5-2022

Early Sibling Play Interactions as a Source of Developmental Support for Toddlers: Observation of Young Children's Developmental Support During Play with Toddler Siblings

Tasha L. Olson
Utah State University

EARLY SIBLING PLAY INTERACTIONS AS A SOURCE OF DEVELOPMENTAL

SUPPORT FOR TODDLERS: OBSERVATION OF YOUNG CHILDREN'S

DEVELOPMENTAL SUPPORT DURING PLAY

WITH TODDLER SIBLINGS

by

Tasha L. Olson

A dissertation proposal submitted in partial fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Human Development and Family Studies

Approved:

_____	_____
Lori A. Roggman, Ph.D.	Lisa K. Boyce, Ph.D.
Major Professor	Major Professor
_____	_____
Kay Bradford, Ph.D.	Julia Yan, Ph.D.
Committee Member	Committee Member
_____	_____
Vonda Jump Norman, Ph.D.	D. Richard Cutler, Ph.D.
Committee Member	Interim Vice Provost of Graduate Studies

UTAH STATE UNIVERSITY
Logan, Utah

2022

ABSTRACT

Early Sibling Play Interactions as a Source of Developmental Support for Toddlers:

Observation of Young Children's Developmental Support During Play

with Toddler Siblings

by

Tasha L. Olson

Utah State University, 2022

Major Professors: Dr. Lori A. Roggman & Dr. Lisa K. Boyce
Department: Human Development & Family Studies

The sibling relationship is a unique and important context for infant and early child development. Despite the important role of siblings and the unique aspects of the sibling relationship, sibling interactions are largely overlooked by scholars as a resource of potential developmental support. Identifying and fostering developmentally supportive interaction (DSI) behaviors in sibling relationships may expand available supports for children's early development and may also support family well-being.

This study used a sample of 15 child-toddler sibling pairs and a correlational design to identify DSI behaviors in interactions between young children and their toddler-aged siblings, determine if and how well DSI behaviors could be observed, determine the similarities and differences between DSIs in child-toddler and parent/caregiver-child interactions, and identify child factors that were associated with DSI behaviors. Caregivers completed a questionnaire online in Qualtrics, answering questions about their children and family, their children's sibling relationship, and their children's play skills.

Caregivers then recorded and submitted 10-minute videos of their young children playing together, these videos were coded by observational coders who were trained to identify DSI behaviors using an established measure of caregiver-child interaction quality, the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO). Older siblings across the 15 sibling pairs were observed engaging in each DSI behavior and coders were able to reliably code videos for behaviors in the Affection, Responsiveness, and Encouragement domains. When compared to an adult comparison sample, DSI behaviors in young sibling interactions were less frequent, less complex, and lower quality than in adult-child interactions. Younger brothers received more encouragement support from older siblings than younger sisters. Older children who were older siblings provided more developmental support than younger children who were older siblings. Older siblings interacted with more warmth when the age gap was larger than when it was smaller. The directions of the correlations for sibling empathy/concern and conflict/aggression with DSI behaviors were all in unexpected directions, with empathy/concern being negatively correlated with DSI behaviors and conflict/aggression being positively correlated with DSI behaviors. These results may provide guidance for supporting developmentally supportive sibling interactions at home and in intervention.

(127 pages)

PUBLIC ABSTRACT

Early Sibling Play Interactions as a Source of Developmental Support for Toddlers:

Observation of Young Children's Developmental Support During Play

with Toddler Siblings

by

Tasha L. Olson

The sibling relationship is a unique and important context for infant and early child development. Despite the important role of siblings and the unique aspects of the sibling relationship, sibling interactions are largely overlooked by scholars as a resource of potential developmental support. Identifying and fostering developmentally supportive interaction (DSI) behaviors in sibling relationships may expand available supports for children's early development and may also support family well-being.

This study used a sample of 15 child-toddler sibling pairs to identify DSI behaviors in interactions between young children and their toddler-aged siblings, determine if and how well DSI behaviors could be observed, determine the similarities and differences between DSIs in child-toddler and caregiver-child interactions, and identify child factors that were associated with DSI behaviors. Caregivers completed a questionnaire online in Qualtrics, answering questions about their children and family, their children's sibling relationship, and their children's play skills. Caregivers then recorded and submitted 10-minute videos of their young children playing together, these videos were coded by research assistants who were trained to identify DSI behaviors using an established measure of caregiver-child interaction quality, the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO).

Older siblings across the 15 sibling pairs were observed engaging in each DSI behavior and research assistants were able to reliably code videos for behaviors in the Affection, Responsiveness, and Encouragement domains. When compared to an adult comparison sample, DSI behaviors in young sibling interactions were less frequent, less complex, and lower quality than in adult-child interactions. Younger brothers received more encouragement support from older siblings than younger sisters. Older children who were older siblings provided more developmental support than younger children who were older siblings. Older siblings interacted with more warmth when the age gap was larger than when it was smaller. Older siblings reported by their caregivers to have higher levels of empathy/concern engaged in fewer DSI behaviors and older siblings reported by their caregivers to have higher levels of conflict/aggression engaged in more DSI behaviors. These results may provide guidance for supporting developmentally supportive sibling interactions at home and in intervention.

ACKNOWLEDGMENTS

CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

CHAPTER I

INTRODUCTION

The sibling relationship is a unique, but important, context for infant and early child development. Siblings can act as attachment figures, comforters, caregivers, companions, emotional supports, rivals, playmates, helpers, mentors, and teachers (Bowlby, 1980; Karavasilis Karos et al., 2007; Howe et al., 2002; Teti & Ablard, 1989). The sibling relationship is often more reciprocal and less hierarchical than an adult-child relationship would be, with older siblings at a closer developmental level than parents to a toddler, putting older siblings in a unique position for supporting their younger siblings' development (Karavasilis Karos et al., 2007). For many, the sibling relationship will be their longest-lasting relationship (Howe & Recchia, 2005) and the effects of establishing a positive or negative sibling relationship can last a lifetime (Ross & Milgram, 1982). Siblings have the potential to support each other's development, which may be especially beneficial for young children, especially those with or at risk for developmental and social delays. Some sibling relationships, however, may not offer these potential benefits, such as when the sibling relationship is characterized by low levels of warmth and understanding (Dunn, 2002) or when a child is not involved in playing with or helping their sibling (Volling & Blandon, 2005). Identifying and fostering developmentally supportive interaction (DSI) behaviors that occur during play between siblings may expand available supports for children's early development and support family well-being.

Siblings support each other's development in several ways that adult caregivers cannot. Older siblings, particularly, can support their younger siblings' development through instruction, modeling, and, importantly, play (Dunn & Munn, 1986). The more relatively developmental levels of siblings, compared to quite different developmental levels of children and parents, allow much more reciprocity in sibling play interactions during play and more understanding by the older sibling of the perspective and abilities of the younger sibling (Recchia et al., 2009). Sibling relationships are thus less hierarchical than parent-child relationships but do have complementary aspects because an older sibling is in a position of being a somewhat more knowledgeable and experienced playmate, teacher, or model (Klein et al., 2003; Recchia et al., 2009; Prime et al., 2014).

Theory supports the important role siblings play in each other's lives. Siblings belong to the same microsystem where their play and interactions affect their behaviors, roles, and relationships with others and the rest of the microsystem. The impact of these interactions on development occur through proximal processes, the reciprocal interactions that occur over time (Bronfenbrenner & Morris, 2006). Older siblings can also help support and guide their younger siblings' knowledge through social interactions, using their greater knowledge and skills to build off their younger siblings' abilities and expand their development (Vygotsky, 1978).

Despite the important role of siblings and the unique aspects of the sibling relationship, sibling interactions are largely overlooked as a resource of potential developmental support, particularly by interventionists such as home visitors and special educators (Beffel et al., 2021). Many home visiting intervention programs serving

families of infants and toddlers aim to support children's early development by fostering developmentally supportive caregiver-child interactions (Weatherston & Tableman, 2002; Roggman et al., 2016). Less attention is paid to sibling relationships unless a sibling is engaged in the home visit or the parents want to discuss sibling conflict or introducing a new sibling. Although Early Head Start home-based programs and some other home visitation programs explicitly invite siblings to participate in home visits (U.S. Department of Health and Human Services, 2019; Rahn, 2020; Rector, 2002), other home visitation models rarely include siblings in home visits to families, either by design or implementation policy (Azzi-Lessing, 2011). For parents and caregivers, DSIs with their children have been effectively increased by using observation feedback to coach caregivers to increase behaviors they already do that are known to support children's early development (Fisher et al., 2016). A similar coaching strategy could be effective for increasing developmental support in sibling interactions given that children engage in similar supportive behaviors during interactions.

Interventions have been done between typically developing children, usually siblings or peers, and some interventions have been used when a child has a disability, such as an autism diagnosis. However, the number of interventions using children as interventionist is nowhere near the number of interventions that use an adult such as a parent/caregiver, a teacher, or a specialist. Many interventions that use other children as interventionists aim to help children build social skills and help them get along with their siblings or peers. These interventions include those that address reducing aggression or increasing positive interactions (Tucker & Finkelhor, 2017). Other interventions address skills development in children with a disability (Kim & Horn, 2010; Daffner et al., 2020),

such as autism (Tsao & Odom, 2006; Ferraioli & Harris, 2011). Although some of these interventions for children with disabilities using siblings as interventionists have promising results (Beffel et al., 2021), the results of other interventions using siblings are mixed (Taeyoung & Horn, 2010), perhaps because the interventionist siblings require intensive training to be taught how to act as intervention agents for their siblings, and the effective skills they may naturally use with their siblings have not been identified. Identifying those natural DSI behaviors used by young siblings can help guide interventions to be more developmentally appropriate for both children.

Purpose

The primary purpose of this study was to identify DSI behaviors in sibling pairs where the youngest child is aged 1 to 3 years old and the older child is 3 to 8 years old, with at least 1 year between the children's ages, using an established measure of DSI in caregiver-child interactions.

Research Questions

This study addressed the following research question:

1) What DSI behaviors do young children, particularly older siblings, engage in with younger toddlers, particularly their younger siblings, during play?

    a. Which DSI behaviors can trained observers reliably identify in the older children by using an established measure of DSI in caregiver-child interactions?

b. How are DSIs between an older child and a toddler *similar to* or *different from* DSIs between an adult caregiver and a child?

c. How do child factors [genders of both children, child ages, parity positions, disability (IFSP/IEP), child play skills, sibling relationship quality, sibling conflict, and children's care environments] affect DSI between toddlers and young children?

CHAPTER II

LITERATURE REVIEW

Play is the primary way children learn. Research is clear that children explore new things and practice emerging skills through play (Gitlin-Weiner et al., 2000). Children build their social skills, motor skills, cognitive skills, and language skills as they play alone and with others (Bunker, 1991; Jamison et al., 2012; Levine et al., 2012; Taylor & Boyer, 2020). Children begin to play with other children, particularly peers and siblings, between the ages of one and five years, depending on their opportunities such as presence of other children in the household, extended family, children in their neighborhoods or communities, and participation in childcare and other community groups like playgroups or churches (Mueller & Brenner, 1977). These interactions often occur under the supervision of parents or other caregivers and have been examined in the context of family relationships (Dunn & Kendrick, 1979) or group care (Brownell, 1990). Children play with children of the same age, but also play with children who are younger or older than they are, such as other children in mixed-age group care. For many children, their most frequent and long-lasting playmate is an older or younger sibling.

There are advantages to playing with a sibling. Some studies have shown links from positive sibling interactions to the younger sibling's peer interactions (Vandell & Wilson, 1987) and to their development of emotion understanding (Cutting & Dunn, 2010), empathy (Jambon et al., 2019), cognition (Klein et al., 2002), theory of mind (McAlister & Peterson, 2006), and language ability (Bridges & Hoff, 2014). Studies of these associations, however, are generally more evident and more widely studied when the two children are preschool aged (3-5 years) and school aged (6-11 years).

In studies of sibling interaction when one of the siblings has a disability, sibling interactions can have positive influences whether the child with a disability is the younger child or the older child (Stoneman, 2001). These studies suggest potentially positive effects of play interactions between younger and older children, but specific interactions between toddlers and preschool age children that could account for these positive outcomes are largely understudied in relation to early development. Specific caregiver behaviors in toddlers' interactions with parents and other caregivers have been identified that predict the children's later development (Roggman et al., 2013a; Vallotton et al., 2017). For example, receiving praise from a parent or caregiver at home during the toddler years can positively affect children's motivation five years later (Genderson et al., 2013). Many of these DSIs require the caregiver to adapt to the toddler's needs and capabilities. This ability would help a young child play with a toddler.

Most preschool-aged children (children aged 3 to 5 years) have developed the ability to adjust their play or teaching to consider the weaknesses, competencies, and abilities of younger children with whom they are familiar, especially younger siblings and childcare classmates (Azmitia & Hesser, 1993; Recchia et al., 2009; Klein et al., 2003). Preschool-aged children who are aware of and interested in the needs of younger children, such as those who have a younger sibling, are more likely to use effective teaching strategies than children who are unaware of and uninterested in the needs of younger children (Klein et al., 2002). Preschool children's effective teaching strategies with a younger sibling include complex skills such as focusing the younger child's attention, giving the shared activity meaning, organizing the learning process, and encouraging the younger child (Klein et al., 2002).

Interactions with older children, especially older siblings, can offer a powerful source of developmental support for the younger child and often for the older child as well (Sang & Nelson, 2017; Hou et al., 2020). These kinds of opportunities could be better leveraged by identifying mixed-age child-child interactions that are especially helpful for the younger child to expand their abilities and learn new skills, and for the older child to take another's perspective and adapt to a less capable play partner. This information could then be used to develop strategies that could be used to increase these kinds of positive sibling interactions. This study aims to identify and describe DSI behaviors between toddlers and preschool-age children which could lead to strategies to increase these developmentally supportive behaviors, especially in intervention. Thus, the purpose of this literature review is to provide a theoretical perspective to highlight the role of interactions with others in early development, to explore the research on the importance of interactions and play for early child development, and to review studies that have attempted to identify positive behaviors in sibling interactions that are likely to provide developmental support.

Theory on the Role of Others in Early Development

Interactions with others within family, childcare, and other social contexts are important influences on children's development. Identifying theories to explain how development happens within social contexts helps in understanding the DSI behaviors used by older siblings with younger siblings during play and how those behaviors can be supported or encouraged. Bronfenbrenner's (1979) bioecological theory and Vygotsky's (1978) sociocultural theory address the contextual embeddedness of children's early

development within their relationships with others in their everyday environments. These two theoretical perspectives were chosen as a framework for the present study. Bronfenbrenner (1995) posited proximal processes within concentrically different social contexts, in which both children's characteristics and the characteristics of their contexts influence development. Vygotsky (1978) postulated that the actions individuals take to reach goals are enabled by their social contexts. The sociocultural model accounts for the process by which children develop through play.

Bronfenbrenner's Bioecological Theory of Human Development and the Process-Person-Context-Time (PPCT) Model

Bronfenbrenner (1979) theorized in the Ecological Theory that children develop within dynamic systems, circular organizations of increasingly distant components that interact with each other. The Bioecological Theory evolved from the Ecological Theory as Bronfenbrenner and others explored and used the theory (Bronfenbrenner & Ceci, 1993; Bronfenbrenner, 1995; Bronfenbrenner & Morris, 2006). Bronfenbrenner (1995) expanded the theory to suggest that development depends on the four main factors in the *Process-Person-Context-Time* (PPCT) model and that PPCT was an appropriate research design to use with the Bioecological Model.

Proximal Processes

Reciprocal interactions, or proximal processes, between the individual and the people and things in their immediate environments are at the core of the PPCT model (Bronfenbrenner & Morris, 2006). These reciprocal interactions become more complex over time as the individual develops (Bronfenbrenner & Morris, 1998). Despite being

central to the PPCT model, the notion of proximal processes needs further development to be correctly understood and used in research (Griffore & Phenice, 2016). Early sibling play interactions are an example of a proximal process. The children both grow and develop over time as they play together, and their play interactions become increasingly complex over time. The theoretical assumptions from the PPCT model, especially about the role of proximal processes, can guide a perspective of sibling relationships as a source of developmental support and learning opportunities.

Person Characteristics

Person characteristics include traits that either encourage or inhibit proximal processes, individuals' resources that affect the proximal processes, and factors that help or hinder initiation of proximal processes (Bronfenbrenner & Morris, 1998). Person characteristics are divided into three types: demand, resource, and force. Demand characteristics are the personal characteristics that influence how others behave toward an individual (Tudge et al., 2009). Child gender, age, and health are demand characteristics that could affect how they are treated by their siblings. Resources refer to social, emotional, and material resources (Tudge et al., 2009). Children's past experiences with their siblings, peers, parents or other adult caregivers, and others are resources that affect their interactions and development. Force characteristics are internal qualities such as temperament, resilience, and persistence that motivate development and interaction (Meadows, 2010). Children's empathy, and sociability could influence their play interactions with their siblings.

Context

The context consists of the systems in Bronfenbrenner's (1979) Ecological Theory: the individual, microsystem, mesosystem, exosystem, macrosystem, and chronosystem. Individuals develop within these systems that are unique to each child, even children within the same communities and families. These systems include the embedded and overlapping levels of influence on sibling interactions. Any change within one level of one system leads to changes and restructuring at other levels and in other systems.

Individual. The child is at the center of their circles of influence. The child's person characteristics influence how the child is affected by their contexts and how the contexts are influenced by the child (Bronfenbrenner, 1979). Both children in sibling pairs are individuals who are at the center of their own circles of influence with unique characteristics, despite living in the same home.

Microsystem. The microsystem refers to the child's experiences within their immediate surroundings and with the people they directly interact with regularly. Microsystems can affect the child's behaviors, roles, and relationships with others (Bronfenbrenner, 1979). This system contains parents, siblings, children in the same childcare classroom, and close peers. The home is a microsystem that siblings share, but the experiences each have with their caregivers and others in the home will differ because of the unique reciprocal interactions between each individual and the setting. The current study focuses on the interactions between siblings within this system.

Mesosystem. The mesosystem consists of the relations between the different microsystems around the individual (Bronfenbrenner, 1979). This could include

interactions between the child's caregivers and the child's childcare teachers or interactions between the child's family and neighbors. These interactions affect the child's development, and the child can be a participant or topic of these interactions (Meadows, 2010). A caregiver explaining the importance of sharing to an older sibling brings together the caregiver-child microsystem with the sibling pair microsystem to support both siblings' development to improve sibling pair interactions.

Exosystem. The exosystem refers to the contexts that indirectly affect the child and that the child also affects indirectly (Bronfenbrenner, 1979). This can include extended family such as cousins or grandparents, parents' workplaces, early childcare and education opportunities in the community, and exposure to others, especially other children, in neighborhoods. An older sibling who goes on a class field trip to a farm may be excited to tell their younger sibling about the experience when they get home from school. The older sibling may want to pretend to have a farm with the younger sibling. Even though the younger sibling did not have the experience of going on the class field trip, they still receive some developmental benefit from the older sibling's classroom microsystem.

Macrosystem. The macrosystem refers to the societal and cultural norms and expectations that influence the child's life (Bronfenbrenner, 1979). This includes cultural expectations about an older sibling's role in caring for a younger child (McHale, et al., 2012) and developing a lasting, often life-long, relationship with each other (Jensen et al., 2020). Cultural norms and values may also vary in terms of how much sibling relationships are valued in children's early lives (Chen et al., 2017). The macrosystem also includes resources that come from the local, state, and national government, schools,

churches, and other institutions. The resources include families' access to childcare and parental leave, both of which may affect the child's opportunities for positive social interactions with siblings.

Chronosystem. The chronosystem refers to change and development over both long and short periods of time (Bronfenbrenner, 1989), including how children change and develop as they age. It can also include family events, such as the birth of a younger child, and larger societal events, such as natural disasters or changes in public policies, that shape how family members interact with the child and the access they have to resources over time.

Time

In the PPCT model, time can include what is happening during the proximal processes (microtime), the length of time the proximal processes occur (mesotime), and the ways proximal process are affected by changing societal and generational expectations and experiences that affect development over a lifetime (macrotime; Bronfenbrenner & Morris, 1998). Siblings interact frequently, these interactions may be brief or sustained, and these interactions occur over and over through siblings' lives.

Vygotsky's Sociocultural Theory

Lev Vygotsky proposed that social interactions with a more knowledgeable or advanced partner, such as a caregiver or an older sibling, are important in building children's skills and knowledge. Central to his theory is the concept of the zone of proximal development, which refers to the difference between skills children can perform independently – what we generally consider to be children's actual level of development

– and what is possible with support and guidance, that is, children's potential level of development (Vygotsky, 1978). Children learn from and teach other children who are more or less knowledgeable than they are (Howe & Recchia, 2005). Children as young as 4 years old are able to accurately recognize another child's level of ability and then cater interactions to that ability level (Gray & Feldman, 2004). These children have the theory-of-mind abilities to observe and recognize a peer's skill level and competence and then adjust their level of support.

