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Dyadic Interaction Between Mothers and Children with Down Syndrome or Williams Syndrome: Empirical Evidence and Emerging Agendas

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Abstract

This chapter highlights the theoretical foundations that have guided research on mother–child interaction. It discusses the physical and behavioral characteristics of children with Down syndrome (DS) that influence their social interactions, then reviews research findings on mother–child interaction in these dyads. It discusses research conducted during the past decade since the review in the last Handbook of Mental Retardation (Marfo, Dedrick, & Barbour, 1998) and proposes an agenda for future research. The chapter also describes the behaviors and processes related to Williams syndrome that are likely to be relevant to mother–child interaction. It proposes a research agenda that both builds on and is distinct from that related to children with DS.

Keywords: Mother–child interaction, developmental disability, Down syndrome, Williams syndrome, social interaction

From a developmental systems perspective, the relational processes that occur between a mother and her young child are central to the child's cognitive and socioemotional development (Shonkoff & Phillips, 2000). A large body of research exists on mother–child interaction in dyads in which a child is developing typically. Such research emanates from several theoretical perspectives. In this chapter, we highlight the theoretical foundations that have guided research on mother–child interaction, and review research relevant to mother–child interaction in dyads in which a child has a specific genetically based disability, either Down syndrome (DS) or Williams syndrome (WS). We have selected to focus on these two syndromes because each has distinct behavioral phenotypes that contribute to patterns of strength and vulnerability in aspects of social interaction.

An understanding of how such patterns relate to mother–child interaction holds promise for service providers, as well as for scholars seeking to portray the full range of developmental patterns. As Hodapp and Burack (1990) contended, learning about typical development is advanced by the study of those with intellectual disabilities because developmental processes can be scrutinized to determine both necessary and sufficient behaviors for adaptive functioning. In this chapter, we discuss the physical and behavioral characteristics of children with DS that influence their social interactions, followed by a review of the research findings on mother–child interaction in these dyads. Research conducted during the past decade since the review in the last Handbook of Mental Retardation (Marfo, Dedrick, & Barbour, 1998) is discussed, and an agenda for future research is proposed. We also focus on WS, a rare genetically based disability, which has a growing research base that provides descriptive information about children's genotypic and phenotypic profiles. In that section, we describe the behaviors and processes related to WS that are likely to be relevant to mother–child interaction. We propose a research agenda that both builds on and is distinct from that related to children with DS. The similarities and contrasts between the profiles of children with each syndrome are informative for those who seek possible avenues of intervention. Mother–child interaction is a disability of genetic etiology.

Theoretical Perspectives on Interaction

The history of theoretical perspectives on child interaction has followed a course, with mother–child interaction being studied in developmental context criteria. Most perspectives on mother–child interaction focus on understanding the trajectory of the mother–child relationship that guides parental attention and deepens the theoretical perspective. Each of these perspectives is described in following sections.

Attachment Theory

Bowlby (1969/1982) originally described the attachment system as an interaction that occurs between a parent and a child. A securely attached child is able to soothe (Bowlby, 1969/1982) by remaining close to the child in situational contexts. The attachment system allows the parent to be present in the physical and emotional needs of the child (Bryant, 1985). Bowlby maintained that, through the attachment working model, the parent is able to form an action plan for future interaction and understand both the self and the other.

To investigate these models, several psychologists Strange Situation paradigm, Waters & Wall, 1978; approaches that classify children's insecurely attached children have focused on behaviors during episodes and more attention on behaviors of mothers' responsiveness, concept prompt, and appropriate their infants' cues, particularly in relation to children.
seek possible avenues of intervention for promoting optimal mother–child interactions when a child has a disability of genetic etiology.

**Theoretical Perspectives on Mother–Child Interaction**

The history of theoretical perspectives on mother–child interaction has followed its own developmental course, with mother–child interaction seen as a key developmental context critical for the healthy development of all children. Although the attachment between the mother and the infant serves as the core of most perspectives on mother–child interaction, an understanding of the transactive dimensions of the mother–child relationship and the cultural context that guides parenting behaviors broadens and deepens the theoretical and empirical base. Each of these perspectives is briefly reviewed in the following sections.

**Attachment Theory**

Bowlby (1969/1982) originally theorized that an attachment system was formed through infants' interactions with their mothers. Attachment behaviors are demonstrated when a young child who is frightened, sick, or stressed is then comforted when an attachment figure provides protection, help, and soothing (Bretherton, 1985). Knowing that the attachment figure is available and would be responsive to the child in situations of stress provides the child with a sense of security (Bowlby, 1969/1982). The attachment system also provides a crucial biological function; it protects the attached person from both physical and psychological harm (Bretherton, 1985). Bowlby (1969/1982) suggested that, through the attachment system, an internal working model is formed that guides the child's action in all future relationships and allows the child to understand both the self and others.

