. Research, health promotion, and teaching skills for healthy adaption are ways in which nurses might influence and improve lifelong outcomes.

The TAFF has policy and organizational implications. A policy maker (such as a placement agency) is assumed to have the goal of maximizing child well-being (meaning \( u_2 \) in our model). While this agency does not have direct interest in the existing family well-being (\( u_1 \)), it would still need to anticipate the family’s decisions depicted in the model. For each child in foster care, the agency would seek out the family with the most capital (present and future) for that child: the family is more likely to accept, will offer more resources to the child, and will have more reserves to preserve the placement in the future. This not only maximizes the child’s well-being, but also increases the well-being of the accepting family by more than the same placement could have affected any other family.

Beyond this efficient placement of children, the agency may have at least two other policy levers whereby they can influence child well-being and placement permanence. First, the agency could infuse the family with additional capital (in either or both periods). While this could be as financial support, other forms of emotional support, respite assistance, and family-strengthening activities could be equally valuable. Note that any increase in capital is proportionally split among all the family. While only a portion directly assists the child in foster care, the rest still increases family well-being and thereby makes the family more likely to accept and preserve placements.

Second, the agency could work to lessen the transfer cost to the child in foster care. This could involve specialized medical care, training specific to the child’s behavioral challenges, and
interventions that help build relationships between the child and the rest of the family. Note that this support will redirect more resources to the child, but this does not necessarily reduce resources for other family members. Particularly when the transfer cost \( t \) is initially high, decreasing \( t \) will benefit everyone in the family. Effectively, the capital goes farther in addressing the disparities for the child, and thus, leaves more available for everyone. Of course, both types of interventions require resources from the agency, who must also consider the relative costs. Ultimately, the final metric would be which intervention best increases the child’s well-being for a given amount of agency expense (of money, personnel, or other resources).

This emerging theory will be useful to nursing practice as it provides the needed framework to identify and advocate for interventions that will best promote well-being for this population. Nurses in hospitals, schools, and within the state foster care organizations could have a profound effect on promoting hardiness and preparing these families. By using the intermodernist perspective and creating a theoretical framework to guide studies that include the dynamic strengths of foster families, nurses could influence and uncover a previously untapped potential for improving the lives of an extremely vulnerable population.

**Conclusion**

The TAFF was presented here with its unique concepts and relationships pertaining to the fostering experience. Foster families are diverse and experience membership and transitions unlike those described in our current theories. These families are tasked with caring for a complex vulnerable population which requires high levels of interaction with the healthcare and governmental systems. Nursing is concerned with the whole being and wellness, not merely the absence of disease. The TAFF embodies this belief. Using nursing’s epistemological authority,
we address how experience, knowledge, and theory development practices can be used to create a mid-range theory to guide research and practice.

Moving forward, rigorous theory evaluation of the TAFF is needed in the context of original research. Such research should be designed with rigorous approaches to test the empirical adequacy and to identify the usefulness and fit of the mathematical model in a new context (i.e. nursing science). Theoretical assertions of the TAFF are philosophically and conceptually congruent but can be operationalized as hypotheses should be further tested within the foster care population. Such research should be conducted with the overarching goal of empowering nurse scholars and other child advocates to improve family functioning, placement stability, and outcomes of children in foster care.
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### Table 1: Comparison of Mid-range Theories

<table>
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<tr>
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<tbody>
<tr>
<td><strong>Paradigm/Roots</strong></td>
<td>Nursing Parenting Caregiving and health transitions (mothers)</td>
<td>Chaos Theory Mathematical influences Biological sciences Organizations</td>
<td>Psychology Families who have members diagnosed with schizophrenia</td>
<td>Nursing Economics Public Health Social Work</td>
</tr>
<tr>
<td><strong>System Components</strong></td>
<td>Mothers, eventually human/patient</td>
<td>Units</td>
<td>Parents and siblings</td>
<td>Members</td>
</tr>
<tr>
<td><strong>Transitions / Adaptation</strong></td>
<td>Triggered by critical events and changes in individuals or environments. Changes provide opportunities for enhanced well-being and expose individuals to increased illness risks.</td>
<td>Survival, evolution, development, and adaptation. Concerned with environments, organizations, and systems that are complex.</td>
<td>Awareness of how the emotional system functions increasing levels of differentiation. Views the family as an emotional unit and uses systems thinking to describe the unit’s complex interactions.</td>
<td>Influenced by internal (family members) and external forces (protection agency, court systems, healthcare systems). Each of these constitute complex systems</td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td>Improved well-being is an indicator of a healthy transition.</td>
<td>Continual re-organization and emergence</td>
<td>Triangles and intergenerational patterns in families.</td>
<td>Members deeply and meaningfully influence each other. Improved relationships lead to improved outcomes.</td>
</tr>
<tr>
<td><strong>Variables</strong></td>
<td>Meanings, expectations, environment, knowledge/skill/planning level, emotional and physical well-being</td>
<td>Interconnectedness, Feedback loops, Butterfly Effects, Fractals</td>
<td>Connectedness and reactivity make the functioning of family members interdependent</td>
<td>Foster family preparedness, hardiness, relationships, capital, and membership</td>
</tr>
<tr>
<td>Applications</td>
<td>Pregnancy, childbirth, parenthood, adolescence, menopause, aging, death, migration, retirement, family caregiving</td>
<td>Atoms, molecules, humans, institutions, corporations.</td>
<td>Mental health of family members. Emotional system is a driving force in clinical problems.</td>
<td>Foster families, including interventions aimed at siblings, to strengthen hardiness.</td>
</tr>
</tbody>
</table>
APPENDIX C – MANUSCRIPT 3:

EFFECTS OF A BEHAVIORAL INTERVENTION WITH FOSTER FAMILIES: A RANDOMIZED CONTROL TRIAL

(PLANNED TO SUBMIT TO JOURNAL OF NURSING SCHOLARSHIP OR DEVELOPMENTAL SCIENCE)
Effects of a Behavioral Intervention with Foster Families: A Randomized Control Trial

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Brennan Christopher Platt
Helena Morrison
Thaddeus Pace
Sheila Gephart

(Planned to submit to Journal of Nursing Scholarship or Developmental Science)
Effects of a Behavioral Intervention with Foster Families: A Randomized Control Trial

Abstract

**Background:** The development and well-being of children in foster care are of high concern, as they often experience lifelong health disparities. A key protective factor is having a safe, consistent environment, which often comes in the form of a consistent and nurturing foster home, in which to adapt and heal from past traumas. An undervalued potential resource with which to disrupt maladaptation and promote connection and healing is positive interactions with foster and permanent siblings currently residing in the home.