Scaffolding, or supporting the learner by adapting to the learner's abilities and needs, is an important aspect of how a more capable other, such as an older sibling, can support a child's development by helping them perform above their typical independent skill level (Klein, et al., 2002; Klein, et al., 2003; Howe & Recchia, 2005; Knott et al., 2007). In preschool-aged child-toddler dyads, in which both children are typically developing, the more skilled and knowledgeable older child is more likely to provide scaffolding for the younger child's learning. Children are often more interested and motivated to imitate a slightly older child than to try and imitate an adult's skills, because an older child's skill level is closer to the child's zone of proximal development (Gregory, 2001). In studies of imitation, infants have been observed imitating models more when the model had higher perceived similarity to the infant, such as when the model was a peer (Rosekrans, 1967; Hanna & Meltzoff, 1993).

Vygotsky recognized the value of children's play with other children for their early development. Collaboration between children is an important way to support cognitive growth. Interacting with other children, whether they are more- or less-skilled

than the child, can support learning and development by providing opportunities to model and imitate behaviors and scaffold learning (Justice et al., 2019).

Together, these contextual theories of Bronfenbrenner and Vygotsky suggest that sibling relationships are likely to involve interactions that support each other's development in unique ways, across multiple shared and non-shared contexts, over long periods of time during a child's lifetime. A somewhat older child may offer support in the zone of proximal development, using skills, tools, and language that are more similar to a younger child's abilities than a parent's capabilities would be. This theoretical perspective points to the value of observing DSI behaviors between siblings during play.

Interactions and Play in Early Childhood

Play is the primary way children adapt to and learn about the world, whether play is solitary or with another person, but learning is more likely to happen through DSIs with a more skilled and capable play partner (Elkind, 2007). For many young children, play with more knowledgeable siblings or peers offers opportunities to observe modeled behavior, imitate and practice these more complex skills, and get feedback (Youngblade & Dunn, 1995). Although few studies have observed DSI behaviors of preschool-aged children with toddlers, many studies have identified these kinds of behaviors in adult caregivers. Caregiver-child interactions can provide a model for future interactions children may have with younger siblings or peers.

Caregiver-Child Interactions

DSIs during caregiver-child interactions predict child outcomes, including academic success, well into childhood (Innocenti et al., 2013). Interactions with parents and other caregivers can include play or caregiving. A review of the literature on parent-child or caregiver-child interactions that support early development reveals four basic categories: warmth, sensitivity, encouragement, and stimulation (Roggman, 2016; Roggman et al., 2013a). These kinds of behaviors when adults are interacting with infants and young children are known to support early development and may also be relevant to identifying DSI behaviors by preschool-aged children with toddlers, whether siblings or familiar peers.

Warmth or Affection

Caregiver warmth during interactions can include expressing positive emotions and affection. Caregiver warmth promotes positive development throughout childhood (Grusec & Goodnow, 1994; Zhou et al., 2002). Children tend to be less aggressive and more compliant when caregiver-child interactions are high in warmth and affectionate behaviors (Caspi et al., 2004).

Sensitivity and Responsiveness to Emotions and Communication

Responsive caregivers are aware of children's cues during interactions and react to those cues sensitively and promptly. Responsive interaction behaviors include reacting to children's positive and negative emotions in appropriate ways, following the child's lead in play activities, adjusting play to fit the child's needs, and replying to children's attempts at communication (Roggman et al., 2013a). Responsive caregiver behaviors

predict secure attachment (McElwain & Booth-LaForce, 2006) and also predict

children's later development in language, cognitive, and social development in childhood

(Roggman et al., 2013a; Galasyuk et al., 2019) and well into adolescence (Koehn &

Kerns, 2018).

Encouragement or Scaffolding

Encouraging caregiver behaviors support children's efforts as they play. These

behaviors support children in becoming independent and willing to try challenging tasks

confidently and creatively (Laurin & Joussemet, 2017; Andreadakis et al., 2020; Grady,

2019). Encouragement during caregiver-child interactions should be supportive but

should not intrude upon the child's efforts. Caregiver encouragement behaviors support

children's social, language, cognitive, and motor development throughout childhood

(Lowe et al., 2013; Gärtner et al., 2018; Dinkel & Snyder, 2020).

Cognitive-language Stimulation or Teaching

Caregiver behaviors that stimulate cognitive and language development include

engaging in conversations with the child, expanding how the child plays or what they say,

and engaging in shared, pretend play (Roggman, et al., 2013a; Cates et al., 2018). These

behaviors promote language use and problem solving, and can support long-term

academic success (Cook et al., 2011; Cates et al., 2012).

Child-Child Interactions

Children's interactions with other children are more likely to be play interactions

than caregiving, especially when the children are siblings or familiar peers, and especially

in Western cultures. Children who have siblings often spend more time with them than with anyone else, including their parents (Berger & Nuzzo, 2008), making it a favorable and useful setting for supporting children's early development (Carpendale & Lewis, 2004). Practitioners may even consider including siblings in interventions to support early development (Beffel et al., 2021). Considering the kinds of parent and caregiver behaviors that predict better child development outcomes, which of these behaviors have been observed between peers or siblings?

Developmental Support in Child-Child Interactions

Warmth or affection between children. Siblings report that affection and prosocial behaviors are important and positive qualities of their sibling relationships (Furman & Buhrmester, 1985). Play can be more complex when an older sibling is positive with a young child during pretend play (Youngblade & Dunn, 1995). By sharing positive emotions with younger siblings through touch, smiling, and participating in shared play activities, older siblings can help younger siblings express positive emotions and have higher quality connections with others (Bai et al., 2016). Warmth balances out conflict in sibling relationships, which can lead to better social competence when interacting with both siblings and peers (Bedford et al., 2004).

Responsiveness to emotions and communication between children. Sibling interactions are an important context for developing social understanding and social-cognitive development (Dunn, 1988). Children can practice identifying and discussing each other's emotions during interactions with siblings. Interactions become more prosocial as children build their skills in understanding their siblings' emotions (Stocker et al., 2002). Even preschool-aged older siblings can interact in increasingly prosocial

ways as they develop greater understanding of their younger siblings' emotions (Volling et al., 2002).

Encouragement or scaffolding between children. Sibling interactions can be an important source of encouragement toward development for children. Encouragement from an older sibling promotes the younger sibling's sense of competence (Klein et al., 2003). Older siblings can support younger siblings' cognitive flexibility and working memory through scaffolding, especially older siblings proximal in age to the younger child (Hill & Palacios, 2020).

Cognitive-language stimulation and teaching between children. Teaching strategies used by preschool-aged children are of particular interest because of the cognitive skills necessary for them to identify the best strategies to help the learner acquire information or skills. By the time most children reach kindergarten, they have developed the ability to teach others. Children at this age are able to identify a learner's knowledge and skills and adjust teaching strategies to help the learner perform well on a task (Howe et al., 2012). In their study of teaching behaviors by preschool-aged children toward younger siblings, Klein and colleagues (2003) found that children as young as 4 years old were able to use some of the same behaviors used by parents, such as focusing the learner's attention to the task and considering the learner's abilities, to improve a younger sibling's task performance.

Benefits of Child-Toddler Interactions for a Preschool-aged Child

Although the benefits of child-toddler interactions have been considered here primarily for the toddler, there are also benefits to the preschool-aged child. Early childhood is a time when children develop rapidly, and their growth during this time can

affect later development. One major milestone during the preschool years is the developmental shift from egocentric thought to consideration of others in a *theory of mind* (Cutting & Dunn, 1999), an understanding that others' thoughts, beliefs, and feelings are separate from their own. Children with theory of mind abilities are sensitive, aware, and able to communicate effectively with others (Cutting & Dunn, 1999; Slaughter et al., 2015). This understanding helps children take one another's perspectives and act as guides by using physical explanations and verbal instructions to teach tasks to those around them, especially younger children (Recchia et al., 2009). Theory of mind helps children cooperate and empathize with others. These are valuable outcomes for children who have had opportunities for playing with younger children.

Characteristics that Influence Interactions and Play between Young Children

Several factors influence the degree to which preschool-aged children interact and play with younger children in developmentally supportive ways. These include child person characteristics that shape proximal processes: gender, age, parity position in families, and relatedness. Research related to these characteristics will be reviewed below.

Familiarity

Children with a closer, more nurturing relationship are more effective teacher/learner pairs. Possibly due to aspects related to the zone of proximal development, these children are more aware of their siblings' or peers' interests and abilities and are better able to focus the learner's attention to the task or use appropriate encouragement (Klein et al., 2002). Children play differently with new acquaintances

than they do with siblings and familiar peers (Lindsey & Berks, 2019). Children engage

in more complex play, cooperate better, communicate more, and solve conflict more

quickly when they play with children they are familiar with, compared with their play

with children whom they have just met. When engaging in socio-dramatic play, which

requires a great deal of cooperation and communication from all children involved,

preschool-aged children playing with familiar children are more likely to use types of

communication that extend the play and increase the complexity of the interaction than

children playing with non-familiar children. Familiarity allows children to feel

comfortable with the children they interact with. Familiarity also gives children more

practice interpreting nonverbal or imperfect communication behaviors (Howes et al.,

1994).

Relatedness (Siblings vs. Peers)

Young children spend less time interacting with their parents than with close

siblings, in life-long relationships defined by two main features: it is both reciprocal and

complementary (Howe & Recchia, 2005). Most play interactions are reciprocal, such as

taking turns, especially between siblings who are closer in age. Examples of

complementary sibling interactions are caregiving and teaching, in which the older child

may have a different role than the younger child.

Gender

Another factor influencing interactions between older and younger children is the

genders of both the older and younger child. In their study of sibling teaching during a

teacher-directed task, Howe and colleagues (2012) noted that the teaching siblings in

same gender sibling pairs used more teaching and encouragement to complete the task.

They also suggested that girls and boys used different types of strategies and that siblings

of either gender respond differently to those teaching strategies. Gender can also affect

the type of play activity children engage in with each other. Girls are more likely than

boys to value emotional closeness and engage in complex social play than boys (Lawhon,

1997). Boys are more likely than girls to engage in rough and tumble play (Reed et al.,

2000) that is highly active and can include running, yelling, jumping, and wrestling.

Age

Older children have the maturity and abilities to engage in more complex social

play than younger children (Ramani, 2012). Children cannot participate in the complex

forms of play and interact well with others if they are not cognitively able to consider the

perspectives of others. Adequate cognitive ability for complex social interactions comes

from maturation and experience with others (Howes & Matheson, 1992). Older children

not only have the cognitive ability to engage in more complex interactions, but they also

often have more experience interacting with and adjusting to other children.

Parity Position

Children's parity positions in their families as older or younger siblings

specifically influence siblings' interaction behaviors. Older and younger siblings also

display different play and teaching strategies. Howe and Recchia (2005) found that

younger siblings were more likely than older siblings to use physical demonstrations and

involve the older sibling in teaching. Older siblings were more likely to use verbal

descriptions. They also suggested that older siblings have more experience teaching and

may be more comfortable taking a leading or teaching role than younger siblings. The proximal processes of teaching and learning from each other build the children's skills and their own confidence in their teacher or learner roles.

Disability

Having a disability can affect the interactions between preschool-aged children and their toddler siblings depending on which child has the disability and the nature and severity of the disability. Some disabilities affect children's abilities to interact with others and can make play interactions difficult for other children (Stoneman, 2001). A typically developing child interacting with a sibling with a disability may need to adjust their play activities, teaching methods, or behaviors to accommodate the abilities and needs of that sibling (Knott et al., 2007).

Sibling Relationship Quality

Sibling relationship quality has a profound effect on children's behavior when they interact with their siblings. Sibling relationships can be either protective or detrimental for children, depending on the relationship quality (Widmer & Weiss, 2000; Pike & Oliver, 2017). More positive early sibling relationships characterized by high warmth and closeness and low conflict and aggression are associated with better social competence (Mendelson et al., 1994; Buist et al., 2021), better psychological adjustment (Garcia et al., 2000), and more social cognitive skills (Youngblade & Dunn, 1995, Paine et al., 2020).

Conflict. A moderate degree of sibling conflict can be beneficial for children's social development if there is a highly warm and close sibling relationship. Children will

be more aggressive with peers if the sibling relationship is not warm and the degree of sibling conflict is high (Stormshak et al., 1996; Faith et al., 2015). Some conflict in the context of a warm sibling relationship may be helpful because it helps children learn and practice conflict resolution strategies within the safety of the sibling context (Volling & Blandon, 2005).

Childcare Environment

The microsystem of childcare group settings can have a great influence on how children interact with each other. High quality childcare programs recognize that young children learn best through play, and these providers will set up the environment in ways that foster play and cooperation. Good childcare providers are also able to foster children's social development through modeling of appropriate behavior and through scaffolding of appropriate interactions (Acar et al., 2017). Children in good childcare programs use complex social play more often and earlier than children in programs that are merely adequate (Howes & Matheson, 1992). Some care programs may include mixed age or ability classrooms where children can practice playing with children of all ages and children with different abilities in ways that may influence their interactions with siblings.

Home Environment

The microsystem of the home environment is a setting where children can spend time with one another and build familiarity with each other. Sibling pairs usually live in the same home with the same caregivers. Different resources in the home environment can affect the opportunities children have to interact together. A home with toys and

materials that stimulate development can provide more opportunities for children to play together in positive and developmentally supportive ways (Bradley & Caldwell, 1984). Family size can also influence the opportunities children have to interact with each other. Large families can create competition for resources which can negatively affect child development (Symeonides et al., 2021). Large family size, however, can also provide children with multiple other children to interact with (Barnett & Kleiber, 1984).

Parents and caregivers in the home environment can be important supporters of the sibling relationship. Caregivers who value positive sibling relationships are more likely to encourage and support positive sibling interactions. They may do this by intervening in conflicts, creating spaces in the home environment for play to occur, or reinforcing positive interactions (Austin et al., 1987). Caregiver relationships with children can also act as a model for sibling relationships (de Bel et al., 2019).

Interventions to Promote Positive Mixed-age Child Interactions

In families and childcare settings, adults often try to intervene to promote positive interactions between children. Beyond avoiding conflict, some adults try to help children get along and play together in positive ways that benefit both of them. These benefits include developmental support for the younger child and opportunities for perspective taking and empathy for the older child. Intervention strategies—informal or formal-- that have been reported include using parent education and caregivers as mediators between siblings to decrease conflict and aggression (Siddiqui & Ross, 2004; Smith & Ross, 2007) and directly improving children's social skills with siblings (Kennedy & Kramer, 2008) and peers (Murano et al., 2020).

Conclusion

Play interactions between preschool-aged children and their toddler siblings can support early development. The genders of both siblings, their ages, parity positions, disabilities, play skills, sibling relationship quality, sibling conflict, and their childcare and home environments are characteristics that may affect sibling interactions. These characteristics of siblings should be considered when studying their interactions and when creating interventions to improve the effectiveness of sibling interactions to provide developmental support to younger children.

Missing from the literature on sibling interaction and play are useful ways to observe and identify the specific behaviors during these interactions that support the younger child's development and learning. Such a measure could be used to measure the impact of interventions to improve the quality of sibling interactions. Research on siblings as interventionists could benefit from a greater understanding of how peer and sibling characteristics influence the quality of sibling interactions (Taeyoung & Horn, 2010).

Hypotheses

This study will address one main research question: What Developmentally Supportive Interaction (DSI) behaviors do older siblings engage in with their younger siblings during play, especially considering which DSI behaviors are related to children's genders, ages, parity positions, disabilities, play skills, sibling relationship quality, sibling conflict, and care environments?

Previous research indicates that children can interact with toddlers using some DSI behaviors. However, they may not engage in DSI behaviors as frequently or adeptly as adult caregivers. Identifying these specific behaviors could help inform intervention using siblings to support young children's development.

1) Young children, particularly older siblings, will engage in DSI behaviors with younger toddlers, particularly their younger siblings, during play interactions.

    a. Trained observers will be able to reliably identify these DSI behaviors in older siblings using an established measure of DSI behaviors in caregiver-child interactions.

    b. DSI behaviors engaged in by children will be similar to behaviors previously observed in adult caregivers, though the frequency, complexity, and quality of the behaviors may be lower.

    c. Child factors [genders of both children, child ages, parity positions, disability (IFSP/IEP), child play skills, sibling relationship quality, sibling conflict, and children's care environments] will affect the frequency, complexity, and quality of DSI behaviors that occur between children and toddlers during play interactions.

CHAPTER III

METHODS

The primary purpose of this exploratory study was first, to identify

developmentally supportive interaction (DSI) behaviors between a young child who is an

older sibling and a toddler who is a younger sibling, compare those behaviors to the DSI

behaviors adults use with children, and, finally, to identify which individual and sibling

factors predict those behaviors. The basic research design and questions, participant

sampling and recruitment, consent process and form, contact and data collection

procedures, and measures were all submitted to Utah State University's Institutional

Review Board (IRB) for review regarding compliance with protection of human research

participants and were approved. This chapter includes information about this study's: (a)

design; (b) participants, including inclusion and exclusion criteria; (c) data collection

procedures; (d) measures; and (e) data management and analyses.

Study Design

This study is an exploratory descriptive validation study using a correlational

design to address the following question: What DSI behaviors do young children,

particularly older siblings, engage in with younger toddlers, particularly their younger

siblings, during play? This included looking at which child-toddler behaviors trained

research assistants could observe and reliably code, determining how sibling interactions

are similar to and different from caregiver-child interaction behaviors, and assessing how

child factors affect developmentally supportive sibling interaction behaviors.

Participants

Thirty families completed the questionnaire in Qualtrics. Of those families, 15 either uploaded a video of their children playing together or met with a researcher to record a video of their children playing together, for a response rate of 50%. The 15 families who did not either upload a video or meet with a researcher were excluded from further analyses.

The older siblings ranged in age from 3 years, 9 months to 7 years, 11 months, with an average age of 5 years, 9 months. The younger siblings ranged in age from 1 year, 3 months to 4 years, 1 month, with an average age of 2 years, 8 months. Age gaps between the older and younger sibling in the sibling pairs ranged from 1 year, 6 months to 5 years, 9 months, with an average age gap of 3 years. Table 1 displays the means and ranges of ages of the participating older and younger siblings as well as the age gaps.

Table 1

Child Ages and Age Gap Means and Range in Months

	N	M (*SD*)	Range	
			Min	Max
Older sibling age	15	68.87 (15.68)	45	95
Younger sibling age	15	32.47 (10.38)	15	49
Age gap	15	36.40 (13.47)	18	69

The sample includes at least two of each of the possible gender pairings between brothers and sisters. Mixed gender pairs were more common than same-gender pairs. Table 2 displays the frequencies of the different pairings.

Table 2

Frequency of Sibling Gender Pairings between Older and Younger Siblings

	n	%
Girl/Girl	2	13.30%
Girl/Boy	4	26.70%
Boy/Boy	3	20.00%
Boy/Girl	6	40.00%

None of the older or younger siblings were reported to have a disability or developmental delay. Most children were cared for during the day by their parent/caregiver. Caregivers reported who, besides themselves, cared for their children 10 or more hours a week during the day. Table 3 shows the frequencies of who most often takes care of the older and younger siblings during the day. Note: an older sibling was cared for by both a grandparent and in school, and a younger sibling who went to a childcare center was also cared for during the day by their other parent/caregiver.

Table 3

Counts of Who Most Often Takes Care of Older and Younger Siblings Aside from The

Parent/Caregiver

	Older Sibling		Younger Sibling	
	n	*%*	*n*	*%*
Other Parent/Caregiver	7	46.70%	8	53.30%
Grandparent	1	6.70%	1	6.70%
Childcare Center	0	0%	1	6.70%
School, education center, or lab school	4	26.70%	0	0%

Sibling pairs came from families ranging from 2 to 8 children, with an average of 3.47 children per family. Table 4 shows the distribution of the number of children in each family. Eight of the older siblings in the sibling pairs were the oldest children in their families. Nine of the younger siblings in the sibling pairs were the youngest children in their families.

Table 4

Distribution of Number of Children in Each Household

Children in household	*n*	*%*
2	5	33.30%
3	4	26.70%
4	4	26.70%
6	1	6.70%
8	1	6.70%

Questionnaires for 14 of the sibling pairs were completed by biological mothers. One questionnaire was completed by an adoptive parent of the sibling pair. Caregivers of all sibling pairs were married and living with their spouses. All caregivers were between

25- and 44-years-old. Fourteen caregivers reported that they and their children were white, and one caregiver reported that they and their children were Black. Caregivers were well-educated. Table 5 shows the highest education level and the current employment status of the caregivers.