To investigate dimensions of attachment, developmental psychologists often have employed the Strange Situation paradigm (Ainsworth, Blehar, Waters, & Wall, 1978; Main & Solomon, 1990), which classifies children into either securely attached or insecurely attached categories. More recent studies, however, have focused less attention on children's behaviors during episodes of separation and reunion, and more attention on the sensitive and responsive behaviors of mothers. In particular, maternal responsiveness, conceptualized as the contingent, prompt, and appropriate reactions of mothers to their infants' cues, has been studied extensively in relation to children's developing competencies (Bornstein, 2006). The affective quality of maternal responsiveness includes maternal warmth and sensitivity and has been postulated to reflect the extent to which the mother expresses positive affect when she responds to her infant's needs and abilities (Bornstein & Tamis-LeMonda, 2001). Empirical evidence regarding mothers' sensitive and responsive behaviors indicates that these qualities are related to typically developing children's later cognitive and language competencies (Bornstein, Tamis-LeMonda, & Baumwell, 2001; Frankel & Bates, 1990; Landry, Smith, Swank, & Miller-Loncar, 2000; Pianta & Harbers, 1996) as well as for social competencies (Elicker, Englund, & Sroufe, 1992; Morrison, Rimm-Kaufman, & Pianta, 2003).

**Transactional Theory**

Researchers working from the basis of attachment theory tend to emphasize the importance of a mother's responses to her child, yet three decades ago Bell (1968) posited that the child's role in this dyadic interaction was an active and equally critical factor. Infants bring dispositional tendencies to the interaction and demonstrate these both in responses to mothers as well as when initiating interactive episodes. Much research, therefore, builds on the recognition of the bidirectional and transactive nature of mother–child interaction (Sameroff & MacKenzie, 2003). Derived from the developmental systems theory, those operating from the view of the transactional model posit that members of the dyad react to each other in a manner that mutually creates developmental pathways. Interactions within dyads have also been described in terms of their synchrony, where interaction within synchronistic dyads has been likened to an interactive dance (Barnard, Hammond, Booth, Bee, Mitchell, & Spiro, 1989). Such synchrony is "an observable pattern of dyadic interaction that is mutually regulated, reciprocal, and harmonious" (Harrist & Waugh, 2003, p. 557). From the perspective of the transactional model, if one partner is off beat or off tempo, the whole interaction may suffer. Thus, an asynchronistic pattern of interaction may have serious implications for children's development, resulting in an insecure attachment relationship (Isabella & Belsky, 1991) and deleterious child functioning (Sameroff & Rovine, 2000).

Consistent with the recognition of the transactional nature of the mother–child dyadic relationship, and stimulated by the co-constructivist model (Bruner, 1982; Vygotsky, 1978), many researchers have focused on how both members of the dyad...
engage the other toward shared or joint activity. According to Tomasello (1995), the dyadic interaction typical of mother–child interaction during the early months changes during the end of the first year to triadic interaction, in which the child and mother coordinate their attention to objects or other individuals. Aspects of shared activities involve the mother’s actions in supporting the child’s efforts, the child’s actions in viewing the mother’s responses, and the dual accommodations made by the mother and child during episodes of joint attention.

Derived from the work of Vygotsky (1978), the co-constructivist perspective emphasizes both the cognitive and emotional benefits that accrue in the young child through maternal efforts to understand and build on the child’s intentions. Emphasizing the cognitive benefits of mother–child co-construction, Heckhausen (1993) described how a toddler develops mastery of behavior—event contingencies through maternal scaffolding of the child’s attempts to attain a goal, such as nestling a series of cups. According to Heckhausen, children develop more positive cognitive trajectories if mothers understand the capabilities of the child and stretch those capabilities by providing “one step ahead” scaffolding.

The dyad also co-constructs knowledge through social referencing. Children use social referencing by taking cues from mothers’ emotional reactions in ambiguous or potentially fearful situations; children then use these cues to determine their own responses (Repacholi, 1998). In this way, children to some extent appropriate maternal emotional reactions, using the mother’s emotional state to judge the safety of a situation. By referencing back to his or her mother, the child develops an emotional foundation for dealing with novel situations, objects, and people.

Some researchers focus extensively on the role of joint attention during mother–child exchanges. The behaviors of both the mother and child that lead to moments of coordinated attention are considered. Legerstee and Weintraub (1997) proposed that joint attention occurs in a developmental sequence. During the first 6 months, infants tend to focus on either a person or an object when presented with both. A mother, however, advances this behavior toward shared activity by following the infant’s line of vision and commenting on what the infant sees. The infant in turn develops sufficient awareness to track the mother’s gaze (Corkum & Moore, 1998). Around 9–12 months of age, the child can intentionally attempt to coordinate his or her regard with that of another individual (e.g., the mother) on an object or another person (Bakeman & Adamson, 1984), resulting in triadic, rather than exclusively dyadic, interaction. Such joint attention between a child and mother to an object, individual, or action facilitates the child’s language acquisition, through, for example, learning appropriate language labels (Carpenter, Nagel, & Tomasello, 1998). Through joint attention, the mother maintains the child’s focus on the shared activity and, in doing so, limits the cognitive demands on the child, thus enabling the word and object (or activity) to be more easily associated with each other (Bruner, 1983). Despite similarities in the developmental sequence of joint attention across mother–child dyads, individual differences in child-caregiver episodes of joint attention are evident and have been found to predict children’s expressive language development (Markus, Mundy, Morales, Delgado, & Yale, 2000).