**Study Aims:** The current study aimed to investigate a technology-delivered family (sibling inclusive) intervention called the Connected Family Series – For Foster Families. Focus was on increasing sibling relationships and family hardiness as foster families care for children in foster care, particularly those with disabilities and special needs. These aims were to: (1) establish feasibility and acceptability of an online behavioral intervention for caregivers and children within the foster family, (2) explore the effects of the intervention on relational quality outcomes among family member participants, with a focus on the relationship between the permanent child in the home and the foster child, and (3) decompose the mechanisms driving improved family hardiness through mediation analysis.

**Methods:** This study employed a randomized control trial design of a behavioral intervention. Stress and relational quality outcomes among members were measured using the concepts of family hardiness, preparedness, and relationship development through a psychometrically validated self-report questionnaire, which included the Family Hardiness Index (FHI), the Integrating Foster Children (IFC) subscale from the Casey Foster Applicant Inventory (CFAI),
and the Sibling Inventory of Behavior (SIB), respectively. Licensed foster families with an active placement of a foster child were recruited through social media. Blinded stratified randomization of families to groups was employed, thus ensuring families caring for high-behavioral-needs children were equally assigned to the control (waitlisted) and intervention groups. The intervention group received a 4-week, online self-paced intervention including videos and activities for both the caregiver and children in the home to promote connection and communication among members.

**Results:** The Connected Family Series intervention was successfully adapted for foster families with positive acceptance among study participants and the community-based participatory research team. Families in the intervention group participated in the online videos and activities at a rate of 78% for those who stayed in the study. Of this group, there was a statistically significant increase in family hardiness \( (p<0.001) \) compared to the control group. Measures of a positive sibling relationship score also increased significantly in the intervention group compared to the control group \( (p<0.002) \), mediating 32% of the total effect in hardiness score. Sibling relationship served as a mediator for increasing indicators of family hardiness.

**Discussion:** Providing the fostering family an online behavioral intervention increased the sibling and foster child relationship positive indicators in addition to overall family hardiness. Siblings living in the home should be recognized for the important role they play in the fostering experience and supported by providing education and tools for successful adaptation. Future research should focus on the long-term impact this may play on placement stability and development, including long-term attachment outcomes for children in foster care.

**1 BACKGROUND**
1.1 The Fostering Family

The long-term health of children requiring out-of-home care is a global concern. Abuse, neglect, poverty, war, drug-abuse, and illness may all lead to a child requiring care by individuals other than their biological parents. In 2019, over 423,000 children were in the United States foster care system (Children’s Bureau, 2020) with combined federal, state, and local costs approaching $15 billion annually (Font & Gershoff, 2020). For many children in foster care (CFC), foster families provide the preferred environment to provide safety and care. A stable foster care placement—establishing a foothold in education and having a steady figure (mentor) who supports youth after they age out of care—appears to be the most important factors to improve outcomes (Gypen et al., 2017). Unfortunately, placement disruptions occur in which a child is moved from home to home or to a more restrictive and less ideal environment, such as group homes or institutions. For example, in 2017 each child in foster care was moved to a new placement an average of 2.4 times during a current case episode; a child with a disability in foster care was moved an average of 4 times (Platt & Gephart, 2022). The negative effects of placement instability on children's well-being continues to be a major issue in foster care (Rubin et al., 2007a), contributing to higher costs to the child and system (Vanderfaillie et al., 2018).

Foster children enter unfamiliar homes carrying complex developmental trauma, resulting in dysfunctional coping behaviors, and altering brain chemistry (Bremner, 2003; Carrion & Wong, 2012). Dysfunctional coping as a result of trauma can lead to barriers in developing healthy relationships and behaviors, which are needed for healing. Consistent with the theoretical model of the Theory of the Adapting Foster Family, the CFS-FF includes three pathways (improving preparedness, hardiness, and promoting positive relationships/attachment) to improve
placement stability, thereby improving outcomes for children with complex trauma (Platt et al., 2022). Exposure to complex trauma is a causal mechanism for poor lifelong outcomes, as it disrupts a child’s sense of self and trust for others (Lawson & Quinn, 2013). Symptoms of exposure to complex trauma include impairments of attachment, disrupted regulation of stress-related biology, impaired affect regulation, dissociation, poor behavioral control, and poor cognitive function (Cook A, 2005). As a result of prolonged abuse, neglect, and stress, neurological maladaptation leads to dysfunctional behaviors that create barriers to placement stability and ultimately, a forward feeding cycle of maladaptive behavior placement instability.

Interventions aimed at promoting foster parent sensitivity have demonstrated positive results in improving receptive communication skills for children in foster care as well as improved attachment (Dozier et al., 2018; Raby et al., 2019), attributes that improve placement stability. Despite successes, foster care intervention studies never/rarely leverage/include the entire family unit, but rather omit the inclusion of permanent children living in the home and participating in fostering in the intervention design. We posit that foster care interventions to improve family hardiness and relationships may be improved by including the sibling connections that stem from permanent children living in the foster home.

1.2 Sibling Connections

Siblings play an integral role in human development and shaping social behavior, potentially playing a primary role in development above that of parent (Lewin & Sharp, 2018). Research has emphasized the effects that siblings have on each other in enhancing the development of care and concern for others (Jambon et al., 2019). Additionally, a positive sibling relationship functions as a buffer between poor parenting practices and externalizing behaviors.
A positive sibling relationship has a protective effect on child adjustment during stressful or adverse life events (Gass et al., 2007). As such, the sibling connection may be the longest and most influential relationship in an individual’s life. Improving and promoting a positive relationship may have influential and long-lasting positive effects.

1.3 The Connected Family Series

Our goal was to develop and test the Connected Family Series – For Foster Families intervention. This intervention is aimed at empowering foster families, including the adult caregivers and siblings already residing in the home, by improving their preparedness to care for children with complex histories of trauma as well as children who potentially have disabilities and/or who are medically fragile. and providing tools for relationship development amongst the family unit. In turn we tested that this intervention would result in greater psychosocial hardiness as a family unit. The intervention tested here seeks to disrupt the cycle of maladaptation by providing behavioral modification within the family unit that will support foster children. Experts note that relationship-based trauma can be resolved through the causal mechanism of loving, stable relationships (Purvis et al., 2013). Hence, a stable family environment — with siblings also prepared to encourage safe attachment — will affect behavior and further promote willingness to keep a placement intact.