Table 5

Distribution of Caregiver Education Level and Employment Status

	n	%		n	%
Some college	1	6.70%	Employed full time	5	33.30%
2-year degree	3	20.00%	Employed part time	4	26.70%
4-year degree	9	60.00%	Unemployed, not looking for work	5	33.30%
Professional degree	1	6.70%	Student	1	6.70%
Doctorate	1	6.70%			

An adult comparison sample for Question 1b was taken from data on a subsample of families from the Early Head Start Research and Evaluation Project (EHSREP), a nationwide sample of infants and their families. Roggman and colleagues (2013b) used videos from the EHSREP when developing the PICCOLO. For this study, only white families who were in the Comparison group and had PICCOLO observations when their children were 36 months old ($n = 628$) were included. This subsample was chosen to reduce the effects that participation in Early Head Start and race would have on PICCOLO scores at 36 months, the age point in the EHSREP study that was closest to the average age of the younger children in this study. Table 6 details sample information about the adult comparison group.

Table 6

Adult Comparison Sample Characteristics

Characteristics	% in sample
Child gender	
Female	51.7%
Male	48.3%
Focus child was the first born	56.0%
Teenaged mother at age of child's birth	32.7%
Maternal education	
12th grade or less (no high school diploma or GED)	32.9%
High school diploma or GED	35.7%
Some college or above	31.4%

Procedures

Recruitment and Consent

Participating sibling pairs were recruited using a convenience sampling method. Participants were recruited using flyers, social media, and through other participants. Participants were also recruited through childcare or early child education programs. The use of internet technology for online data collection and virtual meetings opened recruitment to sibling pairs throughout the United States from a variety of demographic backgrounds.

Informed Consent

Primary caregiving parents or other legal caregivers were asked to provide consent for their children to participate in the study. An Informed Consent Form was

available to families digitally on Qualtrics or as a PDF form through email. Caregivers

provided consent for themselves and their children before completing any questionnaires

about their children and families. Caregivers, or others recording the children, were

instructed to ask participating children for their assent to participate and be video

recorded.

Incentives

Incentives were included to increase the likelihood of participation. All caregivers

who completed the Qualtrics survey and either uploaded a video of their children playing

together or met with a researcher over Zoom to record the video were emailed a $50

Amazon gift card.

Data Collection

Caregivers of participating sibling pairs began participation by completing a

questionnaire in Qualtrics that began with the Informed Consent Form and continued

with caregiver-report measures (see Measures section). Videos of sibling play sessions

were collected by caregivers or research assistants. Directions for multiple ways of

recording and uploading a video of the child and toddler playing together were provided

to participating families who completed the questionnaire on Qualtrics (see Appendix B).

A video of the sibling play session could be recorded (a) in the home by the caregiver and

uploaded directly into Qualtrics or a folder on Box immediately or at a later time or (b) in

a virtual meeting by a research assistant using a platform such as Zoom.

Videos submitted by caregivers through Qualtrics or Box were saved to a secure

Box folder. Virtual visits conducted via Zoom were recorded by the visiting research

assistant using Zoom's built-in record function. The research assistant saved visit videos to a secure Box folder. Videos were labeled with a sibling pair identification (ID) number, with no embedded identity indicators, which was assigned upon receipt of the Informed Consent form and completion of the Qualtrics questionnaire.

Videos of the play sessions were coded by an independent team of research assistants trained to reliability at identifying DSI behaviors. They were initially trained to reliability by observing parents with toddlers, observing examples of child-child interactions, and participating in discussions (see data collector training, below). These research assistants entered their video codes and notes for the behaviors in a questionnaire in Qualtrics.

Instructions for Recording Child-Toddler Interactions

Instructions for recording the child-toddler play videos (see Appendix A) were provided to caregivers through the caregivers' preferred forms of communication after they completed the Qualtrics questionnaire. Caregivers were instructed to set up a play area for the sibling pair and remain nearby to watch the children, only intervening when necessary. The older siblings were asked to play with their younger siblings for ten minutes using a caregiver-selected set of toys in three categories: a book or pictures to talk about, toys for pretending, and a toy for problem-solving and sharing. These types of toys allow for a variety of play behaviors and have been used in other studies to observe developmentally supportive caregiver-child interactions (e.g., Fuligni & Brooks-Gunn, 2013). Books or pictures could include illustrated children's books, family photo albums, or picture flash cards, or any set of images that the children can look at together and talk about what they see in the images. The toys for pretending could include pretend food

and play sets, dolls, dress-up supplies, or similar materials that allow for pretending. Toys for problem-solving and sharing include puzzles, blocks, shape sorters, or board games. All materials were toys caregivers already had available in their homes.

Data Security

All data and videos were accessible only by IRB-approved research assistants who were listed on the IRB protocol for the study. Data and videos are stored in a secure Box folder. Qualtrics data are only accessible by the lead researchers on the study. Each participating sibling pair was assigned a random identification (ID) number. A file linking ID numbers with participant names and contact information is stored in a secure Box folder accessible only by lead researchers on the study.

Measures

Child and Family Information

Information on the families was collected using a family information demographic questionnaire for each participating family. Primary caregivers completed a questionnaire for their children with questions concerning each child. At the beginning of their participation in the study, caregivers reported each child's age, parity position, and gender; whether the child has a disability; number of children in the home; caregiver and child ethnicity; caregiver information including age, education, marital status, and employment; childcare types and time spent in care; and location indicated by zip code.

This information was used to describe the sample and relevant child characteristics were examined in relation to the research variables.

Developmentally Supportive Play Interactions

The 10-minute video recordings of play interactions were coded by trained and reliable research assistants using the *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes* (PICCOLO; Roggman et al., 2013b). The PICCOLO is a measure of parents' or other primary caregivers' DSI behaviors with children aged 10 to 60 months, that has also been used to study and support DSI behaviors by other caregivers, such as those providing group care (e.g., Jump Norman et al., 2013; Lippard et al., 2016). Items were adjusted as necessary to refer to child-toddler interactions rather than caregiver-child interactions.

The PICCOLO consists of 29 DSI behaviors observed in four domains – Affection, Responsiveness, Encouragement, and Teaching. Affection consists of 7 items such as "speaks in a warm tone of voice" and "is engaged in interacting with child". Responsiveness consists of 7 items such as "is flexible about child's change of activities or interests" and "responds to child's emotions". Encouragement consists of 7 items such as "waits for child's response after making a suggestion" and "supports child in doing things on his or her own". Teaching consists of 8 items such as "labels objects or actions for child" and "does activities in a sequence of steps". These 29 DSI behaviors have been shown to support child development throughout infancy and early childhood which leads to positive developmental outcomes well into late childhood including prosocial behavior, language development, and school readiness (Roggman et al., 2013a; Innocenti et al., 2013).

The PICCOLO was originally validated using over 4,500 videos of caregiver-child interaction from a sample of 2,048 families with children participating in the Early Head Start Research and Evaluation Project (EHSREP) and shows good reliability and validity for observing caregiver-child interaction behaviors with infants, toddlers, and young children. Interrater reliability between pairs of observers averaged $r = .77$. Scale reliability was tested using Cronbach's α in each of the four domains for an average of .78. Factor loadings for the individual items within each domain averaged .65. The PICCOLO domains and total scores for this original sample were significantly correlated with similar measures of parenting interactions for the same sample, including positive regard, sensitivity, supportiveness, and cognitive stimulation, demonstrating good construct validity. The PICCOLO also has good predictive validity. Domain and total scores were significantly correlated with later child outcomes in cognitive, language, and socioemotional development and school readiness at the end of preschool (Roggman et al., 2013a) and at the end of fifth grade (Innocenti et al., 2013). The PICCOLO has since been shown to be a reliable and valid measure of caregiver-child interaction quality with infants younger than 10 months (Gurko, 2018).

Video Coder Research Assistant Training

Three video coder research assistants were recruited through human development and psychology courses and previous studies to be research assistants for course credit and research experience. Video coder research assistants were trained to reliably code videos of caregiver-child interactions through a series of Canvas modules and weekly Zoom meetings over the course of a semester. They continued to meet with the coding research team weekly to discuss progress and ask questions. All research assistants

completed the Human Research Basic Course and became Collaborative Institutional

Training Initiative (CITI) certified before viewing videos of the sibling pairs. Research

assistants for similar studies have been successfully trained using these methods. Video

coders practiced coding existing videos of sibling or mixed-age peer play before coding

videos for this study.

Play Skills

Play skills with other children were measured using caregiver report on the *Penn*

Interactive Peer Play Scale (PIPPS; Fantuzzo et al., 1995). Caregivers completed the

measure in Qualtrics for the older child. The PIPPS consists of 34 four-point Likert-type

items that are used to rate frequency of both positive and negative play behavior observed

during free play within the last two months. The 34 items are separated into three

domains: play interaction (8 items), play disruption (15 items), and play disconnection

(11 items). Play interaction refers to cooperative and helpful social play behaviors and

includes items such as "helps other children" and "shows creativity in making up stories

and activities". Play disruption refers to antisocial behaviors that get in the way of play

interactions and includes items such as "does not take turns" and "verbally assaults

others". Play disconnection refers to nonparticipation in play and includes items such as

"withdraws" and "seems unhappy" (Fantuzzo & Hampton, 2000).

The PIPPS was developed to assess peer play interactions in preschool and

kindergarten aged children living in disadvantaged urban areas (Fantuzzo, et al., 1995).

The PIPPS has a caregiver-report version to assess peer/sibling play at home. The PIPPS

can be used as a screening and assessment tool, a way to inform program curricula, a

communication tool for caregivers, and an evaluation tool for classroom-based intervention (Fantuzzo & Hampton, 2000).

Initial validation studies indicate that the PIPPS scores are correlated with teacher-report scores on the Social Skills Rating System (SSRS, Gresham & Elliot, 1990), peer sociometric ratings, and play observations. Children who scored high in play interaction were generally well-liked by peers and rated by teachers as having high social skills. Children who scored high in play disruption and play disconnection were often not well-accepted or recognized by peers and tended to play alone (Fantuzzo & Hampton, 2000).

Sibling Relationship Quality

Sibling relationship quality was measured using caregiver report on the 6-scale version of the *Sibling Inventory of Behavior* (SIB; Schaefer & Edgerton, 1979; Hetherington et al., 1999). Caregivers completed this measure in Qualtrics for both the toddler and the child. The SIB was originally developed to assess parents' reports of one child's behavior toward a sibling in families with children, with and without disabilities, aged 3 to 8 years. The original SIB consisted of 28 items divided into eight dimensions: empathy and concern, kindness, leadership and involvement, acceptance, anger, unkindness and teasing, and embarrassment (Schaefer & Edgerton, 1979). The measure has since been adapted and used effectively with siblings in early childhood (Volling & Blandon, 2005).

Hetherington and colleagues (1999) adapted the SIB to include 32 items divided into six scales: empathy/concern, companionship/involvement, rivalry, conflict/aggression, avoidance, and teaching/directiveness. All items are answered using

a 5-point Likert-type scale ranging from 1 (never) to 5 (always). Volling and Blandon (2005) used this 6-scale version of the SIB in their research on young children's sibling relationships in the preschool years with age-specific interpretations of a few items (see Appendix D). They found the 32-item SIB to be psychometrically sound for use with preschool-aged children, with each scale, except for teaching/directiveness, showing internal consistency of over .70. Mothers' and fathers' reports were correlated across parents and over time with correlations ranging from .26 to .65. Volling and Blandon (2005) also tested concurrent validity with observed sibling behaviors and reports of behavior problems. They found predictive validity with early parent reports of sibling relationship quality and later observed sibling behaviors and later behavior problems.

Data Management and Analysis Plan

Data Storage

Sibling pair identification numbers were randomly assigned to each pair at the pair level upon caregiver completion of the Informed Consent form and the Qualtrics questionnaires. Identification numbers are four-digit numbers starting with 50 (e.g., 5032). Variables were labeled with indicators (Sib1 for older sibling and Sib2 for younger sibling) to denote which variables refer to older sibling information and which refer to younger child information; thus, all data are at the pair level.

Caregiver-report survey data was exported from Qualtrics into an SPSS file which included both variable labels and variable names. Research assistants entered coding data into Qualtrics surveys, noting the video label that included the sibling identification

number and their name in the survey. The coding data was exported from Qualtrics into

an Excel file for initial inspection of codes. The file was then opened within SPSS and

saved as an SPSS (.sav) data file. This file was merged with the caregiver-report survey

data to create a master data file for analysis in SPSS.

The SPSS data file with the adult comparison sample for Question 1b was merged

with a copy of the master data file for analysis in SPSS. The adult comparison sample file

includes family information and PICCOLO domain and measure codes at 36 months.

Data Analysis

Research Question 1a Analyses

Which DSI behaviors can trained observers reliably identify in the older children

by using an established measure of DSI in caregiver-child interactions?

Frequencies for each PICCOLO item were charted to determine which items were

observed the most and least in the child-toddler interactions. Five of the 15 videos were

double-coded. Reliability estimates from these videos were made using percent

agreement for each PICCOLO domain and the overall PICCOLO scores.

Research Question 1b Analyses

How is DSI between an older child and a toddler similar to or different from DSI

between an adult caregiver and a child?

An independent samples t-test compared PICCOLO scores from the sample with

PICCOLO scores from an adult comparison group selected from an existing data set.

Coders provided qualitative examples of some behaviors to illustrate how PICCOLO

items were coded for child-toddler interactions. Coders also provided qualitative information about the similarities and differences between the child-toddler interactions for this study and the caregiver/child interactions they observed as part of their training to code PICCOLO and had been coding prior to coding videos of sibling interactions.

Research Question 1c Analyses

How do child factors [genders of both children, child ages, parity positions, disability (IFSP/IEP), child play skills, sibling relationship quality, sibling conflict, and children's care environments] affect DSI between toddlers and young children?

Independent samples t-tests were used to determine the differences in mean PICCOLO scores between older brothers and older sisters as well as between younger brothers and younger sisters. Bivariate correlations were then used to explore if continuous measures of the child factors, specifically child ages, age gap, sibling relationship quality, and sibling conflict, were associated with DSI behaviors as measured by the PICCOLO. Scatterplots were also used to explore those associations.

CHAPTER IV

RESULTS

The primary purpose of this study was to identify the DSI behaviors that young children, particularly older siblings, engage in with their toddler-aged younger siblings during play. The following chapter reviews the statistical analyses and results used to answer the research question and its three parts. The analyses include descriptive statistics with means, standard deviations, and ranges of key variables. Frequencies and percent agreement were used to determine which DSI behaviors as measured by the PICCOLO could be observed during child-toddler sibling play interactions and how reliable those observations were between observational coders. Independent samples *t*-tests were included to determine the whether the PICCOLO means for siblings were significantly different from PICCOLO means from an adult comparison sample. Qualitative information from the coders about the videos and their experiences coding were used to identify some of the similarities and differences between DSIs observed during sibling interactions and those observed during adult-child interactions. Pearson correlations were used to identify the directions and associations between child factors and DSI behaviors. Tables and figures were used to illustrate the results. Data for this study were collected using a questionnaire in Qualtrics, video uploads into Qualtrics and Box, and coder data entered into Qualtrics. Questionnaire responses and coder data were downloaded into both Excel and SPSS. All analyses were done using SPSS 28.0.

Question 1a

(1a) Which DSI behaviors can trained observers reliably identify in the older siblings by using an established measure of DSI in caregiver-child interactions?

Coders observed sibling pairs engaging in most of the PICCOLO behaviors. Figure 1 shows the frequencies of sibling pairs scoring either a 1 or 2 in each behavior in each PICCOLO domain, meaning that the older siblings were observed engaging in the behavior to some degree. Some behaviors were more commonly observed than others. Behaviors in the Responsiveness domain were among the most frequently observed, especially Responsiveness 6, looks at the child when child talks or makes sounds. This was the most frequent behavior, observed in every pair. Affection 5, uses positive expressions with child, and Teaching 5, engages in pretend play, were the least common behaviors observed in the videos. Most other behaviors in the Teaching domain were also not frequent, with only four of the eight behaviors observed in at least half of the pairs.

Figure 1

Frequencies of Sibling Pairs Engaging in Each PICCOLO Behavior
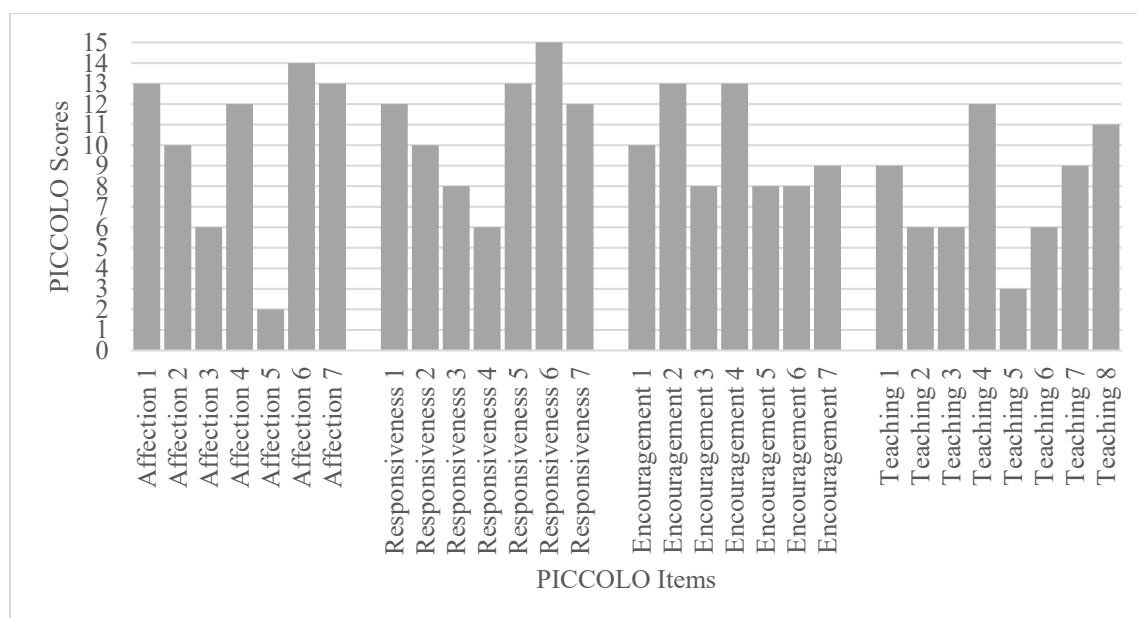
Five videos were double coded by at least two coders, including three that were coded by a team of at least two coders in a Zoom meeting and then coded by an additional coder independently. The recommended minimum level of interrater agreement to achieve reliability for the PICCOLO is 75% (Roggman et al., 2013b). Table 7 details the percentage of double-coded videos coded reliably for each domain as well as the average across domains. Teaching proved to be the most challenging domain for coders to agree upon. Coders reported having trouble understanding what some of the children were saying, often because the children spoke quietly or unclearly. Not hearing or understanding some of the specific words the children used during play could have resulted in inconsistent coding for Teaching. Although Affection was reliably coded for each of the five double-coded videos, coders disagreed about each item at least once. In

the cases of disagreement beyond the 3-points across no more than three items and 1-point per item allowed by the measure for reliability, the scores for videos coded by a team during a Zoom meeting or the first set of codes were kept for analyses.

Table 7

Number of Double-Coded Videos Coded Reliably for Each Domain and the Average Across Domains

Domain	% videos coded reliably
Affection	100%
Responsiveness	80%
Encouragement	80%
Teaching	60%
Average Across Domains	80%

Question 1b

1b. How is DSI between an older child and a toddler *similar to* or *different from* DSI between an adult caregiver and a child?

An independent samples t-test was run to compare the mean PICCOLO scores at the overall level and for each PICCOLO domain between the sibling pair child/toddler group and the mean and standard deviation from an adult comparison group, a subsample of caregivers and toddlers from the EHSREP data. Using *t*-tests is the advised analysis for comparing two independent groups in studies with small samples (Gall et al., 2007) and can be used with samples as small as $n = 6$ (Fritz et al., 2012). Levene's test for equality of variances indicated unequal variances for the overall PICCOLO ($F = 12.19$, *p*

< .001), the Affection domain ($F = 17.77$, $p < .001$), the Responsiveness domain ($F =$ 13.43, $p < .001$), and the Encouragement domain ($F = 11.16$, $p < .001$), so the *t*-tests that do not require homogeneity of variance were selected. These independent samples *t*-tests indicated that parents and caregivers in the adult comparison sample had significantly higher PICCOLO scores than the sibling pairs in all domains and the overall PICCOLO score (see Table 8). Coders also provided justifications and examples for their codes for each item. Table 9 shows examples of coders' justifications for one of the most frequent PICCOLO behaviors and one of the least frequent PICCOLO behaviors from each domain.