**Cultural Theory**

The mother–child transactional dyadic relationship occurs within a larger context that includes cultural values and ideologies about optimal mother–child interaction. Salmon (2000) delineated how transactions involving the mother–child dyad are related to genotype, phenotype, and environment (which they term “environotype”), with the latter including cultural codes of child rearing and family codes related to group belonging. Cultural psychologists (e.g., Harkness & Super, 1996; Rogoff, 2003) indicate that behaviors and actions on the part of mothers have roots in culturally sanctioned beliefs and values. Moreover, beliefs about the nature of developmental disability are often culturally based and lay the foundations for maternal actions, expectations, and interpretations of a child’s behavior (Fadiman, 1997; Garcia, Coll, & Magnuson, 2000). Although analyses of cultural codes are beyond the scope of this chapter, the larger framework that includes such codes is valuable to consider when interpreting the current research on mother–child interaction in dyads in which a child has a developmental disability.

**Down Syndrome**

**Down Syndrome: Mother–Child Attachment Research**

In a review of the socioemotional development of typically developing children, Thompson, Easterbrooks, and Padilla-Walker (2003) posit that individual differences in mother–child secure attachment relate to the child’s psychobiology, as well as to mothers’ sensitive responsiveness to the child. Down syndrome, a genetic disorder that affects up to 1 in 1,000 births, also displays phenotypic behaviors that may directly influence child attachment. For example, common among children with Down syndrome are congenital heart defects, congenital infections, which can limit engagement in sustained interactions, challenges among infants with Down syndrome in attachment acquisition, and the challenges of infants with Down syndrome in attachment. The lethargic quality may create a challenge for mothers in understanding and building on the child’s intentions during learning tasks. Mothers may also indirectly influence the relationship by requiring more time and energy to obtain information about their child’s vulnerability. Such suggestions suggest that the attachment may be different.

Amid speculations that a lack of phenotypic characteristics may lead to attachment difficulties, a study conducted at the University of Washington has revealed similar results. Important questions about typicality of maternal and child attachment, which have typically been used, especially in mature-rather than infancy-sample studies, have typically been used, especially in mature-rather than infancy-sample studies. In a meta-analysis of maternal and child attachment, van IJzendoorn and Sroufe (1992) analyzed studies of samples and typically developed studies of clinical samples from populations identified specifically utilizing the child’s characteristics and criteria (e.g., DS); parents of typically developing children (e.g., age typically used, especially in infancy-sample studies). The parents of typically developing children (e.g., age range 12–24 months) were considered “other-infant” and the children aged 12–24 months were considered “other-infant” and the children aged 12–24 months were considered “other-infant.”

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sensitive responsiveness to the child. Children with DS, a genetic disorder that affects cognitive development, also display phenotypic characteristics or behaviors that may directly influence the mother–child relationship. For example, health impairments common among children with DS include thyroid dysfunction, congenital heart defects, and ear infections, which can limit children’s energy to engage in sustained interactions. In addition, sleep problems, such as obstructive sleep apnea, are prevalent among infants with DS and contribute to frequent awakening and daytime sleepiness (American Academy of Pediatrics: Committee on Genetics, 2001). The lethargy quality of infant behavior may create a challenge for mothers to engage their children in interactions and sustain their children’s attention during learning tasks. Phenotypic behaviors may also indirectly influence the attachment relationship by requiring mothers to expend time and energy to obtain information and resources and by evoking expectations from mothers regarding their children’s vulnerability (Guralnick, 1998). Such associations suggest that secure mother–child attachment may be difficult to achieve.

Amid speculations that arise about the relation of phenotypic characteristics of children with DS to mother–child attachment, a few such studies have been conducted during the last decade. The studies have revealed similar results, but also have led to important questions about the validity of measures typically used, especially the Strange Situation (Ainsworth et al., 1978), when applied to children with DS and their mothers.

In a meta-analysis of the relative effects of maternal and child problems on the quality of attachment as evidenced by the Strange Situation, van IJzendoorn, Goldberg, Kroonenberg, and Frenkel (1992) analyzed studies of children from clinical samples and typically developing samples. The 34 studies of clinical samples included those drawn from populations identifying a child problem, specifically utilizing the child’s diagnosis as the identifying criteria (e.g., DS); populations identified by maternal problems (e.g., mental illness, maltreatment); and populations that were difficult to classify and were considered “other.” The data from typically developing children came from 21 samples with children aged 12–24 months; children in the clinical samples tended to be older, ranging in age from 12–50 months. Overall, the researchers found that the mother appeared to play a more important role than the child in shaping the quality of the infant–mother attachment relationship, as maternal problems increased the likelihood of an insecure attachment classification. Of the “child problem” group, only children with DS were found to be significantly overrepresented in one insecure attachment classification, the disorganized attachment category. Van IJzendoorn et al. (1992) suggested that the coding scheme utilized by the Strange Situation may not be valid for children with DS since the original classification scheme was constructed for a typically developing, middle-class population; therefore, the interpretation of the reaction of children with similar genetically based disabilities who show delayed or muted responses to social situations like the Strange Situation is not readily understood.