2 METHODS

The purpose of this study was to investigate a technology-delivered behavioral intervention designed to improve foster family functioning, sibling connection, and stability for CFC. The tested intervention sought to disrupt the cycle of maladaptation by providing behavioral modification within the family unit that would support CFC.
2.1 Design

This study employed a randomized control trial design of a behavioral intervention with foster families caring for a CFC as well as a permanent child in the home. The intervention was a set of videos and activities titled “The Connected Family Series – For Foster Families” (CFS-FF) (further referred to as ‘the intervention’) and was created/adapted in partnership from the Connected Family Series (CFS) by psychologists at the Karyn Purvis Institute of Childhood Development (KPICD). Adaptation was needed as the original intervention was geared toward adoptive families and excluded foster families.

The intervention tested was self-paced and delivered via technology to include foster families in rural and underserved locations. Each week, families received a link for a caregiver video and a child video running in length from 5 to 20 minutes. Weekly coordinating electronic handouts were available through the same weekly link. These handouts helped to walk families through communicating and connecting activities as well as ideas to create family traditions or rituals. Videos and activities were based on previous research conducted through the KPICD indicating that behavioral changes of caregivers could improve family outcomes. We predicted that behavioral changes which included caregivers and the children in the home would improve family functioning and facilitate healing from relationship-based trauma and its associated symptoms.

The study consisted of two concurrent groups: a treatment or “intervention” group and a control group which was waitlisted. Stratified randomization was used to assign participants into the intervention or control group. Blinding of the two groups to participants was not done (i.e. participants knew whether or not they received the video intervention). However, assignment to
a group was blinded by using anonymized randomization. To assure that the control and intervention groups consisted of equal numbers of families caring for children with challenging behavioral needs, families filled out a form (before assignment to groups) to describe the CFC’s behaviors and/or developmental concerns. These forms allowed the research team to assign a score indicating if the CFC required high or low level of care based on complex medical/developmental care and challenging behaviors. Families were randomized using blinded stratification techniques to ensure both groups consisted of families caring for high and low needs children. The intervention group received access and weekly emails to the videos and activities. The control group had access to the current standard supports available to foster families but did not receive the intervention during the study period. After the 4-week intervention, an additional week was given to collect follow-up data. Once post intervention data was received, families in the control group were given access to the videos and activities via a link.

2.2 Participants

Convenience sampling was employed via recruitment through social media platforms. The study followed rigorous guidelines to recruit and screen participants, to aid in the study’s reproducibility and appropriate application (Friedman et al., 2015). The defined study population was foster families with both a permanent child and a foster child in the home. Eligibility criteria ensured that sibling interactions and how they affected family hardiness would be captured. Families were recruited through the Karyn Purvis Institute of Childhood Development (KPICD) and the Utah Foster Care Foundation social media pages over seven days during January of 2022.
2.2.1 Study Criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>5. Licensed foster families</td>
<td>6. Non-English speaking</td>
</tr>
<tr>
<td>6. Must have at least one permanent child (biological or adopted) living in the home before the foster or newly adopted child entered the home</td>
<td>7. No permanent sibling between the ages of 7 at 17</td>
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<tr>
<td>7. At least one foster or foster-to-adopt child placed in the home</td>
<td>8. No current foster placement living in the home</td>
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<tr>
<td>8. All participants other than the foster or foster-to-adopt child must have English as their primary language.</td>
<td>9. Designated as a group home</td>
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<td></td>
<td>10. Greater than six children living in the home</td>
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2.2.3 Sample Size Calculations

The total sample size for the study (N=130) families was estimated for 80% power for t-test and ANOVAS, $\alpha<.05$ using G*Power software. Although the exact effect size of the intervention was unknown, we used results from the randomized control trial by Schoemaker et al. (2020) in which a video intervention to improve parenting among foster families was used. Their effect size was 0.34 for differences of the intervention on parenting sensitivity measures using the adapted Ainsworth scales for sensitivity and non-interference. Consistent with Shoemaker et al., a similar sample size was found to be sufficient to detect significant results for the intervention for the original CFS.

2.3 Procedures

The study spanned six months, including one month for recruitment and collection of baseline data, one month for the intervention, one month for post intervention data collection, and three months for data analysis. After Institutional Review Board (IRB) approval from the University of Arizona (STUDY00000382), the recruitment flyer was posted on the official Karyn Purvis Institute of Child Development website and social media sites.

2.3.1 Participant Recruitment
Once a family was recruited, they were connected (within one week) with a study team member and screened for inclusion and exclusion criteria. If appropriate, the family was enrolled in the study. Information was given about the study and informed consent was collected. An independent statistical team ensured stratified random assignment to study groups. Participating families (in either intervention or control groups) received a $25 gift card after completion of the pre-intervention assessment and an additional $25 gift card after completion of the post-intervention assessment. Families in the control (or current practice group) were given the opportunity to participate in the intervention after final collection of data and comparison of both groups had been achieved.

2.3.2 Human Subjects Protection

A special and vulnerable population (children) was involved to conduct research that is intended to improve participant lives and, by extension, more vulnerable children (i.e., those in foster care) with current great need relative to risks that are comparably minimal. Online platforms, particularly those that are intended to facilitate effective parenting of children with special needs, hold promise for strengthening current training programs (Kaasbøll et al., 2019). Including children in this study was deemed likely to increase the success of parental trainings. Without studying the family as a whole, we lose the family-centered potential to improve long-term outcomes for foster children. We also are likely to improve the functioning and mental health of the children who participate in the training/intervention. The control group (receiving no intervention) was given the opportunity to participate in the intervention after the trial.

2.4 The CFS-FF Behavioral Intervention
The CFS-FF is a behavioral intervention adapted from the Connected Family Series (CFS) by Dr. Jana Hunsley at Karyn Purvis Institute of Child Development (KPICD). The CFS was initially developed using concepts and strategies from the nationally accepted Trust-Based Relational Intervention (TBRI) (Purvis et al., 2013). Three strategies included in the intervention designed to interrupt negative causal mechanisms include 1) trauma-informed sibling education (to increase preparedness), 2) positive attachment behavior adoption (to improve relationship development), and 3) stress reduction techniques (to increase family hardiness). The behavioral changes of the caregivers and children in the home facilitate healing from relationship-based trauma and its associated symptoms. Activities to increase preparedness are aimed at improving sibling understanding of factors that influence behavior and needs of children with complex trauma histories through an educational module. Information provided includes what foster care is, why kids come into care, and what special needs or behaviors might they see. Children in the home were prompted to reflect on their experiences and readiness for being a foster family/sibling. Relationship development came through modeling activities that promote cooperation, with the goal of nurturing greater attachment. These activities are adapted to children from caregiver TBRI training, previously used by state foster care agencies. The intervention’s content and structure are novel approaches for an intervention with foster families as it is an accessible, online, self-paced format involving all family members. The intervention harnesses technology to access families in remote regions and families that may not have easy transportation to in-person care coordination and therapy.