Table 8

Means, Standard Deviations, and t-Tests of PICCOLO Scores by Sibling Pair Group and the Adult Comparison Samples

	Sibling N = 15		Adult Comparison N = 628				
	M	*SD*	*M*	*SD*	*t*	*df*	*p*
PICCOLO	24.33	12.27	40.23	7.66	4.99	14.26	< .001
Affection	6.73	3.67	10.42	2.03	3.87	14.20	< .001
Responsiveness	6.40	3.38	11.27	2.03	5.56	14.24	< .001
Encouragement	6.07	3.75	10.12	2.26	4.17	14.24	< .001
Teaching	5.13	2.77	8.43	2.82	4.48	641	< .001

Table 9

Examples of PICCOLO Behaviors from Children and the Scores Assigned to Those Items

PICCOLO Item	Score	Child Example
Affection		
Item 5: Uses positive expressions with child	1	Sister used brother's nickname twice.
Item 6: Is engaged in interacting with child	1	Brother engages with younger brother a couple of times but spends most of the time playing independently.
Responsiveness		
Item 4: Follows what child is trying to do	1	One example: sister follows younger brother with toy pet carriers into the other room to pretend that they were taking their dogs to the pet store.
Item 6: Looks at child when child talks or makes sounds	1	Sister looked a few times, but she remained mostly focused on the toys.
Encouragement		
Item 4: Supports child in doing things on their own	1	Older sister lets her brother build with blocks independently. Her help interferes a lot with the shape sorter and tower
Item 5: Verbally encourages child's efforts	2	During puzzles, older brother told younger brother, "Oh, you were wrong. It goes over here."
Teaching		
Teaching 4: Labels objects or actions for child	2	Older brother labeled many things in the book. They talked about what to do with the puzzle. Older brother labeled some doctor tools.
Teaching 5: Engages in pretend play with child	1	Older brother briefly pretended that the toy cars/drivers were talking to younger brother.

Although all PICCOLO behaviors were observed in the sibling pair sample, coders noted that they saw differences in the frequency, appearance, complexity, or tone of some PICCOLO behaviors when those behaviors were done by a child rather than an adult. Coders met over Zoom to discuss similarities and differences between the child-

toddler sibling pair videos from this study and the adult-child videos used during training

and the adult-child videos they had coded for other studies. Table 10 lists some of the

themes in similarities and differences coders noted when coding videos with child/toddler

pairs rather than caregiver/child pairs that came from the group discussion.

Table 10

Similarities and Differences Between Child/Toddler Pair Videos and Caregiver/Child Videos

Similarities	Differences
Both parents and siblings can do behaviors from the PICCOLO, and we can observe and score them	There's a difference in interest in interaction. Older siblings seem more reluctant to play or less invested than adults.
Both parents and siblings use a warm voice when talking to a younger child/sibling.	Siblings are not only playing with the sibling, but they're also playing independently. The sibling happens to be there as a play partner.
Parents and siblings seem to use positive expressions at the same rate. It doesn't happen often.	Siblings move a lot more. The camera has to move a lot.
	Siblings show emotional warmth differently. They may show it a little roughly.
	Siblings tend to lead or direct the play more than parents. Parents tend to follow more than siblings.
	Children do a lot more self-talk.
	Not as much variety in the toys they play with in each video. Siblings seem more content to play with one type of toy the whole video and not switch to the other available toys.

Question 1c

1c. How do child factors [genders of both children, child ages, parity positions, disability (IFSP/IEP), child play skills, sibling relationship quality, sibling conflict, and children's care environments] affect DSI between toddlers and young children?

Some child factor variables were not included in these analyses because of lack of variability within the sample. No children were reported to have a disability or developmental delay. Of the 30 children, only 6 children were cared for during the day outside of their homes or by someone other than a parent/caregiver.

Independent samples *t*-tests compared the mean PICCOLO scores at the overall level and for each PICCOLO domain for male and female siblings and for older and younger siblings. Results of the t-test for older siblings did not produce statistically significant differences. There was a statistically significant difference in the mean Encouragement scores for younger sisters (M = 4.25, SD = 4.03) and younger brothers (M = 8.14, SD = 2.12); $t(13) = -2.29$, $p = .04$, with older siblings expressing more encouragement to younger brothers than to younger sisters. Table 11 shows the PICCOLO means for each of the four gender pairings and the PICCOLO means for the whole sample of sibling pairs.

Table 11

Means of Sibling Gender Pairings and All Pairs

	Girl/Girl $n = 2$	Girl/Boy $n = 4$	Boy/Boy $n = 3$	Boy/Girl $n = 6$	All Pairs $N = 15$
Affection	4.50	8.00	8.67	5.67	6.73
Responsiveness	3.00	8.00	6.67	6.33	6.40
Encouragement	1.50	7.75	8.67	5.17	6.07
Teaching	1.00	1.50	4.67	5.33	5.13
Overall PICCOLO	10.00	31.00	28.67	22.50	24.33

Pearson correlation coefficients were computed to assess the correlations between PICCOLO scores and the ages of the oldest siblings, the ages of the younger siblings, and the age gaps between the siblings. Table 12 shows the Pearson correlation coefficients for the sibling age variables (child ages and the age gap between the siblings) and PICCOLO scores for each domain and the overall. Age of the older sibling was positively correlated with PICCOLO scores for all domain scores and the overall scores. Only Affection was positively correlated with sibling age gap.

Table 12

Correlations between Sibling Age Variables and PICCOLO Scores

	PICCOLO	Affection	Responsiveness	Encouragement	Teaching
Older Sibling Age	.72**	.75**	.68**	.59*	.58*
Younger Sibling Age	.44	.31	.42	.39	.50†
Sibling Age Gap	.50†	.63*	.46†	.39	.29

†$p <.10$, *$p < .05$, **$p < .01$, ***$p < .001$

Scatterplots for the variables show positive, linear associations with points clustering near the lines of best fit. Scatterplots summarizing the results for the significant correlations can be found in Figures 2 through 7.

Figure 2

Scatterplot for the Correlation between Older Sibling Age in Years and Overall PICCOLO Scores
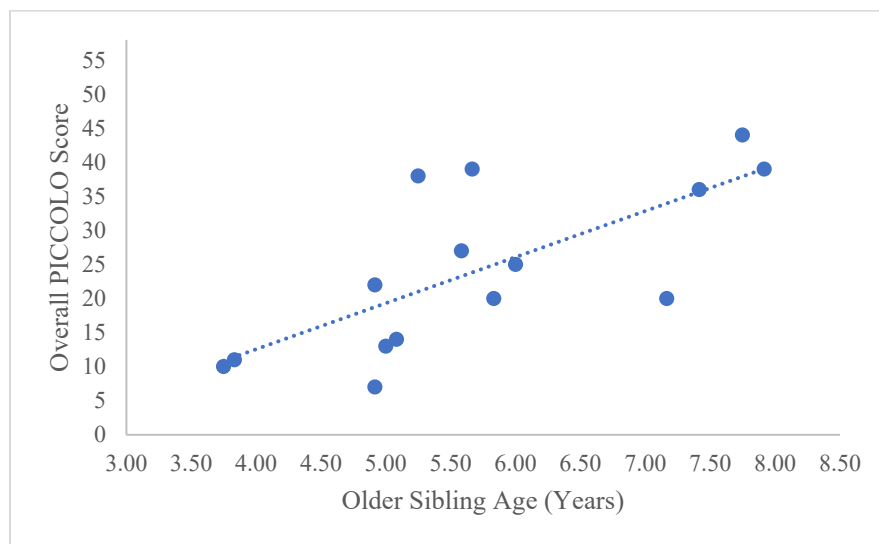
Figure 3

Scatterplot for the Correlation between Older Sibling Age in Years and Affection Scores
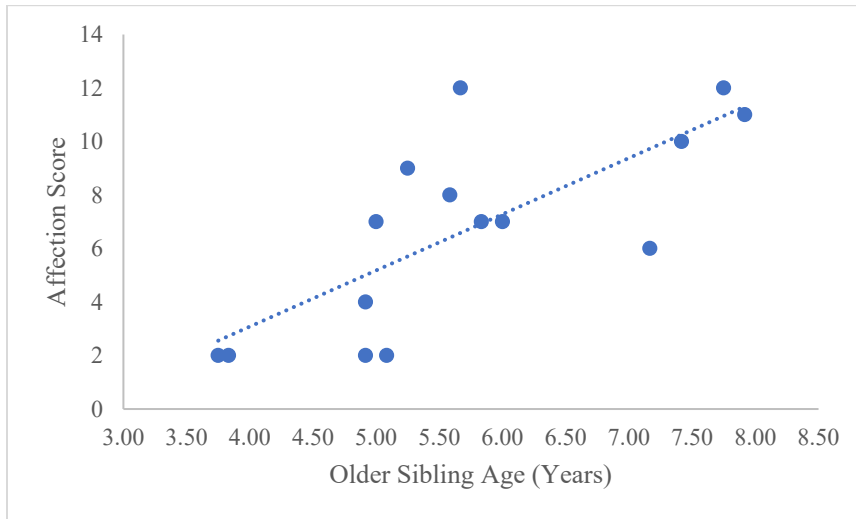
Figure 4

Scatterplot for the Correlation between Older Sibling Age in Years and Responsiveness
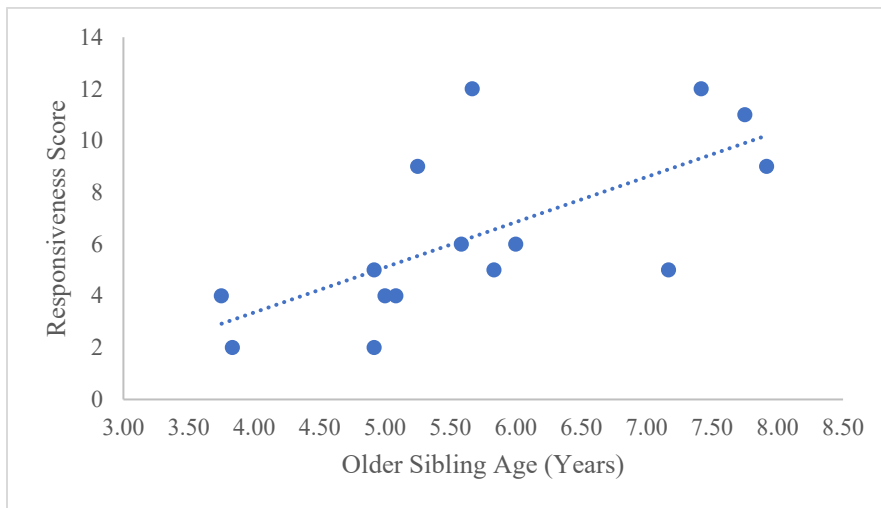
Scores

Figure 5

Scatterplot for the Correlation between Older Sibling Age in Years and Encouragement

Scores

Figure 6

Scatterplot for the Correlation between Older Sibling Age in Years and Teaching Scores

Figure 7

Scatterplot for the Correlation between Sibling Age Gap in Years and Affection Scores
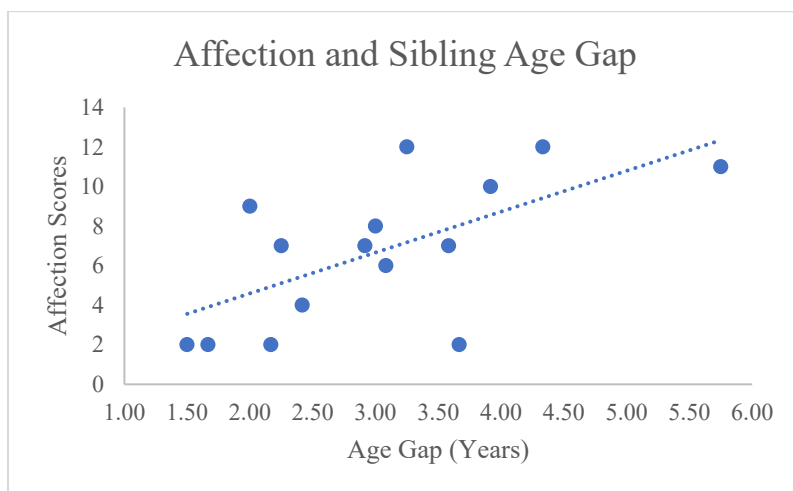
To assess the associations between PICCOLO scores and PIPPS scores for both the older and younger siblings, Pearson correlation coefficients were computed. None of the correlations for play skills as measured by the PIPPS were statistically significant.

To assess the associations between PICCOLO scores and scores for the dimensions of the SIB, Pearson correlation coefficients were computed between PICCOLO scores and scores for the dimensions of the SIB. Encouragement was negatively correlated with Empathy/Concern. Responsiveness, Encouragement, and the overall PICCOLO were positively correlated with Conflict/Aggression. Only Encouragement was negatively correlated with the SIB Positive composite score (Companionship/Involvement, Empathy/Concern, and Teaching/Directiveness). Table 13 shows the Pearson correlation coefficients for the SIB dimensions of Empathy/Concern and Conflict/Aggression as well as the composite of the positive SIB dimensions with the PICCOLO scores for each domain and the overall.

Table 13

Correlations between SIB Dimensions and PICCOLO Scores

	PICCOLO	Affection	Responsiveness	Encouragement	Teaching
SIB Companionship/ Involvement	-.10	-.20	.03	-.36	.26
SIB Empathy/ Concern	-.34	-.24	-.28	-.53*	-.14
SIB Teaching/ Directiveness	-.15	.06	.01	-.46†	-.12
Positive SIB Composite	-.25	-.18	-.10	-.57*	.02
SIB Rivalry	-.27	-.23	-.27	-.21	-.27
SIB Conflict/ Aggression	.53*	.46†	.51*	.53*	.40
SIB Avoidance	.29	.28	.42	.05	.34
SIB Negative Composite	.06	.06	.08	.07	.01

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$

Pearson correlation coefficients were computed to assess the intercorrelations between the dimensions of the SIB because correlations with the PICCOLO were not in the expected direction. Table 14 shows the intercorrelations. A negative correlation for Empathy/Concern approached significance with Conflict/Aggression. Parents who reported more empathy and concern also reported less conflict and aggression.

Table 14

Intercorrelations between SIB Dimensions

	1	2	3	4	5
1. Companionship/Involvement	-				
2. Empathy/Concern	.42	-			
3. Teaching/Directiveness	.44[†]	.36	-		
4. Rivalry	-.11	-.25	.28	-	
5. Conflict/Aggression	.02	-.45[†]	-.34	-.10	-
6. Avoidance	.35	-.16	.30	-.07	.40

[†]$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$

Although the aforementioned correlations between SIB dimensions were statistically significant, scatterplots for the variables show weaker patterns than the correlation coefficients may indicate. Points on all scatterplots are not clustered consistently along the lines of best fit. Scatterplots summarizing the results for the significant correlations can be found in Figures 8 through 12. The PICCOLO coders noted that the sibling pairs who scored the lowest in Responsiveness and Encouragement spent most of the observations engaged in independent play. In one case, the older sibling hid under a toy basket.

Figure 8

Scatterplot for the Correlation between Empathy/Concern and Encouragement Scores
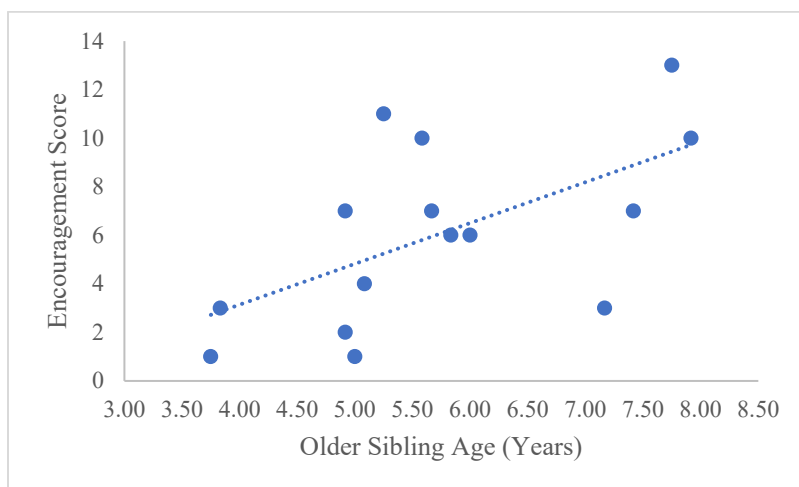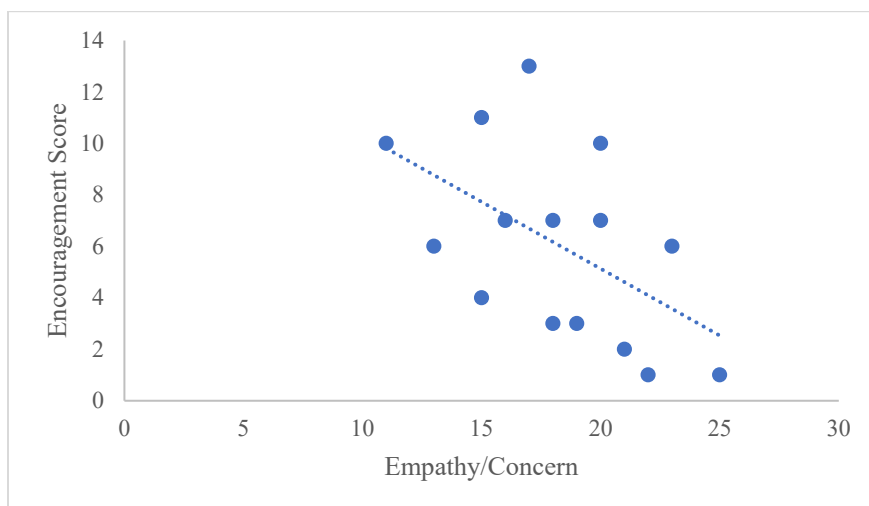

Figure 9

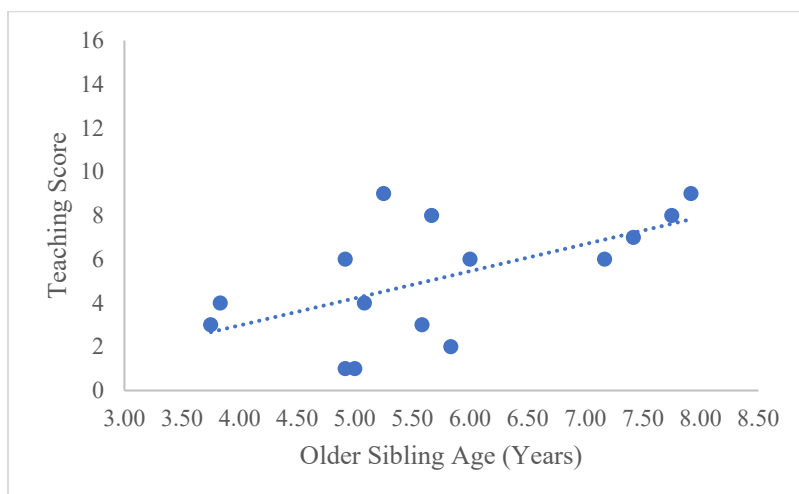*Scatterplot for the Correlation between Conflict/Aggression and Responsiveness Scores*
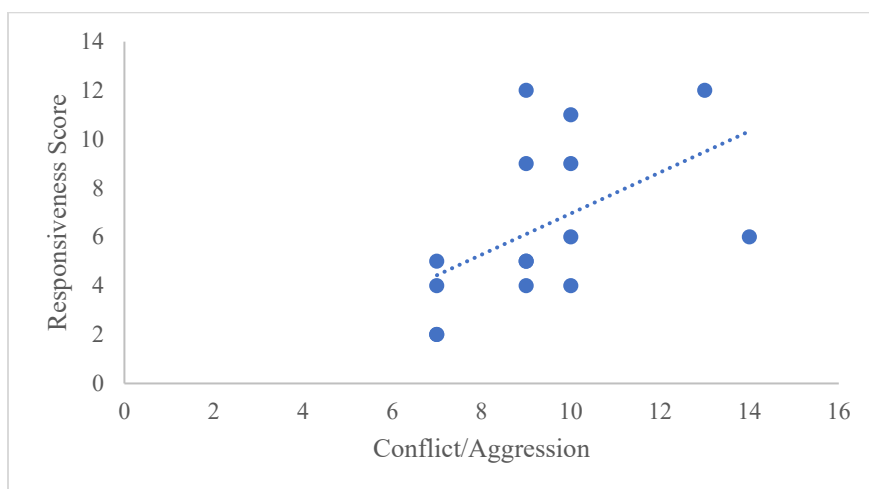
Figure 10

Scatterplot for the Correlation between Conflict/Aggression and Encouragement Scores
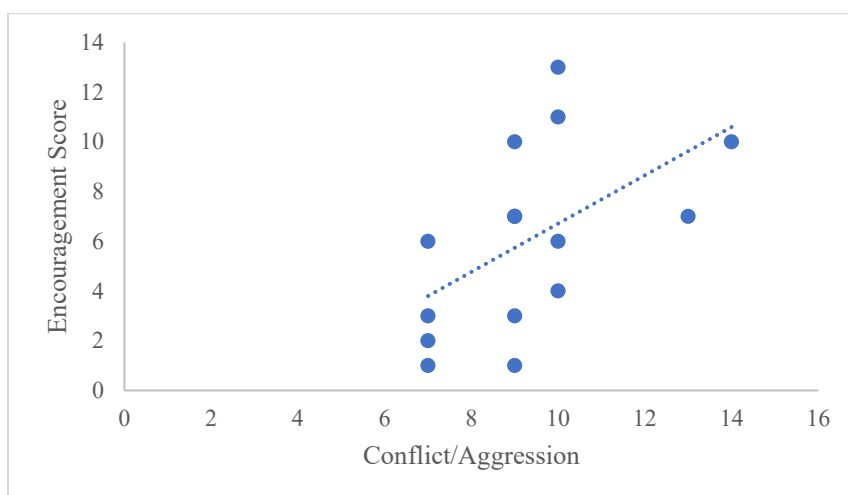
Figure 11