In an effort to test the validity of the Strange Situation as an assessment of attachment for children with DS, Vaughn, Goldberg, Atkinson, Macgregor, and Seifer (1994) investigated the attachment ratings of 138 children with DS taken from three independent studies. All of the children recruited to the three studies were in some form of early intervention services. Children ranged in chronological age (CA) from 24–54 months (developmental age of 10–36 months), from 12–36 months (developmental age from 8.5 months to 23.6 months), and from 21–37 months (average developmental age of 16.2 months) in the three studies, respectively. A comparative sample of 146 typically developing children was available from an independent study of infants and toddlers between 12 and 14 months of age (Vaughn, Lefer, Seifer, & Baglow, 1989). For this study, Vaughn et al. (1994) chose to categorize cases that might have been otherwise classified as insecure-disorganized as insecure-unclassifiable.

Although Vaughn et al. (1994) found that, overall, more children with DS were classified as insecurely attached in comparison to the typically developing group, they attributed this finding to the larger number of children with DS who were categorized as “unclassifiable” and insecure. The developmentally and chronologically younger children with DS were the most likely to be considered insecure-unclassifiable. When these insecure-unclassifiable cases were dropped from the analysis, Vaughn et al. (1994) found that the proportions of secure versus insecurely attached cases were no longer significantly different, and in fact a larger proportion of cases from the DS group were assigned to the secure classification than the typically developing group. They speculated that the Strange Situation itself may produce a lower level of stress.
reactions in children with DS as compared to typically developing children, as they noted that the children with DS rarely showed distress during the episodes of separation and reunion. Children with DS also did not seek to maintain contact in the reunion episodes, and even if they did seek proximity to the mother, they required little or no comforting. Vaughn et al. (1994) proposed that the Strange Situation may not provide sufficient attunement to the unique behavioral profile of children with DS and thus is not a valid measure of attachment quality for children with DS.

The results of a more recent study (Moore, Oates, Goodwin, & Hobson, 2008) add more evidence to the prior speculation that children with DS exhibit less intense emotional responsiveness than other children under situations of stress. Moore and colleagues investigated the responses of infants with DS when their mothers employed the Still-Face procedure of Tronick, Als, Adamson, Wise, and Brazelton (1978). During this procedure, mothers stop expressing positive emotions and maintain a neutral expression even when their infants attempt to elicit positive affect. Although typically developing infants usually display some form of dysregulation during the Still Face procedure, infants with DS were found to show significantly less fussing than their typical peers in both the still phase and the re-engagement phase.

In an effort to determine whether the lack of distress reactions in children with DS is related to attachment quality, Ganiban, Barnett, and Cicchetti (2000) investigated the relation of low versus high negative reactivity and attachment classification in 30 children with DS at 19 and 27 months of age (average Bayley Mental Developmental Index was 62 [SD = 13] at 19 months and 62 [SD = 12] at 24 months). As in prior studies, the researchers found a high frequency of insecure-disorganized type or insecure-unclassifiable attachments, specifically 30% of the children displayed this attachment pattern. Additionally, contrary to Vaughn et al.’s (1994) hypothesis, Ganiban et al. (2000) reported that low negative reactivity was not consistently related to insecure attachment classifications. Both high and low negative reactivity groups displayed increases in proximity seeking, contact maintenance, resistance, and avoidance during the course of the Strange Situation. The researchers posited that, in contrast to the speculations of Vaughn et al. (1994), the attachment system of children with DS is in fact being activated by the separations and reunions of the Strange Situation.

Ganiban et al. (2000) also found increasing levels of attachment insecure in the children with DS over the 8-month period from the time children were 19–27 months old. The researchers speculated that reciprocal synchronous interactions may be difficult to establish in these mother–child dyads. This may create a cumulative effect on the overall quality of the interaction over time, leading to higher rates of attachment insecurity as the children grow older. The researchers continued to question why an elevated rate of attachment insecurity occurs in children with DS and suggested that the attachment patterns described by Ainsworth et al. (1978) may actually be different for children with DS.

Atkinson et al. (1999) investigated the influence of child intellectual/adaptive functioning and maternal sensitivity, and their interaction, on attachment security. They examined 53 infants and toddlers with DS between the CAs of 14 and 30 months, with developmental ages of 12–23 months at first observation. Mothers and children were assessed four times at home and two times in the lab over a 2-year period. The researchers found a similar pattern to that reported in other investigations, with fewer children with DS displaying secure attachments (40%) and a higher proportion displaying unclassifiable (47%) attachment patterns in the Strange Situation at 26 months. The researchers maintained, however, that the unclassifiable group’s security status was unclear. They investigated whether characteristics of the child and mother were related to attachment security status and found that children with lower cognitive functioning were less likely to be classified as securely attached. They also found that maternal sensitivity, defined as the mother’s prompt and appropriate response to the child’s cues, was positively related to children’s security status. Thus, both maternal sensitivity and child cognitive performance predicted attachment security, where relatively high levels of both factors increased the probability of the child being classified as securely attached whereas low levels of either decreased that likelihood.