2.5 Measures
Research data was obtained through online surveys before the intervention (T1) and after the intervention (T2). Survey tools included the Sibling Inventory of Behavior (SIB), the Family Hardiness Index (FHI), and a modified version of the Casey Foster Applicant Inventory-Applicant Version. Data gathered was coded using a unique identifier for each participant. Participants screened and deemed to fit inclusion and not exclusion criteria filled out a demographic survey. Caregivers then completed the three-pronged battery of assessments containing 52 questions formatted on Qualtrics, with an expected time to complete of 15 to 20 minutes.

2.5.1 Measures of family hardiness

Family hardiness was measured using the Family Hardiness Index (FHI). The FHI instrument is a 20-item Likert-type scale with a 4-point response scale ranging from false to true about the family situation (McCubbin et al., 1987). Higher scores indicate higher family hardiness. Validity and reliability have been established through positive correlations with family function measures, with a Cronbach’s alpha coefficient of .82 with test-retest reliability of .86 across multiple study samples including those caring for children with developmental disabilities (McCubin et al., 1996). Studies have employed the FHI to accurately indicate hardiness levels within foster families and those raising children with special needs (Hendrix & Ford, 2003; Roberts et al., 2017).

2.5.2 Measures of sibling relationship

The Sibling Inventory of Behavior (SIB) was developed to assess sibling relationships between a typically developing sibling and a child with a disability using a 28-item questionnaire (Schaefer, 1981) and was used here to assess relationship development. The measure assesses
four aspects of sibling relationships: kindness (nine items), avoidance (six items), involvement (seven items), and empathy (six items). Validity of the Sibling Inventory of Behavior scales (one for positive relationship indicators and one for negative relationship indicators) has been demonstrated using correlational and observational data with Cronbach alphas ranging from .64 to .81 for each item, indicating that these items are closely related and thus internally consistent (Volling & Blandon, 2003). Responses were tallied in two categories: questions indicating a positive sibling relationship (positive sibling inventory behaviors) and questions indicating a negative sibling relationship (negative sibling inventory behaviors).

2.5.3 Measure of Family Preparedness/Readiness to Foster

A modified version of the Casey Foster Applicant Inventory-Applicant version (CFAI) was used to assess family preparedness, which is a psychometric self-report tool used to assess the potential readiness and ability to foster parent successfully (Buehler et al., 2006). Data from previous studies involving foster parents have shown internal consistency and reliability (ranging from 0.64 to 0.96) (Orme et al., 2007). The Integrating Foster Children subscale includes the ability to integrate a foster child into a foster family with birth or adopted children (Orme et al., 2006). Questions are based on a Likert scale from ‘1’ (strongly disagree) to ‘4’ (strongly agree). Example statements include, “My children want to have a foster brother or sister” and “My children are able to deal with a foster child with serious problems.”

2.6 Data Analysis Strategy

Survey data was collected through Qualtrics and downloaded into STATA statistical software. Descriptive statistics were calculated to address the feasibility of the online behavioral intervention (Aim 1). Regressions were computed to examine the effect of the intervention on
relational quality outcomes relative to the control group (Aim 2). Mediation analysis allowed us to decompose the mechanisms driving improved family hardiness (Aim 3).

3 RESULTS

3.1 Flow of Participants

Figure 1 reports the progress of recruited participants through the randomized control trial, depicted with the CONSORT diagram.
Figure 1:
CONSORT 2010 Flow Diagram

Enrollment
Assessed for eligibility (n=192)
Excluded (n=71)
Inclusion criteria not met (n=22)
Declined to participate (n=49)
Other reasons (n=0)
Randomized (n=121)

Allocation
Assigned to intervention (n=59)
- Completed initial assessments (n=45, 76%)
- Unable to reach/unresponsive (n=13)
Assigned to control (n=62)
- Completed initial assessments (n=53, 85%)
- Unable to reach/unresponsive (n=9)

Follow-Up
Still enrolled at follow up (n=45)
- Completed follow up assessment (n=38, 84%)
- Unable to reach/unresponsive (n=7)

Still enrolled at follow up (n=53)
- Completed follow up assessment (n=51, 96%)
- Unable to reach/unresponsive (n=2)

Analysis
Initial assessments, Tables 3 & 5 (n=45 of 45)
- None excluded
Assessment change, Tables 4, 6, 7 (n=38 of 38)
- None excluded

Initial assessments, Tables 3 & 5 (n=48 of 53)
- Incomplete SIB form (n=5)
Assessment change, Tables 4, 6, 7 (n=45 of 51)
- Incomplete SIB form (n=3)
- Missing permanent child age (n=3)
3.2 Participant Demographics

The Karen Purvis Institute of Child Development is a global organization located in the United States. However, this study focused on families residing within the United States that were also currently licensed foster families. Families also had to currently have at least one foster child living in the home and at least one permanent sibling living in the home with an age between 7 and 17 years. Table 2 provides summary statistics of sample demographics.

All the primary caregivers that responded to the study were female, 98% (n=93) were white, 6% Hispanic (n=6), 1% Black (n=1), and 1% (n=1) Native American. Most participants (84%) were from married households, and the main caregivers were mostly between the ages of 35 to 44 (51%). The majority of families or caregivers had obtained their bachelor’s degree or higher (81%). The average time that families in this study had been licensed as foster families was 4.91 years. When assessing the needs of the foster child, 61% of families had a foster child living in the home who would be categorized as a high needs child (usually meaning the child displayed developmental or behavioral problems that required additional resources).

Table 1
Sample Demographics (N=95)

<table>
<thead>
<tr>
<th>Foster Parent</th>
<th>N (%) or Mean (Std Dev)</th>
<th>Child</th>
<th>N (%) or Mean (Std Dev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>95 (100%)</td>
<td># of Permanent Children</td>
<td>2.52 (1.56)</td>
</tr>
<tr>
<td>White</td>
<td>93 (98%)</td>
<td>Permanent Child Age</td>
<td>8.97 (3.32)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>6 (6%)</td>
<td># of Foster Children</td>
<td>1.93 (0.99)</td>
</tr>
<tr>
<td>Married</td>
<td>80 (84%)</td>
<td>Foster Child Age</td>
<td>6.4 (4.66)</td>
</tr>
<tr>
<td>Age 25-34</td>
<td>33 (34%)</td>
<td>Foster Child High Needs</td>
<td>58 (61%)</td>
</tr>
<tr>
<td>Age 35-44</td>
<td>48 (51%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s or higher</td>
<td>77 (81%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time employed</td>
<td>32 (34%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income of $42-126k/yr.</td>
<td>69 (73%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years Licensed</td>
<td>4.91 (3.89)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Table reports summary statistics for enrolled adult participants (left) and the participating permanent child or foster child (right).
3.3 Analysis on Effects of the Intervention

To explore the effects of the intervention on relational quality outcomes among family member participants, the changes between the initial survey and one-month follow-up were computed for each participant’s measure of FHI, SIB, and CFAI. The mean change in each measure was compared between the intervention and control groups.