Scatterplot for the Correlation between Conflict/Aggression and Overall PICCOLO
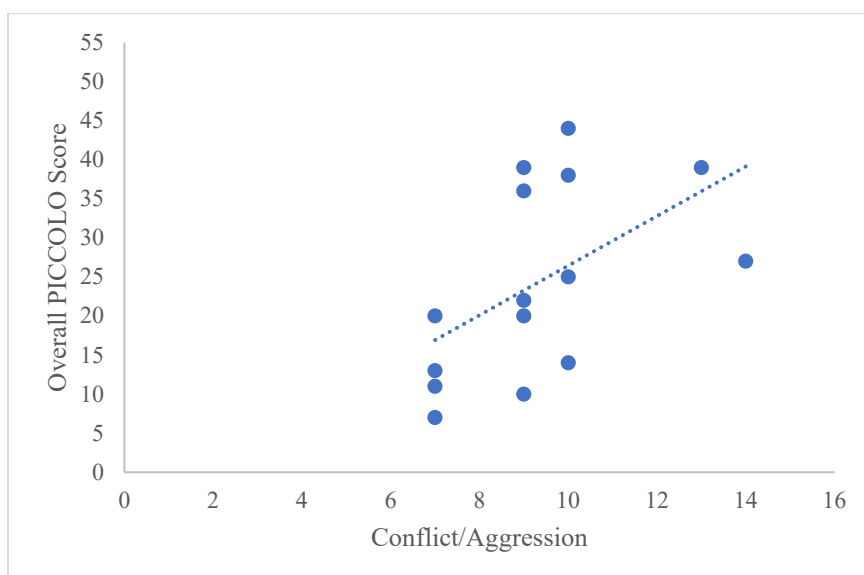
Scores

Figure 12

Scatterplot for the Correlation between Positive SIB scores and Encouragement Scores
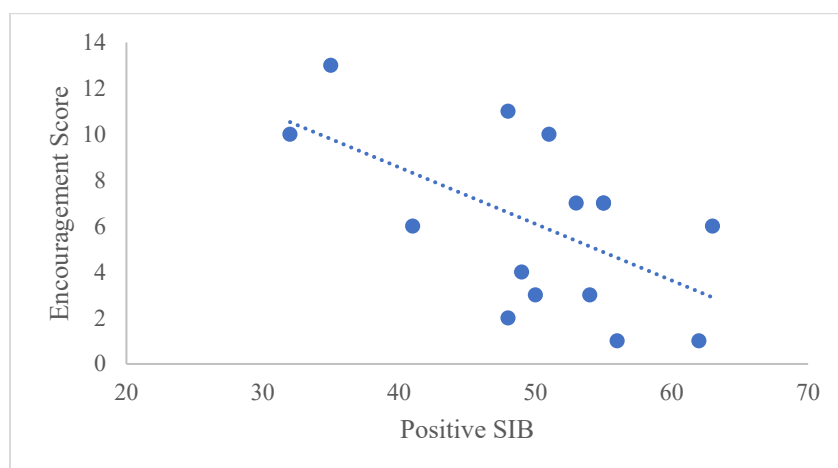
Summary of Results

Results from this study indicate that older siblings can be observed engaging in DSI behaviors as measured by the PICCOLO with their younger siblings during play. Some of the PICCOLO behaviors, however, were observed infrequently while others were observed in most of the 15 participating child-toddler sibling pairs. Comparisons with an adult comparison sample indicated that children score lower than adults for all PICCOLO domains and the overall PICCOLO. Coders also noted that the sibling videos were similar to and different from adult-child videos. Older sibling age as well as age gap are both factors that are positively associated with PICCOLO scores. Scores for all PICCOLO domains and the overall PICCOLO scores increased as the ages of the older siblings increased. Sibling age gap was significantly positively correlated with Affection scores and approached significance for Responsiveness and the overall PICCOLO. The directions of the correlations between the Encouragement, Responsiveness, and the

overall PICCOLO and the Empathy/Concern and Conflict/Aggression dimensions of the SIB were unexpected. The correlation between Empathy/Concern and Encouragement was negative while the correlations between Conflict/Aggression and Responsiveness, Encouragement, and the overall PICCOLO were positive. Previous research could help understand the results of this study and future research could help explore and expand the results.

CHAPTER V

DISCUSSION

This chapter includes a discussion of the results for each of the three parts of the research question. The limitations are discussed next, followed by a discussion of the contributions this study makes to the field as well as the future directions and implications for this work. The final section summarizes the chapter.

Interpretation of Results

Play interactions between young children and their toddler siblings are important sources for early developmental support (Karavasilis Karos et al., 2007). This study used an existing measure of caregiver-child interaction quality (PICCOLO; Roggman et al., 2013b) to identify the DSI behaviors that young children engage in with their toddler-aged younger siblings during play. Results suggest that young children can engage in behaviors that are known to support later development and school readiness when done in early caregiver-child interactions. Although the DSI behaviors are fewer in number, less complex, or lower quality for young children than adult caregivers, the present study indicates that children have a foundation of skills that they can build over time through proximal processes with their siblings. Child factors did affect the frequency and quality of DSI behaviors between older and younger siblings. Younger brothers received more encouragement and support from their older siblings than younger sisters. Older sibling age, age gap, and sibling conflict and aggression were associated with more frequent or complex DSI behaviors while sibling empathy and concern and generally positive sibling

relationship characteristics were associated with less frequent or complex DSI behaviors. This section explores the results of this study in relation to the three parts of the research question and the existing research literature.

Can the PICCOLO Measure of DSI Be Used to Observe Sibling Interactions?

The first question was to determine which DSI behaviors trained observers could reliably identify in older siblings using an established measure of DSI in caregiver-child interactions. The PICCOLO was the measure chosen to identify the DSI behaviors in child-toddler interactions. A team of three coders were trained to reliability on the PICCOLO using caregiver-child videos and who had practiced coding child-toddler videos independently and as a group. These trained observers watched and coded the child-toddler videos collected for this study. Across the 15 observations, coders were able to identify every PICCOLO behavior.

Items within the Responsiveness domain were among the most frequently observed behaviors. Every older sibling was observed looking at their younger siblings when the younger sibling talked or made sounds (item 6). Young children are often very aware of and interested in what their siblings are doing because of their familiar relationships with each other (Lindsey & Berks, 2019). Sibling familiarity is a convenient, and sometimes rewarding, context for older siblings to practice interpreting nonverbal or imperfect communication behaviors (Howes et al., 1994).

Some items, however, were more infrequent than others in this sibling pair sample. One of the least frequent behaviors was Teaching 5, engages in pretend play. Pretend play is linked to language development (Hà, 2022), cognitive development (White et al., 2021; Bergen, 2002), social-emotional development (Richard et al., 2021,

Youngblade & Dunn, 1995), and school readiness (Roggman et al., 2013b). Vygotsky

(1979) noted that pretense was crucial for early development. Pretend play is also a

complex and mature form of play that requires complex cognitive and social skills like

symbolic thinking and theory of mind (Weisberg, 2015). Facilitation from another,

especially a caregiver, can support children engaging in pretend play at higher levels,

building on children's zones of proximal development, and for longer amounts of time

than when they pretend alone (Haight & Miller, 1993). The low frequency of pretend

play in the present study may be because pretend play is one of the more cognitively

advanced of the PICCOLO items.

Other infrequent Teaching behaviors are also cognitively complex, including item

2, suggesting activities to extend what child is doing, and item 6, does activities in a

sequence of steps. Older siblings can teach skills to their younger siblings, but only skills

that they have developed through proximal processes (Meadows, 2010). Older siblings as

young as 4 years are able to focus their siblings' attention and consider the siblings'

abilities with the purpose of improving younger siblings' task performance, working in

the younger siblings' zones of proximal development (Klein et al., 2003) and the older

siblings become more adept at engaging in cognitively complex play through maturation

and experiences with others (Howes & Matheson, 1992). Shifting from egocentric

thought to considering other's perspectives through theory of mind is a major milestone

during the preschool years (Cutting & Dunn, 1999). Some of the older siblings in the

sample of the current study had passed through this stage of development, but nearly half

of the older siblings were preschool-aged.

Initial reliability percentages for videos of interactions between young siblings indicate that achieving reliability at the 75% level, which is the recommended minimum level of interrater agreement for the PICCOLO (Roggman et al., 2013b), is possible for the Affection, Responsiveness, and Encouragement domains of the PICCOLO, but may be challenging for the Teaching domain. Some items were more challenging than others for the coders to code reliably. The PICCOLO has been used for interactions between adults and children including parents of children with a disability (Innocenti et al., 2013), dads and their young children (Anderson et al., 2013), mothers and their toddlers playing with electronic toys (Wooldridge & Shapka, 2012), and caregivers and children in group childcare settings (Jump Norman & Christiansen, 2013). The current study is the first study to use the PICCOLO with observations of children playing together. Items that can reliably be coded during adult-child interactions may look different or be observed less frequently during child-toddler interactions, making it more difficult for coders to achieve reliability.

Are DSI Behaviors Different in Sibling and Parent-Child Interactions?

The second question was to determine how DSI between an older sibling and a toddler-aged younger sibling are similar to or different from DSI between an adult caregiver and a young child or toddler. The adult comparison group for this question is a subsample from the EHSREP data of white families who did not participate in Early Head Start. These families were selected as a comparison for the present study rather than the entire sample from the EHSREP data in order to reduce the effects of race and participation in Early Head Start on PICCOLO scores. Results from an independent samples t-test suggest that the frequency, complexity, and quality of DSI behaviors as

measured by the PICCOLO are different for the child-toddler sibling pairs compared with the adult comparison sample. Lower means for the child-toddler sibling pairs suggest that young children use DSI behaviors less frequently and with less complexity than adult caregivers in the comparison group. Parents and caregivers have more maturity and experience scaffolding children's development than young children. Children continue to build these complex skills through proximal processes where they can practice and experience teaching and learning over time.

Coders for the present study met together in a Zoom meeting and noted some similarities and differences between the caregiver-toddler sibling pair videos for this study and caregiver-child videos learned to observe and code prior to this study. Coders noted that they were able to observe the same behaviors in the child-toddler pairs that they see in adults, though some behaviors did not occur as often or that children interacted in ways that could not be fully captured using the PICCOLO. For example, in the Responsiveness domain, coders noticed directiveness and independent play, which are behaviors that may be problematic in caregiver-child interactions but would be expected in play between children. Engaging in independent solitary or parallel play is developmentally appropriate for young children (Parten, 1932). Directiveness is also an expected behavior in play between young children. Children during play may direct the interaction in some way, such as by assigning roles in an activity or telling the other child what they will play with next (Volling & Blandon, 2005) or focusing attention to support task performance (Klein et al., 2003). Directiveness during play may be a consequence of theory of mind as children can identify what the others are doing and pull them into the play by assigning a role or activity.

Most of the Affection behaviors looked similar for both sibling and caregiver-child interactions. Coders noted that adults and siblings use a warm tone of voice with younger children and that positive expressions for both groups included nicknames. Similar warm and affectionate DSI behaviors could be a response to the younger siblings' demand characteristics as toddlers. Coders noted that the ways children show emotional warmth to their younger siblings differed from the ways adults show emotional warmth to young children. Emotional warmth in child-toddler interactions seemed rougher than what coders had experienced in caregiver-child videos. The context of the sibling microsystem is a place where young children can practice social skills and negotiate the balance between warmth and aggression or conflict because they are not optional relationships (Meadows, 2010). Successfully negotiating the balance of warmth and aggression or conflict with a sibling through proximal processes can lead to the development of better social competence when interacting with other children (Bedford et al., 2004).

What Child Factors are Related to DSI Behaviors in Sibling Interactions?

The third question was to identify how child factors of either sibling affects DSI behaviors in child-toddler sibling pairs. Results of an independent samples t-test of child gender suggest that older brothers and older sisters do not differ in their mean PICCOLO scores for the individual domains or the overall PICCOLO. Older brothers and older sisters gave their younger siblings approximately the same level of developmental support. Results of an independent samples t-test for younger brothers and younger sisters, however, were significantly different in the Encouragement domain only, showing that younger brothers received more encouragement, help, and support from

their older siblings than younger sisters. Gender affects how children play with each other. Older siblings use different strategies when playing with younger brothers and sisters (Howe et al., 2012). Girls tend to play in complex social ways (Lawhon, 1997) and boys tend to engage in rough and tumble play (Reed et al., 2000).

Results from a series of bivariate correlations indicate that sibling age is associated with PICCOLO scores for each domain and the overall PICCOLO score. The older the older siblings, the higher their scores for each domain and the overall score. These findings link directly to Bronfenbrenner's and Morris's (2006) notion of demand resources within the 'Person' part of the PPCT model. Older children have greater maturity, abilities, and experience to support their younger siblings' development (Ramani, 2012; Howes & Matheson, 1992). The age of the younger sibling in relation to PICCOLO scores approached significance for the Teaching domain only, with older siblings observed doing more teaching with younger siblings who were older. Sibling age gap was positively and significantly correlated with the Affection domain, and approached significance for Responsiveness and the overall PICCOLO, with older siblings showing more affection and responsiveness when the sibling age gap was larger. These results suggest that more warm and affectionate behaviors can be observed in pairs with larger age gaps, where the children would be more developmentally different, than in pairs with smaller age gaps, where the children would be closer in developmental ability. Other research has also shown that older siblings' abilities to engage in warm, responsive, and developmentally supportive become more frequent as the sibling age gap widens (Howe & Recchia, 2005). A wider age gap reflects differences in the dynamics between the siblings that may not be as pronounced with a smaller age gap. Older

siblings in pairs with larger age gaps have greater knowledge and skills that come with maturity and experience (Howe et al., 2012).

Results from bivariate correlations for DSI with sibling relationship quality and conflict had unexpected results. The correlations for both sibling empathy and concern and overall positive aspects of the sibling relationship as measured by the SIB were significant, yet negative, for Encouragement. Results from bivariate correlations for sibling conflict and aggression were significant, yet positive, for Responsiveness, Encouragement, and the overall PICCOLO. In scatterplots, however, points did not cluster closely to the lines of best fit, suggesting that the unexpected results might reflect an overestimation of the association in the small sample. When used to observe caregiver-child interactions, the PICCOLO captures what parents and caregivers do well, what they are comfortable doing, and what they think is important for their children's development (Roggman et al., 2013b). Young children, however, may not react to being observed the same way as adults, which could affect their willingness to "show off" their abilities as an older sibling. Another possibility is that siblings who engage in play with each other more often, may have more opportunities for conflict and aggression but also more opportunities for an older sibling to respond to and encourage a younger sibling. This could parallel research on mother-child relationships and father-child relationships, which indicate that mothers are closer with their children than fathers are and have more conflict with their children than fathers have (Yan et al., 2019). Conflict is not always negative. A moderate degree of conflict in an otherwise supportive sibling relationship can help children practice their conflict resolution skills through proximal processes with their siblings (Volling & Blandon, 2005).

Limitations

The limitations for this study are important to consider when interpreting the results. The sample for this study was small. Small samples limit the power of the analyses and the complexity of the analyses possible to make correct assumptions about the data. Homogeneity in family structure was another limitation. Most of the sibling pairs were white and were cared for during the day by a parent. All of the sibling pairs came from two-parent households with educated caregivers who were married. Age ranges for both the older and younger siblings were fairly wide meaning that the developmental levels of the two children and the resulting developmental gaps between them, varied across the pairs. Older siblings crossed developmental eras from preschool-aged into middle childhood and younger siblings ranged from toddlerhood to preschool-aged. As a result, ages for the youngest older siblings and the oldest younger siblings in the sample overlapped. A disadvantage of the wider age range was less precision at addressing the research questions. An advantage of the wider age ranges was that more sibling pairs met the participation qualifications.

Reliability issues constitutes another limitation. Coders did not initially reach reliability with their codes for Teaching. Coders had trouble agreeing on whether older sibling self-talk counted toward items 4 and 7. Some coders also had trouble understanding what some of the young children were saying, missing some of the specific words the older siblings used with their younger siblings. Teaching is a complex skill for children that is not as typical for preschool-aged siblings as it is for siblings in middle childhood (Volling & Blandon, 2005). Teaching also lacked strong internal consistency for Hetherington and Clingempeel (1992) as they expanded the SIB for use with siblings

experiencing parent divorce. Codes for Teaching were used in analyses despite the low reliability. Three of the double-coded videos were subsequently coded by the full coding team during a Zoom meeting and the scores were used in the analyses. The first set of codes for the other two double-coded videos were kept for analyses.

The procedures for task set-up with the child-toddler pairs was not completely consistent with procedures for the adult comparison group. Parents in the EHSREP study, the source of observations and data for the PICCOLO for parents, were given three bags by the home visitor or researcher visiting their homes and told to play with the toys in order. The first bag contained books; the second bag contained a pretend-play toy, such as a play cooking set with pans and food or a grocery shopping set with a cash register and food; the final bag contained manipulative toys, such as blocks (Roggman et al., 2013a). The PICCOLO measurement developers recommend using similar play materials – picture books, manipulative toys, and pretend play toys – but not putting them in separate containers (Roggman, 2013b). Per these recommendations, caregivers for the child-toddler pairs were asked to find and set out three sets of toys that they already own including a book or pictures to talk about, toys for pretending, and a toy for problem-solving and sharing. The caregivers were then asked to ask the older child to play with the toys and their younger sibling for 10 minutes while the caregiver recorded the interaction. Older siblings may not follow the directions when asked to play with specific toys on demand. Asking caregivers to record any 10 minutes the siblings play together rather than setting up a situation with specific toys and standard instructions may allow space for the children to play more naturally. Additionally, with all three sets of toys

available at the same time, the siblings could be interested in different toys and may play independently with their own selection from the toys.

Another procedural difference was that videos for the adult comparison sample were recorded in the families' homes by a home visitor or researcher who were trained in the study procedures. Videos for the present study were recorded either by the caregivers or by a researcher over Zoom, which may affect the consistency of the procedures and task set-up. However, these procedures allowed for families across the United States to participate in research in their own homes without having to worry about exposure to COVID-19 by a researcher. Even with these limitations, the results suggest that siblings are able to engage in these DSI behaviors and that this can be further explored with a larger sample size.

Future Directions

Despite the limitations, findings of this study point toward possible contributions that could be explored through future research. The primary way future research could expand this study is to use a larger sample size. A larger sample would be useful to see if the trends in the results hold with more observations of more sibling pairs. This could help with determining which PICCOLO items may need to be revised or removed to better adapt the measure to sibling pairs.

A larger sample would also be helpful in exploring the effects of gender pairings and age gaps, as well as child factors not well-represented in the present study. Older siblings in pairs with larger age gaps engage in more scaffolding behaviors because older siblings have more maturity and experience scaffolding (Howe & Recchia, 2005), while

smaller age gaps may be more motivating for the younger sibling to imitate older siblings' actions because both children have closer cognitive abilities (Gregory, 2001). Child factors such as disability, childcare environments, and ethnicity were rare or lacked variation, and, therefore, were not explored in the present study. A larger, more diverse sample would allow adequate variability for any associations with those variables to be tested appropriately. A larger sample would open the data for more complex analyses, specifically using multivariate analyses to explore the effects of the child factors on DSI behaviors. For example, examining the role of the sibling age difference or family size in relation to the unexpected finding that negative aspects of the sibling relationship were correlated with positive aspects of developmental support.

Further work could also expand to explore other variables that may affect DSI behaviors and build on what is understood about important proximal processes between young children. For example, familiarity and relatedness could not be tested in the current study. Research indicates that familiarity and relatedness influence how young children play and interact with other children (Lindsey & Berks, 2019). Future research could examine the effects of familiarity and relatedness on DSI behaviors in mixed-age peer pairs by including samples of siblings, cousins, neighbors, and classmates in mixed-age childcare programs.

Further work is needed to explore reliability and better understand how to maintain good internal consistency with a larger sample of sibling pairs. Information from reliability for the present study suggests that more could be done to support coders in identifying behaviors in child-toddler sibling pairs, particularly in the Teaching domain. Ways to supplement coding could include more practice opportunities coding

videos of sibling or other child pairs or providing transcripts for the videos. The qualitative descriptors in Table 9 and 10 were helpful for guiding coders, observations from a larger sample could provide more guidance for coders and could contribute to measurement guidelines for research or interventions interested in developmental support in young sibling pairs.