Researchers are still trying to explain the finding that children with DS are more likely than typically developing children to be classified as insecure-disorganized or as insecure-unclassifiable in relation to the attachment categories based on the Strange Situation. Some investigators have questioned the validity of this paradigm and classification system for studying mother–child relations in dyads in which a child has DS (e.g., Ganiban et al., 2000; van Ijzendoorn et al., 1992). Even if further research determines that the paradigm is studying attachment in this context, all findings from studies on attachment both the child and the mother relationship.

Investigating the overall dyadic mother–child dyad may be crucial for children with DS’s attachment, research with typically develop suggests that a relation exists between dyads and secure attachment (1991). Since dyadic synchrony of the child to the interactive characteristics of children health-related issues, low motorable preverbal cues (Hyche, Bal, 1992), may lead to asynchrony. Nevertheless, the mother relationship is likely to vary as children remain in the relationship of children with DS, and their bidirectional influences.

Down Syndrome: The Label Mother–Child Interaction
Early interactions between mothers and infants provide a vital context for later development (2000). Researchers have shown that the interactive behaviors between mothers and their typically developing children with DS during the first 2 years of life (Ciecielski, Vaughn, Stel Roach, Barratt, Miller, & Laanan, 2000). The importance of both the learning context is evident. Research has shown that a relation between mother and child functioning has been established (DS). Observations of maternal behaviors during interactions predicted higher functioning of children with DS (Hauser-Cram, Krauss, Upshur, & Sayer, 2010). The first 10 years of life and communication skills (Shonkoff, Krauss, Sayer, mother–child exchanges appear to be a significant factor for children with DS.

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also found increasing rates in the children with DS at 12 months as compared to the time children were 6 months of age. The researchers speculated that the high interaction rates may be due to the unique characteristics of the mother-child dyads, which are different from the typical interactions. They also suggested that the attachment security in the children with DS may be affected by the mother's behavior, with the children showing more security in children with DS compared to the control group. However, the researchers did not provide specific details on the methodological aspects of their study.

Investigating the overall dyadic synchrony of the mother-child dyad may be crucial to understanding children with DS's attachment classifications. In their study, the researchers found that the mother-child interaction was characterized by a higher proportion of secure (7%) attachment patterns compared to 26 months. The researchers noted that the unclassifiable status was low, indicating that the children with DS had a higher probability of being classified as securely attached. They also emphasized the importance of maternal sensitivity and appropriate prompts in shaping the interaction. The researchers concluded that the high levels of maternal sensitivity and responsive behaviors were crucial for the development of secure attachment in children with DS.
those developing typically mainly in the context of cognitive problem solving situations. As early as preschool, children with DS tend to show a dependence on adults when presented with challenging tasks. Kasari and Freeman (2001) presented children with DS aged 5–12 years with both solvable and unsolvable puzzles. They found that children with DS frequently used adults for help by looking at the experimenter’s face and puzzle during unsolvable tasks, but they did not make many verbal requests for help. Children with DS also took longer to start and complete all tasks compared to children with intellectual impairment of unknown etiology (MA 30–77 months) and typically developing children (MA 43–67 months). Similarly, Pita’airn and Wishart (1994) found that children aged 3–5 years with DS exhibited a high rate of nonverbal help-seeking during challenging tasks and attempted to engage the experimenter in activities, possibly as a means to evade completing the task. These findings suggest that young children with DS may require finely tuned support from their caregivers to develop the persistence and mastery skills necessary to complete problem-solving tasks.

In a detailed review of mother–child interaction, Marfo, Dedrick, and Barbour (1998) analyzed a series of studies that suggested that mothers tend to be highly directive with their children with intellectual disabilities. They emphasized that although maternal directives have been considered to be intrusive (e.g., Cienciala, DuBow, Vaughan & Seifer, 1995), many such directives may instead be purposeful and adaptive, especially in dyads in which children display inappropriate use of objects or noncompliant behavior. Roach, Barrass, Miller, and Leavitt (1998) examined mother–child interactions among 28 toddlers with DS aged 11–30 months with a developmental age of 10–17 months. Comparison groups of typically developing children were matched on chronological or developmental age. Roach et al. found that mothers of all three groups were contingently responsive to their children’s behavioral signals, but that mothers of children with DS engaged in more directive behaviors than did mothers of children in the other two groups. Roach et al. reported that mothers of children with DS also used more supportive behaviors (e.g., vocal praise or scaffolding by holding an object) and that directives (e.g., “Find the red one”) were often embedded within a series of supportive behaviors. Therefore, the behavioral context of directives deserves consideration, as does their role in structured as opposed to unstructured situations (Marfo et al., 1998). Marfo (1990) posited that directives are multidimensional and require examination within a broader view of maternal adaptation. Such a perspective is necessary as we develop a deeper understanding of the challenges posed by children with DS during shared activities with their mothers.