The intervention created a statistically significant improvement in family hardiness (mean FHI), with Cohen’s d reporting an effect size of 0.97. Sibling relationship measures, both positive indicators (SIB+) and negative indicators (SIB-), had significant improvements, with Cohen’s d of 0.76 and 0.71, respectively. The intervention CFAI measure did not show a significant change, with Cohen’s d of 0.06. These effects are further explored in the regression analyses reported in Tables 4, 6, and 7 below.

The pre-intervention questionnaire showed that, when a foster child had higher behavioral needs, the negative aspects of the sibling relationship (SIB-) were more pronounced. Behavioral needs did not affect positive aspects of the sibling relationship (SIB+), and the ages of the foster child or permanent child had no significant impact on either measure (Table 3).

Table 3

<table>
<thead>
<tr>
<th>N = 93</th>
<th>Predictors of Sibling Inventory of Behavior Scores in Initial Family Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive Sibling Behaviors Pre</td>
</tr>
<tr>
<td>Permanent Child Age</td>
<td>-0.14</td>
</tr>
<tr>
<td>Foster Child Age</td>
<td>-0.19</td>
</tr>
<tr>
<td>Foster Child High Needs</td>
<td>-1.87</td>
</tr>
<tr>
<td>Constant</td>
<td>43.2***</td>
</tr>
<tr>
<td>R^2</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Notes: Table reports regression results of child characteristics on the SIB measure of relationship quality (whether positive relationship aspects in SIB+, or negative relationship aspects in SIB-). p-values for each coefficient are reported in italics. p<0.05 *, p<0.01 ***, p<0.001 ***
When reevaluated four weeks later, SIB+ measure showed some mean reversion, with higher scores tending to fall. The SIB+ measure also improved for older permanent children (by 0.7 points per year older). The SIB+ of intervention families increased by an additional 5.5 points. Indeed, these two effects appear connected: when the intervention status is interacted with the permanent child age, all the improvement occurs through the interaction. The SIB+ relationship improved by 0.86 points (with a p-value of 7.2%) for each year older if they received the intervention; but neither the permanent age nor the intervention status was significant on its own. This indicates that the intervention is especially effective for older kids (Table 4, Specifications 1 & 2).

The SIB- measure showed similar mean reversion, such that worse (larger) scores showed more improvement than those with better scores. The intervention also improved the SIB- score by an average of 2.9 points. The age of the permanent child also had a positive impact (though with a p-value of 12%) and thus the interaction of age and intervention was also not significant (Table 4, Specifications 3 & 4).

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SIB+ Improve</td>
<td>SIB+ Improve</td>
<td>SIB- Improve</td>
<td>SIB- Improve</td>
</tr>
<tr>
<td>N = 83</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIB+ Pre</td>
<td>-0.40***</td>
<td>-0.36***</td>
<td>0.35***</td>
<td>0.33***</td>
</tr>
<tr>
<td>SIB- Pre</td>
<td></td>
<td></td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Permanent Child Age</td>
<td>0.72**</td>
<td>0.37</td>
<td>0.25</td>
<td>0.08</td>
</tr>
<tr>
<td>Foster Child Age</td>
<td>-0.24</td>
<td>-0.22</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>Foster Child High Needs</td>
<td>-0.78</td>
<td>-0.47</td>
<td>-0.39</td>
<td>-0.19</td>
</tr>
<tr>
<td>Intervention</td>
<td>5.50***</td>
<td>-2.35</td>
<td>2.90**</td>
<td>-0.88</td>
</tr>
<tr>
<td>Intervention Age</td>
<td></td>
<td>0.86</td>
<td>0.074</td>
<td>0.42</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.80</td>
<td>-1.98</td>
<td>-2.23</td>
<td>-0.92</td>
</tr>
<tr>
<td>R^2</td>
<td>0.421</td>
<td>0.445</td>
<td>0.310</td>
<td>0.325</td>
</tr>
</tbody>
</table>

Table 4
Predictors of Relationship Change in Follow-up Sibling Inventory of Behavior (SIB)
Notes: Table reports regression results of child characteristics, initial sibling inventory of behavior (SIB) score (de-meaned), and intervention status on the improvement in the SIB score (increase in SIB+ or decrease in SIB-). \( p \)-values for each coefficient are reported in italics. \( p<0.05 \), \( p<0.01 \), \( p<0.001 \).

The pre-intervention questionnaire showed that a positive sibling relationship and younger foster child age were positive predictors of initial Family Hardiness Index (FHI) scores. Negative relationship issues were not significant, nor was the permanent child’s age (Table 5).

Table 5

Predictors of Family Hardiness Index (FHI) in Initial Family Survey

<table>
<thead>
<tr>
<th>Predictor</th>
<th>FHI Pre</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 93</td>
<td></td>
</tr>
<tr>
<td>Permanent Child Age</td>
<td>-0.06</td>
</tr>
<tr>
<td>Foster Child Age</td>
<td>-0.23</td>
</tr>
<tr>
<td>Foster Child High Needs</td>
<td>-1.11</td>
</tr>
<tr>
<td>SIB+ Pre</td>
<td>0.17**</td>
</tr>
<tr>
<td>SIB- Pre</td>
<td>-0.05</td>
</tr>
<tr>
<td>Constant</td>
<td>41.94***</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.178</td>
</tr>
</tbody>
</table>

Notes: Table reports regression results of child characteristics and initial SIB measure of relationship quality on initial Family Hardiness Index measure. \( p \)-values for each coefficient are reported in italics. \( p<0.05 \), \( p<0.01 \), \( p<0.001 \).

When re-evaluated after four weeks, the FHI score showed moderate mean reversion: for each additional point in the initial score, the post score was 0.3 points lower. Families who received the intervention, in contrast, significantly increased by 4.3 points. Improved sibling relationships contributed to the increase in family hardiness. In the second specification, a 1-point increase in the SIB+ measure results in a significant 0.25 point increase in the FHI. The intervention still had a significant direct effect on family hardiness, though reduced from 4.3 to 3.1 points (See Table 6).