Validation of PICCOLO for supporting DSI between siblings will require further research. Future studies, particularly longitudinal studies, need to address the association of sibling DSIs to children's development to identify any impact of developmental support from sibling interactions, whether sibling DSIs are influenced by caregiver-child DSIs in the same family, and whether sibling DSIs make additional contributions to younger siblings' development, over and above the influence of caregiver-child DSI. These future studies could also investigate the benefits of these proximal processes for the older siblings, specifically the older siblings' own learning and teaching skills, and the impact on their socioemotional skills for positive peer relations throughout childhood and for future positive parenting. Interactions are bi-directional processes, with both children working together in reciprocal and complimentary ways and learning together (Howe & Recchia, 2005).

Implications

This study indicates that older siblings can engage in DSI behaviors that are linked to development for caregiver-child interactions. If future research shows value added by supporting sibling relationships as a proximal process and context for developmental support, then PICCOLO or a similar tool could be a powerful asset for

family-centered developmental services that aim to increase developmental support in the home for infants and toddlers.

Interventions that use siblings as interventionists exist in the field of special education. Often those interventions involve intensive training for the interventionist sibling rather than building skills within naturally occurring sibling interactions (Beffel et al., 2021). Beffel and colleagues (2012) suggested that an effective alternative to more involved interventions for prosocial behavior would be encouraging older siblings to use prosocial skills within sibling interactions to help younger siblings learn and practice prosocial skills. Older siblings have skill levels closer to the young children's zone of proximal development than adults. This may be more motivating for the younger siblings to imitate (Gregory, 2001). Identifying which DSI behaviors are already happening within sibling pairs can help practitioners in early intervention, special education, and home visiting determine existing support and encourage those behaviors during sibling play interactions.

Many home visiting programs use a family-centered approach to effectively coach parents and caregivers to use their family strengths to support their children's development through observation, feedback, collaboration, and reflection (Inbar-Furst et al., 2020). Parents and caregivers usually already work to encourage positive, developmentally supportive sibling relationships in their homes (Beffel et al., 2021). Home visitors can use coaching strategies to help support parents and caregivers in encouraging DSI behaviors between their young children. The PICCOLO, or an adaptation for sibling interactions, can act as a guide home visitors can use with caregivers to identify DSI behaviors that occur when their young children interact with

each other and then collaboratively build feedback that is individualized for the older sibling.

The present study has implications for the bioecological notion of proximal processes (Bronfenbrenner & Morris, 2006), particularly those between young siblings. Young children often engage in behaviors that promote positive proximal processes with their siblings. These proximal processes are similar to those between parents or caregivers and young children. Yet, the proximal processes between siblings are different because of the person characteristics of the siblings. The results of this study suggest that as the demand aspect of age increases, older siblings' abilities to bring warmth, responsiveness, encouragement, and cognitive stimulation to proximal processes increases. Furthermore, younger siblings' demand characteristic of gender affected how much encouragement they received in proximal processes with their older siblings.

Conclusions

This study highlights young children's abilities to use DSI behaviors during play with their younger siblings. DSI behaviors can be identified in observations of child-toddler sibling play using the PICCOLO, a measure of caregiver-child interaction quality. However, these behaviors are less frequent or complex in sibling pair interactions than they are in adult interactions with children. Child factors such as younger sibling gender, older sibling age, age gap, sibling conflict and aggression, and sibling empathy and concern are associated with DSI behaviors. However, the sample for this study was small, at 15 sibling pairs, and similar in family characteristics. This made determining the full effect of child factors on DSI behaviors difficult. Future studies should include a larger

sample for a better understanding how child factors, especially gender pairings and sibling relationship quality, are associated with DSI behaviors during child-toddler sibling interactions. Further exploration of this topic can help clarify what children are doing to support their younger siblings and how identifying DSI behaviors in sibling play interactions can supplement intervention.

REFERENCES

Acar, I. H., Hong, S. Y., & Wu, C. (2017). Examining the role of teacher presence and scaffolding in preschoolers' peer interactions. *European Early Childhood Education Research Journal*, *25*(6), 866-884. https://doi.org/10.1080/1350293X.2017.1380884

Anderson, S., Roggman, L. A., Innocenti, M. S., & Cook, G. A. (2013). Dads' parenting interactions with children: Checklist of observations linked to outcomes (PICCOLO-D). *Infant Mental Health Journal*, *34*(4), 339-351. https://doi/10.1002/imhj.21390

Andreadakis, E., Laurin, J. C., Joussemet, M., & Mageau, G. A. (2020). Toddler Temperament, Parent Stress, and Autonomy Support. *Journal of Child and Family Studies*, *29*(11), 3029-3043. https://doi.org/10.1007/s10826-020-01793-3

Austin, A. M. B., Summers, M., & Leffler, A. (1987). Fathers' and mothers' involvements in sibling communication. *Early Childhood Research Quarterly*, *2*(4), 359-365.

Azmitia, M., & Hesser, J. (1993). Why siblings are important agents of cognitive development: A comparison of siblings and peers. *Child Development*, *64*(2), 430-444. https://doi.org/10.1111/1467-8624.ep9306035471

Azzi-Lessing, L. (2011). Home visitation programs: Critical issues and future directions. *Early Childhood Research Quarterly*, *26*(4), 387-398. https://doi.org/10.1016/j.ecresq.2011.03.005

Bai, S., Repetti, R. L., & Sperling, J. B. (2016). Children's expressions of positive emotion are sustained by smiling, touching, and playing with parents and siblings:

A naturalistic observational study of family life. *Developmental Psycholog*y, *52*(1), 88-101. https://doi.org/10.1037/a0039854

Barnett, L. A., & Kleiber, D. A. (1984). Playfulness and the early play environment. *The Journal of Genetic Psychology*, *144*(2), 153-164. https://doi.org/10.1080/00221325.1984.9923421

Bedford, V. H., Volling, B. L., Lang, F. R., & Fingerman, K. (Eds.) (2004). *Growing together: Personal relationships across the lifespan*. New York, NY: Cambridge University Press.

Beffel, J. H., Gerde, H. K., & Nuttall, A. K. (2021). Siblings and interventions: How siblings influence development and why practitioners should consider including them in interventions. *Early Childhood Education Journal*, 1-10. https://doi.org/10.1007/s10643-021-01273-3

Bergen, D. (2002). The role of pretend play in children's cognitive development. *Early Childhood Research & Practice*, *4*(1), n1.

Berger, S. E., & Nuzzo, K. (2008). Older siblings influence younger siblings' motor development. *Infant & Child Development*, *17*(6), 607-615. https://doi.org/10.1002/icd.571

Bowlby, J. (1980). *Attachment and loss, volume 3: loss; sadness and depression*. New York: Basic Books.

Bradley, R. H., & Caldwell, B. M. (1984). The relation of infants' home environments to achievement test performance in first grade: A follow-up study. *Child Development*, *55*(3), 803-809. https://doi.org/10.1111/j.1467-8624.1984.tb03817.x

Bridges, K., & Hoff, E. (2014). Older sibling influences on the language environment and language development of toddlers in bilingual homes. *Applied Psycholinguistics*, *35*(2), 225-241. https://doi.org/10.1017/S0142716412000379

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Bronfenbrenner, U. (1989). Ecological systems theory. In R. Vasta (Ed.), *Annals of child development, Vol. 6. Six theories of child development: Revised reformulations and current issues*. (pp. 187-249). London: JAI Press

Bronfenbrenner, U. (1995). The bioecological model from a life course perspective: Reflections of a participant observer. In P. Moen, G. H. Elder, Jr., & K. Lüscher (Eds.), *Examining lives in context: Perspectives on the ecology of human development* (pp. 599–618). American Psychological Association. https://doi.org/10.1037/10176-017

Bronfenbrenner, U., & Ceci, S. J. (1993). Heredity, environment, and the question "How?": A first approximation. In R. Plomin & G. E. McClearn (Eds.), *Nature, nurture & psychology* (pp. 313–324). American Psychological Association. https://doi.org/10.1037/10131-015

Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology Vol 1, theoretical models of human development* (pp. 993–1028). West Sussex: Wiley.

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner & W. E. Damon (Eds.), *Handbook of child*

psychology: Vol 1, theoretical models of human development (pp. 793–828). West

    Sussex: Wiley.

Brownell, C. A. (1990). Peer social skills in toddlers: Competencies and constraints

    illustrated by same-age and mixed-age interaction. *Child Development*, *61*(3),

    838-848. https://doi.org/10.1111/j.1467-8624.1990.tb02826.x

Buist, K. L., Slagt, M., & de Haan, A. D. (2021). Sibling relationships and school entry

    psychosocial functioning: Dual risk or differential susceptibility? *Journal of

    Family Psychology*, Advance online publication.

    https://doi.org/10.1037/fam0000896

Bunker, L. K. (1991). The role of play and motor skill development in building children's

    self-confidence and self-esteem. *The Elementary School Journal*, *91*(5), 467-471.

    https://doi.org/10.1086/461669

Carpendale, J. I. M., & Lewis, C. (2004). Constructing an understanding of mind: The

    development of children's social understanding within social interaction.

    Behavioral and Brain Sciences, *27*(1), 79–151.

    https://doi.org/10.1017/S0140525X04000032

Caspi, A., Moffitt, T. E., Morgan, J., Rutter, M., Taylor, A., Arseneault, L., ... & Polo-

    Tomas, M. (2004). Maternal expressed emotion predicts children's antisocial

    behavior problems: using monozygotic-twin differences to identify environmental

    effects on behavioral development. *Developmental Psychology*, *40*(2), 149-161.

    https://doi.org/10.1037/0012-1649.40.2.149

Cates, C. B., Dreyer, B. P., Berkule, S. B., White, L. J., Arevalo, J. A., & Mendelsohn, A.

    L. (2012). Infant communication and subsequent language development in

children from low income families: the role of early cognitive stimulation. *Journal of Developmental and Behavioral Pediatrics: JDBP*, *33*(7), 577-585. https://doi.org/10.1097/DBP.0b013e318264c10f

Cates, C. B., Weisleder, A., Johnson, S. B., Seery, A. M., Canfield, C. F., Huberman, H., ... & Mendelsohn, A. L. (2018). Enhancing parent talk, reading, and play in primary care: sustained impacts of the Video Interaction Project. *The Journal of pediatrics*, *199*, 49-56.e1. https://doi.org/10.1016/j.jpeds.2018.03.002

Chen B., Zhao Y., Han W., Wang Y., Wu J., Yue X., Wu Y. (2017). Sibling relationships: Forms, causes and consequences. *Advances in Psychological Science*, *25*(12), 2168-2178. https://doi.org/10.3724/SP.J.1042.2017.02168

Cook, G. A., Roggman, L. A., & Boyce, L. K. (2011). Fathers' and mothers' cognitive stimulation in early play with toddlers: Predictors of 5th grade reading and math. *Family Science*, *2*(2), 131-145. https://doi.org/10.1080/19424620.2011.640559

Cutting, A. L., & Dunn, J. (1999). Theory of mind, emotion understanding, language, and family background: Individual differences and interrelations. *Child Development*, *70*(4), 853-865. https://doi.org/10.1111/1467-8624.00061

Cutting, A. L., & Dunn, J. (2006). Conversations with siblings and with friends: Links between relationship quality and social understanding. *British Journal of Developmental Psychology*, *24*(1), 73-87. https://doi.org/10.1348/026151005X70337

de Bel, V., Kalmijn, M., & van Duijn, M. A. (2019). Balance in family triads: How intergenerational relationships affect the adult sibling relationship. *Journal of*

Family Issues, *40*(18), 2707-2727.
https://doi.org/10.1177%2F0192513X19860181

Dinkel, D., & Snyder, K. (2020). Exploring gender differences in infant motor development related to parent's promotion of play. *Infant Behavior and Development*, *59*, 101440. https://doi.org/10.1016/j.infbeh.2020.101440

Dunn, J. (1988). *The beginnings of social understanding*. Cambridge, MA: Harvard University Press.

Dunn, J. (2002). Sibling relationships. In P. K. Smith & C. H. Hart (Eds.), *Blackwell handbook of childhood social development* pp. 223-237). Blackwell Publishing.

Dunn, J., & Kendrick, C. (1979). Interaction between young siblings in the context of family relationships. In *The child and its family* (pp. 143-168). Springer, Boston, MA.

Dunn, J., & Munn, P. (1986). Siblings and the development of prosocial behavior. *International Journal of Behavioral Development*. *9*(3), 265-284. https://doi.org/10.1177/016502548600900301

Elkind, D. (2007). *The power of play: Learning what comes naturally*. Da Capo Lifelong Books.

Faith, M. A., Elledge, L. C., Newgent, R. A., & Cavell, T. A. (2015). Conflict and dominance between siblings as predictors of children's peer victimization. *Journal of Child and Family Studies*, *24*(12), 3623-3635. https://doi.org/10.1007/s10826-015-0171-1

Fantuzzo, J. W., & Hampton, V. R. (2000). Penn Interactive Peer Play Scale: A parent and teacher rating system for young children. In K. Gitlin-Weiner, A. Sandgrund,

& C. Schaefer (Eds.), *Play diagnosis and assessment* (pp. 599–620). John Wiley & Sons, Inc.

Fantuzzo, J. W., Sutton-Smith, B., Coolahan, K. C., Manz, P. H., Canning, S., & Debnam, D. (1995). Assessment of preschool play interaction behaviors in young low-income children: Penn Interactive Peer Play Scale. *Early Childhood Research Quarterly*, *10*(1), 105–120. https://doi.org/10.1016/0885-2006(95)90028-4

Fisher, P. A., Frenkel, T. I., Noll, L. K., Berry, M., & Yockelson, M. (2016). Promoting healthy child development via a two-generation translational neuroscience framework: the Filming Interactions to Nurture Development video coaching program. *Child Development Perspectives*, *10*(4), 251-256. https://doi.org/10.1111/cdep.12195

Fritz, C. O., Morris, P. E., & Richler, J. J. (2012). Effect size estimates: Current use, calculations, and interpretation. *Journal of Experimental Psychology: General*, *141*(1), 2-18. https://doi.org/10.1037/a0024338

Fuligni, A. S., & Brooks-Gunn, J. (2013). Mother–child interactions in Early Head Start: Age and ethnic differences in low-income dyads. *Parenting*, *13*(1), 1-26. https://doi.org/10.1080/15295192.2013.732422

Furman, W., & Buhrmester, D. (1985). Children's perceptions of the qualities of their sibling relationships. *Child Development*, *56*(2), 448– 461. https://doi.org/10.2307/1129733

Galasyuk, I. N., Lavrova, M. A., Suleymanova, E. V., & Kiselev, S. Y. (2019). Parent responsiveness and its role in neurocognitive and socioemotional development of

one-year-old preterm infants. *Developmental Psychology*, 12(3), 86-104.

https://doi.org/10.11621/pir.2019.0307

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research* (8th ed.). Pearson

Education, Inc.

Garcia, M. M., Shaw, D. S., Winslow, E. B., & Yaggi, K. E. (2000). Destructive sibling

conflict and the development of conduct problems in young boys. *Developmental*

Psychology, *36*(1), 44-53. https://doi.org/10.1037/0012-1649.36.1.44

Gärtner, K. A., Vetter, V. C., Schäferling, M., Reuner, G., & Hertel, S. (2018). Training

of parental scaffolding in high-socio-economic status families: How do parents of

full-and preterm-born toddlers benefit?. *British Journal of Educational*

Psychology, *88*(2), 300-322. https://doi.org/10.1111/bjep.12218

Gitlin-Weiner, K., Sandgrund, A., & Schaefer, C. E. (2000). *Play diagnosis and*

assessment. Wiley.

Grady, J. S. (2019). Parental gentle encouragement promotes shy toddlers' regulation in

social contexts. *Journal of Experimental Child Psychology*, *186*, 83-98.

https://doi.org/10.1016/j.jecp.2019.05.008

Gray, P., & Feldman, J. (2004). Playing in the zone of proximal development: Qualities

of self-directed age mixing between adolescents and young children at a

democratic school. *American Journal of Education*, *110*(2), 108-146.

https://doi.org/10.1086/380572

Gregory, E. (2001). Sisters and brothers as language and literacy teachers: Synergy

between siblings playing and working together. *Journal of Early Childhood*

Literacy, *1*(3), 301-322. https://doi.org/10.1177/14687984010013004

Gresham, F. M., & Elliott, S. N. (1990). *Social Skills Rating System*. Minneapolis, MN: Pearson Assessments.

Griffore, R. J., & Phenice, L. A. (2016). Proximal processes and causality in human development. *European Journal of Educational and Development Psychology*, *4*(1), 10-16. https://5y1.org/download/b8eaac3026620ea4802015d4386ca399.pdf

Grusec, J. E., & Goodnow, J. J. (1994). Impact of parental discipline methods on the child's internalization of values: A reconceptualization of current points of view. *Developmental Psychology*, *30*(1), 4–19. https://doi.org/10.1037/0012-1649.30.1.4

Gurko, K. L. (2018). *Socioeconomic status influence on mothers' interactions with infants: Contributions to early infant development* (Publication No. 10816562) [Doctoral dissertation, Utah State University]. ProQuest Dissertations Publishing.

Hà, T. A. (2022). Pretend play and early language development—Relationships and impacts: A comprehensive literature review. *Journal of Education*, *202*(1), 122-130. https://doi.org/10.1177/0022057420966761

Haight, W. L., & Miller, P. J. (1993). *Pretending at home: Early development in a sociocultural context*. Suny Press.

Hanna, E., & Meltzoff, A. N. (1993). Peer imitation by toddlers in laboratory, home, and day-care contexts: implications for social learning and memory. *Developmental Psychology*, *29*(4), 701-710. https://doi.org/10.1037/0012-1649.29.4.701

Hetherington, E.M., & Clingempeel, W.G. (1992). Coping with marital transitions: A family systems approach. *Monographs of the Society for Research in Child Development*, *57*, (2-3, Serial No. 227). https://doi.org/10.2307/1166050

Hetherington, E. M., Henderson, S., & Reiss, D. (1999). Adolescent siblings in

    stepfamilies: Family functioning and adolescent adjustment. *Monographs of the*

    Society for Research in Child Development, *64* (4, Serial No. 259), 1–222.

    https://doi.org/10.1111/1540-5834.00045

Hill, T. Y., & Palacios, N. (2020). Older sibling contribution to younger children's

    working memory and cognitive flexibility. *Social Development*, *29*(1), 57-72.

    https://doi.org/10.1111/sode.12400

Hou, X. H., Gong, Z. Q., Wang, L. J., Zhou, Y., & Su, Y. (2020). A reciprocal and

    dynamic development model for the effects of siblings on children's theory of

    mind. *Frontiers in Psychology*, *11*, 554023.

    https://doi.org/10.3389/fpsyg.2020.554023

Howe, N., & Recchia, H. (2005). Playmates and teachers: reciprocal and complementary

    interactions between siblings. *Journal of Family Psychology*, *19*(4), 497-502.

    https://doi.org/10.1037/0893-3200.19.4.497

Howe, N., Recchia, H. E., Della Porta, S., & Funamoto, A. (2012). "The driver doesn't

    sit, he stands up like the Flintstones!": Sibling teaching during teacher-directed

    and self-guided tasks. *Journal of Cognition and Development*, *13*, 208–231.

    https://doi.org/10.1080/15248372.2011.577703

Howe, N., Rinaldi, C. M., Jennings, M., & Petrakos, H. (2002). "No! The lambs can stay

    out because they got cozies": Constructive and destructive sibling conflict,

    pretend play, and social understanding. *Child Development*, *73*(5), 1460-1473.

    https://doi.org/10.1111/1467-8624.00483

Howes, C., & Matheson, C. C. (1992). Sequences in the development of competent play

  with peers: Social and social pretend play. *Developmental Psychology*, *28*(5),

  961-974. https://doi.org/10.1037/0012-1649.28.5.961

Howes, C., Droege, K., & Matheson, C. C. (1994). Play and communicative processes

  within long-and short-term friendship dyads. *Journal of Social and Personal*

  Relationships, *11*(3), 401-410. https://doi.org/10.1177/0265407594113006

Inbar-Furst, H., Douglas, S. N., & Meadan, H. (2020). Promoting caregiver coaching

  practices within early intervention: Reflection and feedback. *Early Childhood*

  Education Journal, *48*(1), 21-27. https://doi.org/10.1007/s10643-019-00980-2

Innocenti, M. S., Roggman, L. A., & Cook, G. A. (2013). Using the PICCOLO with

  parents of children with a disability. *Infant Mental Health Journal*, *34*(4), 307-

  318. https://doi.org/10.1002/imhj.21394

Jambon, M., Madigan, S., Plamondon, A., Daniel, E., & Jenkins, J. M. (2019). The

  development of empathic concern in siblings: A reciprocal influence model. *Child*

  development, *90*(5), 1598-1613. https://doi.org/10.1111/cdev.13015

Jamison, K. R., Forston, L. D., & Stanton-Chapman, T. L. (2012). Encouraging social

  skill development through play in early childhood special education

  classrooms. *Young Exceptional Children*, *15*(2), 3-19.