**Down Syndrome: The Influence of Behavioral Phenotypes on Shared Activity**

Children with DS demonstrate behavioral profiles that create significant challenges for mothers as they help their toddlers explore the environment and learn to communicate effectively. Although eye contact between the child and caregiver occurs at a later age for children with DS, the general sequence of gaze development appears to be similar (Carvajal & Iglesias, 2002). Nevertheless, in confirmation of earlier research (e.g., Kasari, Mundy, Yirmiya, & Sigman, 1990), Carvajal and Iglesias (2000) have documented that infants with DS (aged 3.2–13.6 months) in comparison to typically developing children of the same age generally display longer gazes to their social partners, although patterns of the two groups are similar in considering the relation between looking and smiling. Researchers studying the movement from face-to-face interaction to triadic interaction point to areas of specific difficulty for the toddler with DS. In a comparison of children with DS to children developing typically matched on MA (from 6 to 20 months MA), Legerstee and Fisher (2008) found that children with DS displayed less coordinated attention (e.g., gaze from an object attended to by both the child and the mother, toward the mother’s face, back to the object) until the MA of 20 months. Children with DS, similar to typically developing children, also began to use declarative pointing (i.e., communicating to share an interesting aspect of an object) after the onset of coordinated attention, although they showed lower levels of such pointing.

Children with DS, however, did not vary from their MA-matched peers in their use of imperative pointing (i.e., communicating to obtain an object) which, Legerstee and Fisher contend, is not as closely linked with children’s understanding of the mental states of others as is declarative pointing.

In a study of children's attention to novel objects, Brown, Johnson, Paterson, Gilmore, Longhi, and Karmiloff-Smith (2003) reported that infants with DS aged 24–37 months (12–21 months developmental age) exhibited fewer and shorter periods of sustained attention toward such objects compared to children matched for either age.

Toddler with DS also show difficulty shifting at object, thereby delaying coordinated joint attention. It is not yet determined whether this reflects a joint preference for social activity by Kasari and Freeman (2001) shifts the information processing abilities of children with DS (Tomasello & Farrar, 1986).

Observations of mothers and infants with DS have revealed that mothers differ in ways to accommodate the child’s attentional difficulties (Hart, 1996). For example, during observation of mothers with DS (aged 12–41 months), Han reported that some mothers respond to sustained attention by requesting and providing objects and making comments to the child’s interest. Other mothers, however, gazed at an object that appear not to be in the child’s interest. Toddlers who are engaged in shared attention with the selected object by gestural and verbal language skills 12 to 30 months, tended to whose mothers a child’s attention was divided in the joint attention. Legerstee reported that, in their study of toddlers with DS (n = 16 months), comparing children of the same age, the child’s attention was divided in the joint attention. Children with DS supported their child's interest by repeating the infant's ability to attend and respond to the object. Nevertheless, infants with DS who were engaged in shared attention with the selected object by gestural and verbal language skills 12 to 30 months, tended to whose mothers a child’s attention was divided in the joint attention. Legerstee reported that, in their study of toddlers with DS (n = 16 months), comparing children of the same age, the child’s attention was divided in the joint attention.

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Observations of mothers and infants with DS have revealed that mothers differ in ways to accommodate the child’s attentional difficulties (Hart, 1996). For example, during observation of mothers with DS (aged 12–41 months), Han reported that some mothers respond to sustained attention by requesting and providing objects and making comments to the child’s interest. Other mothers, however, gazed at an object that appear not to be in the child’s interest. Toddlers who are engaged in shared attention with the selected object by gestural and verbal language skills 12 to 30 months, tended to whose mothers a child’s attention was divided in the joint attention. Legerstee reported that, in their study of toddlers with DS (n = 16 months), comparing children of the same age, the child’s attention was divided in the joint attention. Children with DS supported their child's interest by repeating the infant's ability to attend and respond to the object. Nevertheless, infants with DS who were engaged in shared attention with the selected object by gestural and verbal language skills 12 to 30 months, tended to whose mothers a child’s attention was divided in the joint attention.
posed that directives require examination maternal adaptation, as we develop the challenges posed by tasks activities with their children matched for either CA or developmental age. Toddlers with DS also showed less interest in playing with objects and more interest in engaging in play with people (Carvalj & Iglesias, 2000; Kasari, Mundy, Yirmiya, & Sigman, 1990; Landry & Chapiński, 1990). Legerstee, Varghese, and van Beek (2002) found that toddlers with DS had particular difficulty shifting attention from person to object, thereby delaying the development of coordinated joint attention. Researchers have not yet determined whether this difficulty relates to an innate preference for social activities, as suggested by Kasari and Freeman (2001) or whether such shifts challenge the information processing capabilities of children with DS, as postulated by Tomasello and Farrar (1986).