Table 6

Predictors of Family Hardiness Index (FHI) Change in Follow-up Survey

<table>
<thead>
<tr>
<th>Predictor</th>
<th>FHI Improve</th>
<th>FHI Improve</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FHI Pre</td>
<td>-0.30***</td>
<td>0.000</td>
</tr>
<tr>
<td>Intervention</td>
<td>4.31***</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>-0.24**</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>3.14***</td>
<td>0.001</td>
</tr>
</tbody>
</table>
The pre-intervention CFAI measure of family preparedness was not significantly related to any of the characteristics of child age or needs, and only weakly positively related to a higher SIB+ score. When re-evaluated after four weeks, the intervention predicted a small but not significant improvement in CFAI. When changes in sibling relationship were also included, however, the intervention had no effect, but SIB+ was positively significant (with a $p=0.015$, see Table 7).

### Table 7

*Predictors of Change in Casey Foster Applicant Index (CFAI) in Follow-up Survey*

<table>
<thead>
<tr>
<th></th>
<th>CFAI Improve</th>
<th>CFAI Improve</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFAI Pre</td>
<td>-0.43***</td>
<td>0.000</td>
</tr>
<tr>
<td>Intervenion</td>
<td>0.54</td>
<td>0.285</td>
</tr>
<tr>
<td>SIB+ change</td>
<td>0.08*</td>
<td>0.015</td>
</tr>
<tr>
<td>SIB- change</td>
<td>0.05</td>
<td>0.374</td>
</tr>
<tr>
<td>Constant</td>
<td>0.61</td>
<td>0.068</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.357</td>
<td>0.448</td>
</tr>
</tbody>
</table>

*Notes: Table reports regression results of initial CFAI score (de-meaned), intervention status, and change in SIB scores on the improvement in the CFAI score. $p$-values for each coefficient are reported in italics. $p<0.05 \,*$, $p<0.01 \,**$, $p<0.001 \,***$*

### 3.4 Improved sibling relationships as a mechanism for improved family hardiness

Mediation analysis results are reported in Figure 2. In short, families who received the intervention reported an increase of 4.3 points in family hardiness (consistent with Table 6, first specification; this is 9.5% of the average FHI score). However, after controlling for improvement in sibling relationships, the direct effect of the intervention was to increase family hardiness by 2.9 points (consistent with Table 6, second specification). The intervention improved sibling
relationships by 5.9 points (consistent with Table 4, first specification; this is 15% of the average SIB+ score), and each point of sibling relationship improvement caused a 0.23-point increase in family hardiness, multiplied for a 1.38-point indirect effect (or 3% of the average FHI). As a mediator for improved family hardiness, SIB+ improvement was responsible for 32% of the total effect.

**Figure 2**
*Mediation of positive sibling relationships in increasing family hardiness*

---

**4 DISCUSSION**

The current study demonstrates foster families that received the CFS-FF intervention have significant increases in positive sibling relationships between the child in the home and the foster child as well as increases in measures for family hardiness. Not only do foster siblings in the home matter, but by supporting their fostering experience through a behavioral intervention, it is possible for child advocates to improve foster sibling relationships. These improved relationships may have longer-term effects such as improving connection and attachment, thereby potentially supporting connection and long-term outcomes for children who have experienced significant past traumas.

---

5 Significance is indicated by *** for p < 0.001
The intervention was successfully tailored and presented in a format acceptable to this population. Feedback received from study participants included the following quotes: “I love that you all are focusing on the connection for the in-between. Our foster son will be here until he goes off to college, but I love that our kids have bonded to him for life” and "I have never felt that anyone understood what our family lives every day until now. She nailed it down to one adopted child that everything seems to revolve around.” The participants validated the need to view the family as a whole and one wrote, “Just the acknowledgment that my family has 6 people, not just the parents and foster child. I felt seen as a whole unit.” This is consistent with findings from the literature equating the fostering sibling to the “invisible child” and that parents feel their children need to be recognized (Hojer, 2007; Raineri et al., 2018). Foster families see the contributions and sacrifices children already residing in the home make on behalf of foster children. This can be by choice or by necessity, but the professional community and government entities have not traditionally recognized or supported them. These children experience grief and loss when a foster child leaves the home and are integral in the acceptance process of a foster child (Gypen et al., 2020). This intervention supports and aligns with the current recommendations in the literature, yet few interventions include the permanent siblings in the home even though they participate in caregiving.

The current study successfully employed a randomized control trial of a behavioral intervention that included children. Retrospective and descriptive studies are commonly employed with this population due to the challenges and costs of working with this population and with biomarkers. This study demonstrates a successful adaptation of an accessible intervention to improve family functioning and increase positive relationships within families. It
also demonstrates the importance of having a control group. As shown previously in Table 6, the average family experiences mean reversion in their FHI over the course of the four-week study period. Despite this, intervention families had a 4.3 point increase in their FHI. Thus, the randomized trial allowed us to more confidently conclude that the intervention did have a significant impact on FHI.

The FHI and SIB proved to be useful and accurate tools for measurement within this study population and experimental design. Not only did the tools capture the concepts that were being taught, but they provided numerical data on how much. Both tools demonstrated construct validity (how well a tool can detect significant differences) and content validity (how accurately a tool taps into the various aspects of the specific construct in question) when applied to the foster family population. To ensure that the FHI and SIB were indeed accurate tools for measurement within this population, we compared results to published research articles in other populations that included children. For example, we compared our bell curve for foster families against the bell curve for mothers of children with cardiac illness (McCubin et al., 1996). We found that the family hardiness bell curve for foster families and for mothers of chronically ill children were indeed similar. This helped to gauge if the tool was being used correctly and was translatable to our specific population. Our findings also supported the reliability of these two measurement tools, that is that the measuring procedure yields the same results on repeated trials. The SIB results were compared with other studies of families raising one typically developing child and another child with disabilities. Both these measurement tools, when compared to the theoretical framework, appear to have theoretical and face value validity, accurately capturing the concepts in a quantitative way as would be expected by the theoretical modeling.
The current study and adaptation of the intervention was grounded in a mid-range theory, the Theory of the Adapting Foster Family, which was specifically developed for use in designing studies of and assisting fostering families (Platt et al., 2022). The unique holistic and interdisciplinary approach required factoring the environment and complex family system dynamics into what was included in the intervention and how it was incorporated. Laying out the theoretical constructs helped frame the study and the adaptation to this population, which is unique and diverse (Bencomo, 2022). Creating/adapting a behavioral intervention that was received well but also had a positive effect on the family required careful planning with conceptual models.

The intervention leverages a previously undervalued and poorly understood source of resilience — the siblings in the home. To our knowledge, an RCT with foster siblings has never previously been conducted. The results were consistent with the theoretical assertions that the relationship between the children in the home may provide a source to buffer stress, improve connection, and assist in improving family hardiness.