  https://doi.org/10.1177%2F1096250611435422

Jensen, A. C., Nielson, M. K., & Yorgason, J. B. (2020). The longest-lasting relationship:

  Patterns of contact and well-being among mid-to later-life siblings. *The Journals*

  of Gerontology: Series B, *75*(10), 2240-2249.

  https://doi.org/10.1093/geronb/gbz083

Jump Norman, V., & Christiansen, K. (2013). Validity of the PICCOLO tool in child care settings: Can it assess caregiver interaction behaviors?. *Infant Mental Health Journal*, *34*(4), 319-329. https://doi.org/10.1002/imhj.21391

Justice, L. M., Logan, J. A., Purtell, K., Bleses, D., & Højen, A. (2019). Does mixing age groups in early childhood education settings support children's language development?. *Applied Developmental Science*, *23*(3), 214-226. https://doi.org/10.1080/10888691.2017.1386100

Karavasilis Karos, L., Howe, N., & Aquan-Assee, J. (2007). Reciprocal and complementary sibling interactions, relationship quality and socio-emotional problem solving. *Infant and Child Development*, *16*(6), 577-596. https://doi.org/10.1002/icd.492

Kennedy, D. E., & Kramer, L. (2008). Improving emotion regulation and sibling relationship quality: The more fun with sisters and brothers program. *Family Relations*, *57*(5), 567-578. https://doi.org/10.1111/j.1741-3729.2008.00523.x

Klein, P. S., Feldman, R., & Zarur, S. (2002). Mediation in a sibling context: the relations of older siblings' mediating behaviour and younger siblings' task performance. *Infant & Child Development*, *11*(4), 321-333. https://doi.org/10.1002/icd.261

Klein, P., Zarur, S., & Feldman, R. (2003). Mediational behaviours of preschoolers teaching their younger siblings. *Infant & Child Development*, *12*(3), 233-242. https://doi.org/10.1002/icd.287

Knott, F., Lewis, C., & Williams, T. (2007). Sibling interaction of Children with autism: Development over 12 months. *Journal Of Autism & Developmental Disorders*, *37*(10), 1987-1995. https://doi.org/10.1007/s10803-006-0347-z

Koehn, A. J., & Kerns, K. A. (2018). Parent–child attachment: Meta-analysis of associations with parenting behaviors in middle childhood and adolescence. *Attachment & Human Development*, *20*(4), 378-405. https://doi.org/10.1080/14616734.2017.1408131

Laurin, J. C., & Joussemet, M. (2017). Parental autonomy-supportive practices and toddlers' rule internalization: A prospective observational study. *Motivation and Emotion*, *41*(5), 562-575. https://doi.org/10.1007/s11031-017-9627-5

Lawhon, T. (1997). Encouraging friendships among children. *Childhood Education*, *73*(4), 228-231. https://10.1080/00094056.1997.10521099

Levine, S. C., Ratliff, K. R., Huttenlocher, J., & Cannon, J. (2012). Early puzzle play: a predictor of preschoolers' spatial transformation skill. *Developmental Psychology*, *48*(2), 530-542. https://doi.org/10.1037/a0025913

Lindsey, E. W., & Berks, P. S. (2019). Emotions expressed with friends and acquaintances and preschool children's social competence with peers. *Early Childhood Research Quarterly*, *47*, 373-384. https://doi.org/10.1016/j.ecresq.2019.01.005

Lippard, C. N., Riley, K. L., & Hughes-Belding, K. (2016). Observing toddlers' individual experiences in classrooms: Initial use of the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes. *Infant Mental Health Journal*, *37*(5), 549-559. https://doi.org/10.1002/imhj.21584

Lowe, J. R., Erickson, S. J., MacLean, P., Schrader, R., & Fuller, J. (2013). Association
of maternal scaffolding to maternal education and cognition in toddlers born
preterm and full term. *Acta Paediatrica*, *102*(1), 72-77.
https://doi.org/10.1111/apa.12037

McAlister, A., & Peterson, C. C. (2006). Mental playmates: Siblings, executive
functioning and theory of mind. *British Journal of Developmental
Psychology*, *24*(4), 733-751. https://doi.org/10.1348/026151005X70094

McElwain, N. L., & Booth-LaForce, C. (2006). Maternal sensitivity to infant distress and
nondistress as predictors of infant-mother attachment security. *Journal of Family
Psychology*, *20*(2), 247–255. http://doi.org/10.1037/0893-3200.20.2.247

McHale, S. M., Updegraff, K. A., & Whiteman, S. D. (2012). Sibling relationships and
influences in childhood and adolescence. *Journal of Marriage and Family*, *74*(5),
913-930. https://doi.org/10.1111/j.1741-3737.2012.01011.x

Meadows, S. (2010). *The child as social person*. Routledge.

Mendelson, M.J., Aboud, F.E., & Lanthier, R.P. (1994). Kindergartner's relationships
with siblings, peers, and friends. *Merrill-Palmer Quarterly*, *40*(3), 416-435.
http://www.jstor.org/stable/23087353

Mueller, E., & Brenner, J. (1977). The origins of social skills and interaction among
playgroup toddlers. *Child Development*, 48(3), 854-861. https://doi.org/1128334

Murano, D., Sawyer, J. E., & Lipnevich, A. A. (2020). A meta-analytic review of
preschool social and emotional learning interventions. *Review of Educational
Research*, *90*(2), 227-263. https://doi.org/10.3102/0034654320914743

Paine, A. L., Karajian, G., Hashmi, S., Persram, R. J., & Howe, N. (2021). "Where's your bum brain?" Humor, social understanding, and sibling relationship quality in early childhood. *Social Development*, *30*(2), 592-611. https://doi.org/10.1111/sode.12488

Parten, M. B. (1932). Social participation among pre-school children. *The Journal of Abnormal and Social Psychology*, *27*(3), 243-269. https://doi.org/10.1037/h0073032

Pike, A., & Oliver, B. R. (2017). Child behavior and sibling relationship quality: A cross-lagged analysis. *Journal of Family Psychology*, *31*(2), 250–255. https://doi.org/10.1037/fam0000248

Prime, H., Pauker, S., Plamondon, A., Perlman, M., & Jenkins, J. (2014). Sibship size, sibling cognitive sensitivity, and children's receptive vocabulary. *Pediatrics*, *133*(2), e394-e401. https://doi.org/10.1542/peds.2012-2874

Rahn, E. (2020). *Home Visitors' Conceptions of Effective Practice in Home Visiting* (Publication No. 27964309) [Master's thesis, University of Nevada, Reno]. ProQuest Dissertations Publishing.

Ramani, G. B. (2012). Influence of a playful, child-directed context on preschool children's peer cooperation. *Merrill-Palmer Quarterly*, *58*(2), 159-190. http://www.jstor.org/stable/23098461

Recchia, H. E., Howe, N., & Alexander, S. (2009). " You didn't teach me, you showed me": Variations in sibling teaching strategies in early and middle childhood. *Merrill-Palmer Quarterly*, *55*(1), 55-78. http://www.jstor.org/stable/23096277

Rector, E. F. J. (2002). *Early Head Start: Home visiting and parenting group program uptake. An implementation study* (Publication No. 3053547) [Doctoral dissertation, University of Washington]. ProQuest Dissertations Publishing.

Reed, T., Brown, M., & Roth, S. (2000). Friendship formation and boys' rough and tumble play: Implications for teacher education programs. *Journal of Early Childhood Teacher Education*, *21*(3), 331-336. http://dx.doi.org/10.1080/0163638000210304

Richard, S., Baud-Bovy, G., Clerc-Georgy, A., & Gentaz, E. (2021). The effects of a 'pretend play-based training'designed to promote the development of emotion comprehension, emotion regulation, and prosocial behaviour in 5-to 6-year-old Swiss children. *British Journal of Psychology*, *112*(3), 690-719. https://doi.org/10.1111/bjop.12484

Roggman, L. A. (2016). Home visiting to promote developmental parenting: Measurement to ensure quality. In L. Roggman & N. Cardia (Eds). *Home visitation programs: Preventing violence and promoting healthy early childhood* (pp. 35-62). Springer.

Roggman, L. A., Cook, G. A., Innocenti, M. S., Jump Norman, V., Boyce, L. K., Christiansen, K., & Peterson, C. A. (2016). Home visit quality variations in two Early Head Start programs in relation to parenting and child vocabulary outcomes. *Infant Mental Health Journal*, *37*(3), 193-207. https://doi.org/10.1002/imhj.21565

Roggman, L. A., Cook, G. A., Innocenti, M. S., Jump Norman, V., Christiansen, K. (2013a). Parenting interactions with children: Checklist of observations linked to

outcomes (PICCOLO) in diverse ethnic groups. *Infant Mental Health Journal, 34*(4), 290-306. https://doi.org/10.1002/imhj.21389

Roggman, L.A., Cook, G. A., Innocenti, M. S., Jump Norman, V. K., & Christiansen, K. (2013b). *Parenting interactions with children: Checklist of observations linked to outcomes (PICCOLO)*. Baltimore, MD: Brookes.

Rosekrans, M. A. (1967). Imitation in children as a function of perceived similarity to a social model and vicarious reinforcement. *Journal of Personality and Social Psychology*, *7*(3p1), 307-315. https://doi.org/10.1037/h0025072

Ross, H. G., & Milgram, J. I. (1982). Important variables in adult sibling relationships: A qualitative study. In M. E. Lamb & B. Sutton-Smith (Eds.), *Sibling Relationships: Their Nature and Significance Across the Lifespan* (pp. 225-249). Taylor & Francis.

Sang, S. A., & Nelson, J. A. (2017). The effect of siblings on children's social skills and perspective taking. *Infant and Child Development*, *26*(6), e2023. https://doi.org/10.1002/icd.2023

Schaefer, E. S., & Edgerton, M. (1979). *Sibling inventory of behavior*. Chapel Hill, NY: University of North Carolina.

Siddiqui, A., & Ross, H. (2004). Mediation as a method of parent intervention in children's disputes. *Journal of Family Psychology*, *18*(1), 147–159. https://doi.org/10.1037/0893-3200.18.1.147

Slaughter, V., Imuta, K., Peterson, C. C., & Henry, J. D. (2015). Meta-analysis of theory of mind and peer popularity in the preschool and early school years. *Child Development*, *86*(4), 1159-1174. https://doi.org/10.1111/cdev.12372

Smith, J., & Ross, H. (2007). Training parents to mediate sibling disputes affects children's negotiation and conflict understanding. *Child Development*, *78*(3), 790-805. https://doi.org/10.1111/j.1467-8624.2007.01033.x

Stocker, C., Burwell, R. A., & Briggs, M. L. (2002). Sibling conflict in middle childhood predicts children's adjustment in early adolescence. *Journal of Family Psychology*, *16*(1), 50–57. https://doi.org/10.1037/0893-3200.16.1.50

Stoneman, Z. (2001). Supporting positive sibling relationships during childhood. *Mental Retardation and Developmental Disabilities Research Reviews*, *7*(2), 134-142. https://doi.org/10.1002/mrdd.1019

Stormshak, E. A., Bellanti, C. J., Bierman, K. L. & Conduct Problems Prevention Research Group. (1996). The quality of sibling relationships and the development of social competence and behavioral control in aggressive children. *Developmental Psychology*, *32*(1), 79-89. https://doi.org/10.1037/0012-1649.32.1.79

Symeonides, C., Vuillermin, P. J., Sciberras, E., Senn, E., Thomson, S. M., Wardrop, N., ... & Ponsonby, A. L. (2021). Importance of accounting for sibling age when examining the association between family size and early childhood cognition, language and emotional behaviour: a birth cohort study. *BMJ open*, *11*(3), e041984. https://doi.org/10.1136/bmjopen-2020-041984

Taeyoung, K., & Horn, E. (2010). Sibling-implemented intervention for skill development with children with disabilities. *Topics in Early Childhood Special Education*, *30*(2), 80-90. https://doi.org/10.1177/0271121409349146

Taylor, M. E., & Boyer, W. (2020). Play-based learning: Evidence-based research to improve children's learning experiences in the kindergarten classroom. *Early Childhood Education Journal*, *48*(2), 127-133. https://doi.org/10.1007/s10643-019-00989-7

Teti, D., & Ablard, K. (1989). Security of attachment and infant-sibling relationships: A laboratory study. *Child Development*, *60*(6), 1519-1528. https://doi.org/10.1111/1467-8624.ep9772539

Tudge, J. R., Mokrova, I., Hatfield, B. E., & Karnik, R. B. (2009). Uses and misuses of Bronfenbrenner's bioecological theory of human development. *Journal of Family Theory & Review*, *1*(4), 198-210. https://doi.org/10.1111/j.1756-2589.2009.00026.x

U.S. Department of Health and Human Services. (2019). *A Parent's Guide to the Head Start Home-Based Program Option*. https://www.rucd.org/assets/uploads/2019/01/Parent_Guide_to_HB_Option.pdf

Vallotton, C. D., Mastergeorge, A., Foster, T., Decker, K. B., & Ayoub, C. (2017). Parenting supports for early vocabulary development: Specific effects of sensitivity and stimulation through infancy. *Infancy*, *22*(1), 78-107. https://doi.org/10.1111/infa.12147

Vandell, D. L., & Wilson, K. S. (1987). Infants' interactions with mother, sibling, and peer: Contrasts and relations between interaction systems. *Child Development*, *58*(1), 176-186. https://doi.org/10.2307/1130299

Volling, B. L., & Blandon, A. Y. (2005). Positive indicators of sibling relationship

    quality: The Sibling inventory of behavior. In *What do children need to*

    flourish? (pp. 203-219). Springer, Boston, MA.

Volling, B. L., McElwain, N. L., & Miller, A. L. (2002). Emotion regulation in context:

    The jealousy complex between siblings and its relations with child and family

    characteristics. *Child Development*, *73*(2), 581–600. https://doi.org/10.1111/1467-

    8624.00425

Vygotsky, L. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press.

Weatherston, D., & Tableman, B. (2002*). Infant mental health services: Supporting*

    competencies/reducing risks (3rd ed.). Lansing: Michigan Association for Infant

    Mental Health.

Weisberg, D. S. (2015). Pretend play. *Wiley Interdisciplinary Reviews: Cognitive*

    Science, *6*(3), 249-261. https://doi.org/10.1002/wcs.1341

White, R. E., Thibodeau-Nielsen, R. B., Palermo, F., & Mikulski, A. M. (2021).

    Engagement in social pretend play predicts preschoolers' executive function gains

    across the school year. *Early Childhood Research Quarterly*, *56*, 103-113.

    https://doi.org/10.1016/j.ecresq.2021.03.005

Widmer, E. D., & Weiss, C. C. (2000). Do older siblings make a difference? The effects

    of older sibling support and older sibling adjustment on the adjustment of socially

    disadvantaged adolescents. *Journal of Research on Adolescence*, *10*, 1-27.

    https://doi.org/10.1207/sjra1001_1

Wooldridge, M. B., & Shapka, J. (2012). Playing with technology: Mother–toddler

    interaction scores lower during play with electronic toys. *Journal of Applied*

Developmental Psychology, *33*(5), 211-218.

https://doi.org/10.1016/j.appdev.2012.05.005

Yan, J., Schoppe-Sullivan, S. J., & Feng, X. (2019). Trajectories of mother-child and

father-child relationships across middle childhood and associations with

depressive symptoms. *Development and Psychopathology*, *31*(4), 1381-1393.

https://doi.org/10.1017/S0954579418000809

Youngblade, L. M., & Dunn, J. (1995). Individual differences in young children's pretend

play with mother and sibling: Links to relationships and understanding of other

people's feelings and beliefs. *Child Development*, *66*(5), 1472-1492.

https://doi.org/10.1111/j.1467-8624.1995.tb00946.x

Zhou, Q., Eisenberg, N., Losoya, S. H., Fabes, R. A., Reiser, M., Guthrie, I. K., ... &

Shepard, S. A. (2002). The relations of parental warmth and positive

expressiveness to children's empathy-related responding and social functioning: A

longitudinal study. *Child Development*, *73*(3), 893-915.

https://doi.org/10.1111/1467-8624.00446

APPENDICES

Appendix A: Sibling Interaction Observation Instructions

Instructions in Qualtrics	Instructions when meeting with research assistant
You will need to record and upload a 7- to 10-minute video of your children playing together. Our team will watch these videos for positive play behaviors. You can record this with a camera, phone, tablet, or computer. Find a place in your house for your children to play where you can record them. Make sure to record them in a place where there is not a lot of background noise and where lighting is above or in front of your children. We want to be able to hear your children and see their faces. Find three toys for them to play with together. First, a book or flashcards that they can look at and talk about the pictures. Second, a pretend play toy. This can be play food, dolls, a toy cooking set, a doctor set, or something similar. Third, a toy for sharing, blocks, a puzzle, or a game usually work well. Place the toys beside the children and ask your children to play. Make sure the children stay within the camera frame and face the camera. Only step in if they begin fighting or either child is too upset to play. Aim for a 10-minute video, but you can stop a little early if your children need a break or are ready to stop.	First, we will record your children playing together for 10 minutes. Our team will watch these videos for positive play behaviors. Do you have the toys—book, pretend toys, and something else-- ready? Great! Pull those out. During this time, please let the children play together as they normally would. I will need you to make sure the children stay within the camera frame and face the camera. Only step in if they begin fighting or either child is too upset to play. I'll be quiet for that time, except if I need to remind you to move or face the camera. At the end of 10 minutes, I will let you know. If we need to stop sooner or take a break, that's okay. Let me know when your children are ready to begin. Okay! Go ahead. *[set timer for 10 minutes and quietly watch the play.]* That's 10 minutes! Thank you!

Appendix B: Child and Family Information Questionnaire

Thank you for helping us understand more about the positive ways siblings play together. Please select or fill in the most accurate answer for each question.

1. What is your zip code?
2. What would be the best way to contact you if we have questions?
   a. Email (enter email address)
   b. Text (enter phone number)
   c. Call (enter phone number)

Please answer these questions about your oldest participating child.
1. How old is your child today (in years and months)?
2. Is your child a
   a. Boy
   b. Girl
   c. Other
3. How many older sisters and brothers does your child have?
4. How many younger sisters and brothers does your child have?
5. Does your child have a developmental delay, a disability, a suspected disability, or other special need?
   a. Yes
   b. No
   c. Unsure
6. Who most often cares for your child for 10 or more hours a week besides you? (select up to 3)
   a. No one other than you
   b. Child's other parent
   c. Child's grandparent
   d. Other relative
   e. In-home childcare
   f. Childcare center
   g. Preschool, elementary school, education center, or lab school
   h. Neighbor or friend

Please answer these questions about your youngest participating child.
1. How old is your child today (in years and months)?
2. Is your child a
   a. Boy
   b. Girl
   c. Other
3. How many older sisters and brothers does your child have?
4. How many younger sisters and brothers does your child have?
5. Does your child have a developmental delay, a disability, a suspected disability, or other special need?

      a.   Yes
      b.   No
      c.   Unsure

6. Who most often cares for your child for 10 or more hours a week besides you? (select up to 3)
    a. No one other than you
    b. Child's other parent
    c. Child's grandparent
    d. Other relative
    e. In-home childcare
    f. Childcare center
    g. Preschool, elementary school, education center, or lab school
    h. Neighbor or friend

Please answer these questions about you and your family.
1. What is your age in years (rounded to nearest year)?
2. What is the highest level of education you have completed?
    a. 1st -8th grade
    b. 9th -11th grade
    c. High School graduate
    d. GED
    e. Some college or Vocational School
    f. Graduated Bachelor's
    g. Graduated Master's or other post-graduate degree
3. What is your relationship to the children?
    a. Mother biological
    b. Father biological
    c. Other (e.g., stepmother, foster mother)
4. What is your relationship status?
    a. Married
    b. Living with partner
    c. Single
    d. Divorced
    e. Widowed
5. What is your living situation?
    a. Living with spouse or partner (with or w/out other adults)
    b. Living with other adults (not a spouse or partner)
    c. Living alone with child(ren)
6. Are you currently employed?
    a. No, I'm not employed
    b. Yes, 1-10 hours/week
    c. Yes, 11-20 hours/week
    d. Yes, 21-29 hours/week
    e. Yes, 30+ hours/week
7. Are you currently enrolled in school or a training program? If yes, how many hours do you typically spend attending class and studying?

a. No, I'm not enrolled in school or training
b. Yes, 1-10 hours/week
c. Yes, 11-20 hours/week
d. Yes, 21-29 hours/week
e. Yes, 30+ hours/week

Appendix C: Parenting Interactions with Children: Checklist of Observations

Linked to Outcomes (PICCOLO)

Affection
1 speaks in a warm tone of voice
2 smiles at child
3 praises child
4 is physically close to child
5 uses positive expressions with child
6 is engaged in interacting with child
7 shows emotional warmth

Responsiveness
1 pays attention to what child is doing
2 changes pace or activity to meet child's interests or needs
3 is flexible about child's change of activities or interests
4 follows what child is trying to do
5 responds to child's emotions
6 looks at child when child talks or makes sounds
7 replies to child's words or sounds

Encouragement
1 waits for child's response after making a suggestion
2 encourages child to handle toys
3 supports child in making choices
4 supports child in doing things on his/her own
5 verbally encourages child's efforts
6 offers suggestions to help child
7 shows Enthusiasm about what child is doing

Teaching
1 explains reasons for something to child
2 suggests activities to extend what child is doing
3 repeats or expands child's words or sounds
4 labels objects or actions for child
5 engages in pretend play with child
6 does activities in a sequence of steps
7 talks to child About characteristics of objects
8 asks child for Information

Appendix D: Sibling Inventory of Behavior

Companionship/Involvement
1. Accepts (Child 1) as a playmate
2. Gets ideas for things they can do together
3. Has fun at home with (Child 1)
4. Treats (Child 1) as a good friend
5. Makes plans that include (Child 1)
6. *Shares secrets with (Child 1)
    - "shares secrets" refers to having shared information with (Child1) or forming an alliance with (Child 1) while keeping something from their parents (e.g., "Don't tell mommy we ate those cookies.")