Observations of mothers and their children with DS have revealed that mothers alter their behavior in different ways to accommodate their child's attentional difficulties (Harris, Kasari, & Sigman, 1996). For example, during an unstructured play observation of mothers with their toddlers with DS (aged 12–41 months), Harris et al. (1996) found that some mothers responded to their child's lack of sustained attention by redirecting the child to maternally selected objects in an effort to engage the child's interest. Other mothers followed their child's gaze to an object that appeared to catch their infant's attention and then successfully sustained their child's attention by animating the object and talking about it. Toddlers whose mothers engaged in shared attention with their child on an object selected by the child were found to have higher receptive language skills 13 months later compared to those whose mothers attempted to redirect the child's attention to an object that the caregiver selected (Harris et al., 1996). These findings raise important questions about the timing of maternal redirection of children's gaze in efforts to facilitate joint attention. Legerstee and Weintraub (1997) reported that, in their study of two groups of infants and toddlers with DS (mean MA of 8.6 months and 16.5 months), compared to typically developing children of the same MAs, those with DS displayed less play with objects and less coordinated attention. When mothers of children with DS supported their children's efforts to interact with an object by integrating it into social play and by repeating patterns of play, they facilitated the infant's ability to attend alternatively to object and to mother. Nevertheless, even with such support, infants with DS showed lower amounts of coordinated joint attention.

The degree of support that mothers provide to their infants is related to the developmental skills of the infant. Legerstee et al. (2002) found similarities in the type of strategies used by mothers of children (both typically developing and DS) based on the child's developmental age (mean MAs of 8.6 months or 16.5 months). During interactions with children of toddler MA, mothers were more likely to use strategies to maintain their children's attention to an object, attempting to engage their children in coordinated attention. In contrast, mothers of children with MAs below 1 year attempted to redirect the attention of their children but often followed that redirection by using behaviors to maintain the children's attention. Although redirection alone appeared to suppress the referential behaviors necessary for joint attention, the subsequent maintaining behaviors supported joint attention. This finding suggests that mothers of children with DS, like mothers of typically developing children, adjust their supportive strategies to match their child's developmental competence and provide scaffolding to foster their child's attentional skills.

Children are often in situations that involve more than one potential interactive partner, and some research has indicated that such situations pose challenges for preschoolers with DS. In a study in which preschoolers with and without DS reacted to a novel object, O'Neil and Happe (2000) found that children with DS (mean age 45 months) in comparison to peers (mean age 22 months) and to children with autism (mean age 55 months) directed behavior to their mothers less often than typically developing children (and similar to children with autism) in the presence of both a toy and an experimenter. O'Neil and Happe (2000) interpreted these findings as indicative of the challenges encountered by children with DS during triadic interactions when two possible partners are present. This interpretation again points to the difficulty that children with DS have making attentional shifts.

Social referencing, another aspect of shared activity, contrasts with coordinated joint attention because it occurs in situations that are ambiguous for the child (e.g., is this novel a threat or amusing?) and occurs for the purpose of information seeking rather than information sharing (Kasari, Freeman, Mundy, & Sigman, 1995). Some differences in social referencing patterns of children with DS have been noted. When presented with a mechanical robot, toddlers with DS (aged 13–42 months) shifted their attention less from a person (either the parent or experimenter) to an object than did children in the comparison group.
group (composed of typically developing children of similar MA, 9–27 months) (Kasari et al., 1995). Kasari et al. speculated that children with DS have more difficulty cognitively appraising the ambiguous situation than do typically developing children. Koenps, Walden, and Baxter (1994), however, found that toddlers with DS engaged in referential looking when ambiguous novel objects were presented to them (e.g., remote-controlled mechanical toys), but the toddlers’ affective responses to the toys frequently did not match the affective responses displayed by mothers. This finding further supports the hypothesis that toddlers with DS have difficulty regulating their attention from person to object and may not attend or encode social information provided by mothers as efficiently as do typically developing children. In turn, mothers of children with DS may have greater difficulty interpreting and responding to their children’s affective expressions when they do not match the ongoing situation. Consequently, mothers may experience challenges in teaching their children with DS about novel objects.

**Williams Syndrome**

**Williams Syndrome: Research Relevant to Dyadic Interaction**

Williams syndrome is a rare genetic disorder that affects children’s cognitive and social development. The cognitive phenotype is characterized by an uneven profile of skills, such as lower problem solving, planning, spatial, and numerical processing skills (Bellugi, Lichtenberger, Jones, Lai, & S. George, 2000) with perceptual functioning more impaired than memory function (Einfeld, 2005) and higher verbal ability relative to perceptual functioning (Tager-Flusberg & Sullivan, 2000). Children with WS present with a unique personality style, often considered to be hyper-sociable (Doyle, Bellugi, Korenberg, & Graham, 2004; Jones et al., 2000), as well as shy, tense, sensitive, empathic, gregarious and people-oriented compared to children with intellectual disabilities from mixed etiologies (Järvinen-Pasley Bellugi, Reilly, Mills, Galaburda, Reiss, & Korenberg, 2008; Klein-Tasman & Mervis, 2003).