There were a few limitations in this study, the first being that the concept of family preparedness was not fully explored. The CFAI did not appear to capture the concept of sibling or family preparedness for fostering. It's possible the intervention did not change family preparedness, but it is also possible that a different or improved tool is needed. The CFAI is meant to measure foster parenting preparedness, and it did not translate over to “family preparedness” in a meaningful way for this study. Additional tools or how the CFAI is applied need to be rethought. A longitudinal study of new foster parents also may be more useful in
measuring the construct of preparedness. In this study, most of the families were experienced foster care providers.

The study included foster families across the United States. It did not include families in other countries and may only be generalizable to those fostering in the United States or those countries with similar foster care systems. The intervention is generalizable to foster families within the United States who have access to the internet. It is likely generalizable to English speaking, industrialized countries with similar foster care systems. It is unlikely that the intervention, in its current form, would be useful for families in countries that are not as developed. Additionally, the main presenter of the videos is a therapist who is Caucasian. To better represent and connect with families globally, the intervention should be adapted to have individuals in the videos who more closely represent other ethnicities of participating families.

4.3 Future Direction and Research

The findings of the current study advance our understanding of how relationship development among members within foster families can be supported and improved. Future research designs should continue to consider the impact and role that permanent or foster siblings play in the caregiving of CFC. The current study used self-report methods as a measure for family hardiness and child/sibling relationships. Valuable information could be gained from tracking bio measures, such as salivary cortisol, which are more objective and may have less reporter bias. Bio behavioral markers would also give an indicator of how stress levels fluctuate between family members, whether perceived by the members or not. Additionally, investigating how the intervention for or support of the permanent sibling in the home affects long-term attachment for both the fostering child and the child in foster care is warranted.
5 CONCLUSION

This study provides evidence for the support of the fostering family through sibling inclusive interventions and shows the feasibility and acceptability of an online self-paced format. Future endeavors should investigate how these interventions and the promotion of healthy attachment affect long-term placement stability and outcomes for vulnerable children who have entered the foster care system.

AKNOWLEDGEMENTS

This project was supported by the Frederick Lange Memorial Endowment Award through the University of Arizona College of Nursing. We gratefully acknowledge the support of the Karyn Purvis Institute of Child Development during the recruitment process and the Foster Care Foundation, which provided community input and feedback on the intervention.

CONFLICT OF INTEREST

The authors have no conflicts of interest to report.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.
References


[https://doi.org/10.1016/j.childyouth.2020.104779](https://doi.org/10.1016/j.childyouth.2020.104779)

[https://doi.org/10.1007/s00787-017-1034-7](https://doi.org/10.1007/s00787-017-1034-7)

[https://doi.org/10.1007/0-387-23823-9_13](https://doi.org/10.1007/0-387-23823-9_13)
APPENDIX D:

LETTER OF SUPPORT AND COLLABORATION WITH THE KPICD
July 22, 2021

To Whom it May Concern:

It is my pleasure to write a letter in support of Christine Platt’s proposal to study the effectiveness of a pre-service intervention for foster families.

I developed a post-adoption intervention for adoptive families called the Connected Family Series as part of my doctorate program dissertation studies. This intervention was created based on my personal, clinical, and research experiences. Results of my study revealed the intervention was effective at improving parenting stress and competence, parent-child relationships, child behavior, and overall family connection and communication in adoptive families.

I permit Christine Platt to adapt, jointly with me, the Connected Family Series intervention for use in her research studies.

I understand my support means that I may participate in the following:

- Consulting on research design, protocol, and/or assessment
- Adapting the Connected Family Series intervention for pre-service training and medically fragile/special needs populations
- Providing the intervention to Christine Platt for use with participants in her research study
- Monitoring the implementation and examination of the intervention in research

I, on behalf of the Karyn Purvis Institute of Child Development, agree to work collaboratively with Christine Platt and the University of Arizona School of Nursing to develop the research project proposed by Christine Platt.

Sincerely,

Jana L. Hunsley, PhD, LCSW
APPENDIX E:

THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD APPROVAL LETTER
EXPEDITED APPROVAL

January 14, 2022

Christine Platt:

Dear Christine Platt:

On 1/14/2022, the IRB reviewed the following submission:

<table>
<thead>
<tr>
<th>Type of Review</th>
<th>Initial Study</th>
</tr>
</thead>
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<tr>
<td>Title</td>
<td>Effects of a Behavioral Intervention with Foster</td>
</tr>
<tr>
<td></td>
<td>Families</td>
</tr>
<tr>
<td>Investigator</td>
<td>Christine Platt</td>
</tr>
<tr>
<td>IRB ID</td>
<td>STUDY00000382</td>
</tr>
<tr>
<td>Sponsor</td>
<td>None</td>
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<tr>
<td>Prime Sponsor</td>
<td>None</td>
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<td>IND, IDE, or HDE</td>
<td>None</td>
</tr>
</tbody>
</table>

Documents Reviewed:
- Advisor Attestation, Category: Institutional Approval,
- Assent form age 8 to 12, Category: Consent Form,
- Assent form ages 13 to 17, Category: Consent Form,
- Attestation for Scientific Review and Department Review, Category: Institutional Approval,
- Citi Training Certificate, Gephardt, Category: Other,
- Communicate Activity (each week included), Category: Participant Material,
- Connect Activities, Category: Participant Material,
- Consent Form, Category: Consent Form,
- Demographics Survey and Foster Child Characteristics Survey Combined in Qualtrics, Category: Data Collection Tool,
- Email to participants for consent forms, Category: Other,
- Example link for Recruitment, Category: Recruitment Materials,
- Family Ritual List, Category: Other,
- Foster Family Full Survey Battery, Category: Data Collection Tool,
The IRB approved the protocol from 1/13/2022.

Regulatory determinations:

- **Risk Level**: No greater than minimal risk
- **Pediatric Risk Level**: 21 CFR §50.51, 45 CFR §46.404. Not involving greater than minimal risk
- **Review Level**: Expedited; (3) Prospective collection of biological specimens for research purposes by noninvasive means; (7) Research on individual or group characteristics or behavior or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies; (7) Research on individual or group characteristics or behavior or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.
- **Special Determinations**: Children

To document consent, use the consent documents that were approved and stamped by the IRB. Go to the Documents tab to download them.
- This project has been reviewed and approved by the IRB or designee. All documents referenced in this submission have been reviewed and approved.
- The University of Arizona maintains a Federally Assured Assurance (FWA) with the Office for Human Research Protections (OHRP) (FWA #00004218).
- This Institution assures that all of its activities related to human subjects research, regardless of the source of support, will be guided by the Belmont Report and applicable regulations according to 45 CFR 46.111 and/or 21 CFR Part 50.
- No changes to this project can be made prior to IRB approval except to eliminate apparent immediate hazard to participants.
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB.
- The Principal Investigator should notify the IRB immediately of any proposed changes that affect the protocol and report any unanticipated problems involving risks to participants or others. Please refer to Guidance for Investigators Responsibility after IRB Approval and Reporting Local Information.