Empathy/Concern
7. Is pleased by progress (Child 1) makes
8. Wants (Child 1) to succeed
9. Shows sympathy when things are hard for (Child 1)
10. Is concerned for (Child 1's) welfare and happiness
11. Tries to comfort (Child 1) when (s/he) is unhappy or upset

Teaching/Directiveness
12. *Teaches (Child 1) new skills
    - "teaches" refers to the older child showing (Child 1) how to work a toy or directing the interaction in some way (e.g., :let's play with the car"
13. Helps (Child 1) adjust to a new situation
14. *Baby-sits and cares for (Child 1)
    - "baby-sits" refers to looking out for (Child 1) or showing concern for (Child 1)'s whereabouts
15. Tries to teach (Child 1) how to behave

Rivalry
16. Tattles on (Child 1)
17. Is jealous of (Child 1)
18. Is nosy and has to know everything about (Child 1)
19. Takes advantage of (Child 1)
20. Blames (Child 1) when something goes wrong
21. Is very competitive against (Child 1)
22. Resents (Child 1)

Conflict/Aggression
23. Teases or annoys (Child 1)
24. Gets angry with (Child 1)
25. Fusses and argues with (Child 1)
26. Hurts (Child 1's) feelings

27. Has physical fights with (Child 1) (not just for fun)

Avoidance
28. Is embarrassed to be with (Child 1) in public
29. Stays away from (Child 1) if possible
30. Acts ashamed of (Child 1)
31. Frowns or pouts when (Child 1) has to be with (him/her)
32. Tries to avoid being seen with (Child 1)

Appendix E: Penn Interactive Peer Play Scale

1. Starts fights and arguments
2. Is rejected by others
3. Doesn't take turns
4. Doesn't share toys
5. Tattles
6. Destroys others' things
7. Verbally assaults
8. Cries, whines, shows temper
9. Grabs other things
10. Is physically aggressive
11. Hovers outside play group
12. Withdraws
13. Wanders aimlessly
14. Is ignored by others
15. Is not invited into play groups
16. Refuses to play when invited
17. Confused in play
18. Needs teacher's direction
19. Seems unhappy
20. Has difficulty moving from one activity to another
21. Shares ideas
22. Leads other children
23. Helps other children
24. Helps settle peer conflicts
25. Directs others' actions politely
26. Encourages others to join play
27. Shows creativity in making up play stories & activities
28. Accepts idea
29. Compromises
30. Disagrees cheerfully
31. Considerate
32. Converses
33. Goes along
34. Smiles

APPENDIX F: CURRICULUM VITAE

TASHA L. OLSON
2905 Old Main Hill, Logan, UT 84322-2905
801.712.2124   Tasha.Olson@usu.edu or TashaLOlson@gmail.com
ORCID iD: https://orcid.org/0000-0002-2296-0198

EDUCATION

Doctor of Philosophy, Family and Human Development Utah State University o Major Professors: Lori Roggman, Ph.D. & Lisa Boyce, Ph.D.	May 2022 Logan, UT
Bachelor of Science, Psychology BYU-Idaho o Minor: Child Studies	Spring 2008 Rexburg, ID

RESEARCH

Graduate Research Assistant

Fall 2013 – Present	PICCOLO & HOVRS Training & Coding Supervisor Utah State University Department of Consumer, Family, and Human Development Supervisor: Lori Roggman, Ph.D.
Summer 2019 – Fall 2021	Family Place PICCOLO Coding Supervisor Utah State University Department of Consumer, Family, and Human Development Supervisor: Vonda Jump Norman, Ph.D.
Fall 2019	Ecuador PICCOLO Coding Supervisor Utah State University Department of Consumer, Family, and Human Development Supervisor: Lisa Boyce, Ph.D.
Spring 2015 & Fall 2018	Data Manager & HOVRS Training Supervisor Utah State University Department of Psychology Supervisor: Mark Innocenti, Ph.D.

TEACHING

Graduate Instructor

Spring 2021	HDFS 5550: Early Childhood Home Visiting (Online)

Fall 2019	HDFS 3210: Families and Cultural Diversity (Broadcast)
Spring 2019	HDFS 1500: Human Development Across the Lifespan (Online)
Fall 2015 & Fall 2017	FCHD 3500: Infancy and Childhood (Online)
Fall 2014 – Spring 2015	FCHD 1500: Human Development Across the Lifespan

Graduate Teaching Assistant

Fall 2020	HDFS 3350: Family Finance (Online) Instructor: Alena Johnson, M.S., A.F.C.
Spring 2020	HDFS 3500: Infancy and Childhood (Online) Instructor: Tori Reevs
Summer 2019	HDFS 3350: Family Finance (Online) Instructor: Alena Johnson, M.S., A.F.C.
Spring 2019	HDFS 6510/7510: Development in Infancy Instructor: Lori Roggman, Ph.D.
Fall 2018	HDFS 1500 Lifespan Development (Online) Instructor: Susan Talley, Ph.D.
Summer 2018	HDFS 3350: Family Finance (Online) Instructor: Alena Johnson, M.S., A.F.C.
Spring 2018	FCHD 3120: Cultural Diversity Instructor: Ryan Seedall, Ph.D.
Spring 2017	FCHD 3130: Research Methods (Online) Instructor: Sarah Tulane, Ph.D.
Fall 2015 & Spring 2016	FCHD 2660: Parenting and Child Guidance Instructor: Elizabeth Davis, M.S.
Spring 2016 – Spring 2017	FCHD 3500: Infancy and Childhood (Online) Instructor: Sarah Tulane, Ph.D.
Spring 2014	FCHD 2000: Careers and Life Planning in FCHD (Online) Instructor: Cindy Stokes, M.S.
Spring 2013	FCHD 3120: Cultural Diversity Instructor: Stacy Jones, Ph.D.
Fall 2012 – Spring 2014	FCHD 4550: Preschool Methods and Curriculum Instructor: Kelli Barker, M.S.

Invited Teaching Presentations

2019	Introduction to Issues, Questions, History of Infancy
	    HDFS 6510/7510: Development in Infancy
	Research in Infancy
	    HDFS 6510/7510: Development in Infancy
	Physical Development during Infancy
	    HDFS 6510/7510: Development in Infancy

2017	Cognitive Development in Infancy FCHD 6510/7510: Development in Infancy

2015	Neurological Development in Infancy FCHD 6510/7510: Development in Infancy
2014	Making the Most of Your Graduate Experience FCHD Graduate Student Orientation With Daily Evans and Rachel Williams
2013	Using Blocks in Preschool Classrooms FCHD 4550: Preschool Methods and Curriculum Working with People with Disabilities and Their Families FCHD 3120: Cultural Diversity
2012	Autism: What is it? FCHD 1500: Human Development Across the Lifespan

PUBLICATIONS

Published

Olson, T.L., Roggman, L.A., Innocenti, M.S. (2020). Developmental Research Methods with Infants & Young Children. In: Benson, J.B. (Ed.), *Encyclopedia of Infant and Early Childhood Development*, 2nd edition. vol. 1, Elsevier, pp. 456–468. https://dx.doi.org/10.1016/B978-0-12-809324-5.23564-5

Roggman, L.A., Cook, G.A., Innocenti, M.S., Jump Norman, V.K., Boyce, L.K., Olson, T.L., ... & Peterson, C.A. (2019). The Home Visit Rating Scales: Revised, restructured, and revalidated. *Infant Mental Health Journal*, *40*(3), 315-330. https://doi.org/10.1002/imhj.21781

Pending Publication

Roggman, L. A., Cook, G. A., Innocenti, M. S., Jump Norman, V. K., Boyce, L. K., Christiansen, K., & Olson, T. L. (pending). *The Home Visit Rating Scales-3; Home Visit Observation Guide: Using the Home Visit Rating Scales-3; Videos for training and practice: Home Visit Rating Scales-3.*

PROFESSIONAL PRESENTATIONS

Meyers, J., Olson, T., & Roggman, L. (2022, April 12). *Is parental encouragement (as measured by PICCOLO) during toddlerhood correlated with high-risk behaviors in 5th grade? Are these correlations different for first born children vs. children with older siblings?* [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://symposium.foragerone.com/2022-usu-srs/presentations/41962

Dikwa, C., Olson, T., & Roggman, L. (2021, April 14-15). *The effects of low socioeconomic status on parent-child interactions.* [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://symposium.foragerone.com/2021-usu-student-research-symposium/presentations/22004

DeMercy, H., Olson, T., & Roggman, L. (2021, April 14-15). *Does maternal psychological risk affect responsive parenting practices and infant emotion*

regulation?. [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://symposium.foragerone.com/2021-usu-student-research-symposium/presentations/20751

Nguyen, M., Olson., T., & Roggman, L. (2021, April 14-15). *Teaching at home: Exploring the relationship between reflective functioning and teaching practices in preschoolers' caregivers*. [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://symposium.foragerone.com/2021-usu-student-research-symposium/presentations/21153

Novoa, D., Olson., T., & Roggman, L. (2021, April 14-15). *Effects of early developmental parenting on later child's language development in low-income families that speak English as a second language*. [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://symposium.foragerone.com/2021-usu-student-research-symposium/presentations/21438

Smith, K., Olson., T., & Roggman, L. (2021, April 14-15). *Involving additional family members in home visits*. [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://symposium.foragerone.com/2021-usu-student-research-symposium/presentations/21488

Williams, R., Olson., T., & Roggman, L. (2021, April 14-15). *Effects of older siblings on early childhood development in low-income families*. [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://symposium.foragerone.com/2021-usu-student-research-symposium/presentations/21425

DeMercy, H., Olson, T., & Roggman, L. (2020, December 10). *Early social-emotional development in children of mothers with psychological risk* [Poster session]. Utah State University Fall Student Research Symposium. Logan, Utah. https://digitalcommons.usu.edu/fsrs2020/17

Munn, G., Olson, T., & Roggman, L. (2020, December 10). Mediating Factors of Family Risk and Parent-Child Interaction Quality. [Poster session]. Utah State University Fall Student Research Symposium. Logan, Utah. https://digitalcommons.usu.edu/fsrs2020/62

Roggman, L., Olson, T., Rinaldi, M.C., Wences, I., Gongora, A., Park, S., Innocenti, M. (2020, June 22-24). *Using tele-visiting to support families with infants and toddlers* [Poster session]. National Conference on Early Childhood, Washington, DC. https://nrcec2020.ipostersessions.com/?s=D3-53-BB-12-6A-C5-22-6C-68-68-26-7E-AA-92-E5-F3

Roggman, L., Olson, T., Rinaldi, M.C., Wences, I., Gongora, A., Park, S., Innocenti, M. (2020, November 30-December 3). *Using tele-visiting to support families with infants and toddlers* [Poster session]. National Conference on Early Childhood, Washington, DC. (Conference cancelled.)

Smith, K., Olson, T., & Roggman, L. (2020, April 8-9). *Do traditional values create stress that interferes with positive parenting?* [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://lnkd.in/eae52V9

Johnson, S., Olson, T., & Roggman, L. (2020, April 8-9). *"Home sweet home": Effects of environment on children's behavior development from infancy to fifth grade.* [Poster session]. Utah State University Student Research Symposium. Logan, Utah. https://lnkd.in/eae52V9

Roggman, L., Gurko, K., Olson, T., Park, S., & Innocenti, M. (2019, May 14). *PICCOLO+B: PICCOLO during the first year in relation to the child's parenthood and development at the second year of age.* Invited research presentation to International PICCOLO Research Meeting, Universidad Catolica, Santiago, CHILE.

Roggman, L. A., Innocenti, M. S., Olson, T., & Rinaldi, M. C. (2019, May 13). PICCOLO: *State of the art of its use in research and intervention.* Invited research presentation to International PICCOLO Research Meeting, Universidad Catolica, Santiago, CHILE.

Hatch, K., Olson, T., & Roggman, L. (2019, April 10). *The effect of early maternal psychological risk and overall parenting quality throughout infancy on externalizing behavior problems in children at fifth grade.* Poster presentation at the annual Utah State University Student Research Symposium. Logan, Utah.

Olson, T. & Roggman, L. (2018, June 26). *The developmental support of parenting behaviors and practices for infants with disabilities at 36 months.* Poster at the National Research Conference on Early Childhood, Arlington, Virginia.

Roggman, L., Olson, T., Innocenti, M., & Cook, G. (2018, June 25). *Measuring home visit quality: the revised Home Visit Rating Scales.* Paper presentation at the National Research Conference on Early Childhood, Arlington, Virginia.

Roggman, L., Gurko, K., Olson, T., & Park, S.J. (2018, May 29). *Developmental parenting and child development outcomes wit infants age 3-9 months: Expanding the validity of PICCOLO to infancy.* Presentation at the 16th World Association for Infant Mental Health World Congress, Rome, ITALY.

Daines, A., Olson, T., & Roggman, L.A. (2018, May 29). *Joint attention at 14 months: Predicting academic outcomes in 2nd and 8th grades.* Clinical poster at the 16th World Association for Infant Mental Health World Congress, Rome, ITALY.

Roggman, L., Olson, T., Innocenti, M., & Cook, G. (2018, May 28). *Measuring the quality of home visiting practices and family engagement.* Presentation at the 16th World Association for Infant Mental Health World Congress, Rome, ITALY.

Olson, T. & Roggman, L.A. (2018, May 27). *The influence of developmental support in the home environment for firstborn and later-born infants with disabilities.* Clinical poster at the 16th World Association for Infant Mental Health World Congress, Rome, ITALY.

Swainston, J.A., Olson, T., Gurko, K., & Roggman, L.A. (2018, May 27). *Supporting mothers with infants: Developmental home visiting quality in relation to the home environment of children with mothers at high and low risk for depression and parenting stress.* Clinical poster at the 16th World Association for Infant Mental Health World Congress, Rome, ITALY.

Olson, T. & Roggman, L. (2018, April 12). *The influence of developmental support in the home environment for firstborn and later-born infants with disabilities.* Poster presentation at the annual Utah State University Student Research Symposium. Logan, Utah.

Hatch, K., Olson, T., & Roggman, L. (2018, April 12). *The influence of maternal education and parent-infant interaction quality on early emotion regulation.* Poster presentation at the annual Utah State University Student Research Symposium. Logan, Utah.

Jenkins, J., Olson, T., & Roggman, L. (2018, April 12). *Exploring the influence of home visit quality on program retention.* Poster presentation at the annual Utah State University Student Research Symposium. Logan, Utah.

Olson, T. & Roggman, L. (2017, April 13). *Mother-infant interactions with first-born versus later children: How do they interact and what factors influence those interactions.* Oral presentation at the annual Utah State University Student Research Symposium. Logan, Utah.

Olson, T. & Roggman, L. (2017, April 7). *Mother-infant interactions for first-borns versus later children and the factors that influence those interactions.* Poster presentation at the Society for Research in Child Development 2017 Biennial Meeting. Austin, TX.

Duke, M., Olson, T., & Roggman, L. (2016, December 8*). Language and Literacy Development in At-Risk Families.* Poster presented at the Utah State University Undergraduate Research Symposium. Logan, Utah.

Nilson, K., Olson, T., & Roggman, L. (December 2016). *Maternal Risk Factors and Their Effect on Parent/Child Interactions.* Poster presented at the Utah State University Undergraduate Research Symposium, Logan, Utah.

Olson, T., Innocenti, M., & Roggman, L. (2016, June 12). *Parents' perceptions of the behavior of young children with developmental disabilities and the time children play with siblings and peers.* Poster presentation at the International Society for Early Intervention, Stockholm, SWEDEN.

Gurko, K., Olson, T., Loesch, L., & Roggman, L. A. (2016, June 2). *Developing parenthood: Facilitating continuity during home visits for a complex family in chaos.* Clinical poster presentation at the World Association for Infant Mental Health, Prague, CZECH REPUBLIC.

Olson, T., Loesch, L., Gurko, K., & Roggman, L. A. (2016, May 30). *Effects of risk factors on parent-infant interaction quality.* Research poster presentation at the World Association for Infant Mental Health, Prague, CZECH REPUBLIC.

Daines, A., Olson, T., & Roggman, L. (2016, March 18). *Mother-infant joint attention in infancy and academic stills in 2nd and 8th grade.* Poster presentation at the Society for Research in Human Development, Denver, Colorado.

Roggman, L., Hill, A., Innocenti, M., Olson, T., Williams, R. (2015, May 6). *Observing home visiting process: Practices and engagement in relation to outcomes.* Presentation at the Home Visiting Research Network Day, Washington DC.

Olson, T., Daines, A., & Roggman, L. (2015, March 20). *A longitudinal study of the influence of joint attention in infancy on academic skills in 2nd and 8th grade*. Poster presented at the biennial conference of the Society for Research in Child Development. Philadelphia, Pennsylvania.

Olson, T., Loesch, L., Roggman, L., & Hill, A. (2015, March 21). *Positive aspects of home visiting influence on child behavior at 36 months*. Poster presented at the biennial conference of the Society for Research in Child Development. Philadelphia, Pennsylvania.

Hill, A., Gurko, K., Olson, T., & Roggman, L. (2014, October). *Home visiting as parent mentoring—parallel developmental relationships*. Poster presentation at the annual conference of the Developmental Networks: Mentoring & Coaching at Work. Albuquerque, New Mexico.

Olson, T. & Neilson, B. (2014, April). *Beyond parenting: Family stress in caring for children with autism*. Poster presentation at the annual Utah State University Student Research Symposium. Logan, Utah.

Aller, T., Olson, T., Williams, R., Hill, A., Gurko, K., Broome, M., & Roggman, L. (2014, March). *Building blocks: A case study of project based learning in human development research*. Paper presented at the biennial conference of the Society for Research in Human Development , Austin, Texas.

WORKSHOPS AND TRAININGS

Olson, T. & Smith, K. (2022, March 5). *Using Coaching and Individualized Feedback in Home Visits to Support Positive Parent-Child Interactions*. 47th Annual Utah Early Childhood Conference, Ogden, Utah.

Olson, T. (2021, July 29). *Giving Feedback with the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO)*. 90-minute webinar for the Family Place Utah, Logan, Utah.

Innocenti, M.S., Olson, T., & Roggman, L.A (2021, March 26 & 31; May 5, 12, & 19). *Home Visit Rating Scales (HOVRS): Observing and Scoring with the Home Visit Rating Scales (HOVRS)*. Three 3-hour webinars for Washington State Department of Children, Youth and Families, Early Intervention Programs, Seattle, Washington.

Olson, T., Wences, I., & Roggman, L. (2020). *Using Tele Visiting to Support Young Children and Their Families*. Utah Association for the Education of Young Children conference. (Conference cancelled)

Innocenti, M. & Olson, T. (2018, April). *Improving Home Visiting Quality by Observing Practices and Engagement with HOVRS*. 2-day workshop in Grand Rapids, Michigan.

Olson, T., Roggman, L., & Innocenti, M. (2018, January 12). *Developmental Home Visits and The Home Visit Rating Scales*. Invited 1-day workshop for Davis and Bear River Head Start programs, Logan, Utah.

Gurko, K., Olson, T., & Loesch, L. (2016, March). *Home Visitor Toolbox*. Utah Association for the Education of Young Children conference, Murray, Utah.

Olson, T., Hill, A., & Gurko, K. (2015, March). *Mentoring in Home Visiting Programs*. Utah Association for the Education of Young Children conference, Ogden, Utah.

Hill, A., Olson, T., & Evans, C. (2015, March). *Helping Families Tell Their Stories*. Utah Association for the Education of Young Children conference, Ogden, Utah.

GRANTS AND AWARDS

2022   CEHS Graduate Student Research Award, Utah State University, College of Education and Human Services & Department of Human Development and Family Studies, $2581

2017   Graduate Research & Creative Opportunities Grant, Utah State University, $1000

2014   Phyllis R. Snow Graduate Scholarship, Utah State University, College of Education and Human Services