Permission of one parent is sufficient as it is research involving not greater than minimal risk as defined in 45 CFR 46.404. Please refer to HSPP Guidance, Research Involving Children.

We value your feedback and would appreciate you taking the time to complete our survey about your experience with the IRB staff:
https://iarizona.co1.qualtrics.com/jfe/form/SV_dgQSVxqciPhiiU4

If questions arise at any time during your study, please email the general IRB inbox at VPR-IRB@arizona.edu
APPENDIX F:

RECRUITMENT POSTING
Announcing a new research opportunity for foster families!

We, in collaboration with the University of Arizona, are seeking foster families to use an online intervention in their homes as part of an IRB approved research study. The Connected Family Series is an effective online intervention originally created to build connection among all members of families post-adoption (if you remember, we studied this intervention back in 2020!). The intervention aims to increase understanding of the experiences of each family member, including siblings, and offers tools to improve communication and family functioning. Now, the University of Arizona is studying the usefulness of this same intervention for foster families.

For more information about the intervention and the research study, please see this blog post for details and contact information. [blog post URL]

**Information to be found on Blog:**

The University of Arizona College in conjunction with the Karyn Purvis Institute of Child Development are conducting research to determine if an online 4-week intervention can provide support for foster families to improve well-being and connection.
The intervention is a 4-week online, self-paced intervention aimed at the meeting the needs of each member of the family and improving well-being and connection. Each week of the 4-week series, parents watch a mini-webinar, children watch a short video, and the whole family completes two activities together aimed at improving communication and connection. Each week’s content builds upon itself with the goal that, at the end of the 4 weeks, families are set-up for success to continue using the tools learned in the intervention.

Who Can Participate?

- Currently licensed foster families residing in the United States.
- Families must have at least 2 children residing in the home (one must be a foster child and another must be a permanent sibling living in the home).
- Foster child must be considered a “placement” and not solely respite care status.
- Families cannot be a designated as a facility or group home.

The Research Study

If you choose to participate, your family will be randomly assigned to either a control group or an intervention group. The intervention group will receive the intervention in February. Families in the control group will be given access to the intervention within 3 months after the intervention group has completed the modules. You cannot elect to be in a specific group.

Participation includes a brief survey about your family, completing assessments at 2 different time points about yourself and your family relationships, and participating in a 4-week online intervention. The 4-week intervention includes watching videos and doing family activities together each week. All participation will take place online.

There are minimal risks involved in this research. Risks include being uncomfortable doing activities with your family and completing the intervention without the presence of a professional.
Some families will be selected to provide saliva samples to test cortisol levels (a stress hormone). This is an easy process and will be explained if you are selected. You may still participate even if you choose not to provide a saliva sample.

Families will receive Amazon eGift cards ($25 after completion of round 1 of the surveys, $25 after completion of the final survey (after intervention), and an additional $25 (max of $75 total) for sending saliva samples.

Please call (801) 709-0613 or email crplatt@email.arizona.edu with any questions

FAQ

Does my family need to be working with a professional in order to participate?

Families do not need to be working with a professional to participate. The intervention was designed to be done in the home without the assistance of an outside professional.

Can I access the intervention without being a part of the research study?

The intervention is only available to families who are participating in the research study. Based on the results of the research study, the intervention may become more widely available in 2023.

What if my family is not eligible to participate in the study?

At this time, you will not be able to access the intervention. However, if the intervention becomes more widely available, there will be no eligibility requirements for families to access it.
Do I need to have TBRI training to participate in this study?

Families are not required to know of or have training in TBRI in order to participate. It is expected that families will have a range of experiences with TBRI from not being familiar with it to having a TBRI Practitioner in the family.

How long does the intervention take to complete each week?

The amount of time depends on the selected family activities. Each week there is a 15-20 minute video for parents to watch, a 5-10 minute video for children to watch. There are also two family activities each week which could take a varying amount of time depending on the family's selection.

If I am in the research study when will I have access to the intervention?

The time of access will depend on which group your family is randomly assigned to be in. Depending on the group, you will either have access in February 2022 or around July 2022. You cannot select which group you will be a part of.

What would my involvement be in the research study?

The main caregiver in each family will complete online assessments at 3 different time points over a 3-month period. Links will be emailed to families and there will be a one-week period to complete the required assessments during each of the 3 time points. Some families may be selected, but are not required, to collect a saliva sample at 3 different time points to measure cortisol, and indicator of stress in the body.

To Participate

Link to study here:
https://uarizona.co1.qualtrics.com/jfe/form/SV_5Ab0WbDdNyFLYTY

IRB # STUDY00000382

This project has been reviewed and approved by the University of Arizona IRB.
APPENDIX G:

DEMOGRAPHIC SURVEY
1) How many family members are in your family?

2) How many children did you adopt in your family?

3) How many children are biologically related to you in your family?

4) How many total children are in your family?

5) What is your family’s socioeconomic status?
   a. 0-31,000
   b. 31,000-42,000
   c. 42,000-126,000
   d. 126,000-188,000
   e. 188,000+

6) Please check each of the below items that best describe your household:
   a) Single-parent household
   b) Two-parent household
   c) LGBTQ parents
   d) Blended family

7) Please complete the following information for each family member:
   a) Age
   b) Gender
   c) Race
   d) If child, bio/foster/adopted status
   e) How long has each child resided in the home?
   f) For each child, indicate if they have a disability or special medical needs and type
g) For each child, indicate level of behavioral challenges in 1 of three categories (typical neuro developing child, moderately delayed/behavioral concerns, or severe behavioral and developmental concerns).

8) How long have you been a licensed foster parent?

9) Did you accept your current placement with the intent to adopt?

10) Were you provided education and preparation to care for children with special needs?
   a) If yes, by whom?
   b) If yes, was this helpful in preparing you for the needs of the child?

11) Were the children in the home provided with education or preparation for a child with special needs to enter the home?
   a) If yes, by whom?
   b) If yes, was this helpful in preparing you for the needs of the child?

12) If asked today, would your family agree to permanency or adoption of the foster child?

13) How bonded are you to the foster child? (0- not at all, to 4 – very)

14) How bonded are the children in your home bonded to the foster child? (0- not at all, to 4 – very)

15) Any additional information you would like to share with the research team?