Based on this profile, one might expect that dyadic interactions between mothers and children with WS would benefit from such social tendencies. A complex understanding of WS has been achieved in regard to the strengths that children with WS have in facial recognition and expressive language acquisition relative to their other cognitive skills. Patterns of behaviors in both of these domains have implications for mother–child interaction.

First, in relation to the interest in faces and the facial recognition skills displayed by children with WS, research has primarily been conducted in laboratory settings. The result (e.g., Bellugi, Wang, & Jerr Heiburn, Most, Philofsky, & Doherty, Rourie, & Bellugi, that despite impairments in and in general cognitive perf with WS show typical perform nction tasks. That skill does no aspects of facial recognition labeling of facial expressions. WS also show difficulty in expressions and in using this social decisions (Fidler et al. a focused on labeling facial en Faja, Schofield, Verbalis, and compared children and at 12–32 years) to those with as to those with typi found that individuals with intellectual disabilities (ma language performance) ha than age-matched individu prison group in identify Children and adults in all were able to accurately . Thus, the skills that child recog of faces and seem to benefit the family posibly the mother–child child’s accurate recog create a synergy of positive

In addition to intact children with WS, in comm tend to gaze more at faces positive context for inter and mothers but also coul in situations it also present. Jones et al. with WS (mean age of 18 to their typically develop reported that children w at the experimenter’s fao performing the task at warm-up tasks and cu (2003) reported two toddler children with WS, in the same age group (71) significantly more time a stranger. These findings predisposition toward predisposition can eal also is likely to interfe the joint attention that...
A decade's work has provided the cognitive load of DS during mother–child interactions are foundational aspects of social competence of all individuals with DS. Obtaining a better understanding of the delays or difficulties children demonstrate when shifting from conversational situations involving triadic social exchanges to those involving dyadic ones has been a focus of research. From future research that targets the identification of mothers of children with DS in making attention to the development of interactions characterized by attention and warmth known to be vital to the mother–child relationship.

Research Relevant toDS

DS is a genetic disorder that affects cognitive and social development. The DS phenotype is characterized by increased body length and weight, midline abnormalities, and craniofacial features. The core features of DS are typically seen in adults, but some features may be more apparent in children with DS. Children with DS have unique personality style, social competence, and emotional development, which can have a significant impact on their interactions with others.

In laboratory settings, the results of several studies (e.g., Bellugi, Wang, & Jernigan, 1994; Fidler, Hepburn, Most, Philofsky, & Rogers, 2007; Wang, Doehring, Rourke, & Bellugi, 1995) have indicated that, despite impairments in visual–spatial skills and general cognitive performance, individuals with DS show typical performance on tasks of visual recognition tasks. This skill does not extend to all aspects of visual recognition, such as emotional labeling of visual expressions. Young children with DS also show difficulty interpreting emotional expressions and using this information to make social decisions (Fidler et al., 2007). In a study focused on labeling facial emotions, Pessa-Skwerer, Faja, Schofield, Verbalis, and Tager-Flusberg (2006) compared children and adults with DS (ages 12–32 years) to those with intellectual disabilities, as well as to those with typical development. They found that individuals with DS and adults with intellectual disabilities (matched for age, IQ, and language performance) had poorer performance than age-matched individuals in the typical comparison group in identifying negative emotions. Children and adults in all three groups, however, were able to accurately label positive emotions. Thus, the skills that children with DS have in the recognition of faces and positive emotions would seem to benefit the family system as a whole and possibly the mother–child dyad in particular. The child's accurate recognition of positive emotions may create a synergy of positive bidirectional effects.

In addition to intact facial recognition skills, children with DS, in comparison to other children, tend to gaze more at faces, which might establish a positive context for interactions between children and mothers but also could interfere with that relationship in situations in which other individuals are present. Jones et al. (2000) studied children with DS (mean age of 18.5 months) in comparison to their typically developing same-aged peers and reported that children with DS “looked excessively at the experimenter’s face, often at the expense of performing the task at hand” (p. 39) during both warm-up tasks and cognitive testing. Mervis et al. (2003) reported two studies in which infants and toddlers with DS, in comparison to those of the same age developing typically, were found to spend significantly more time looking at their mothers or a stranger. These findings suggest an innate predisposition toward social interaction. Such a predisposition can enhance dyadic interaction but is also likely to interfere with the development of the joint attention that occurs in triadic interactions between mother, infant, and objects (Doyle et al., 2004; Laing et al., 2002). In an extensive review, Järvene-Pasley and colleagues (2008) summarized research that indicates that children with DS spend more time looking at a novel adult than at their parent when involved in triadic situations. As a result, they often turn triadic interactions into dyadic ones by attempting to “hook” the engagement of the novel adult. Therefore, joint attention with a parent and object can readily become interrupted by the child's predilection to focus on novel persons, with a concomitant lack of attention to the parent or the object selected. Although the effects of such actions have not been fully investigated, it is probable that such behaviors reduce the child's ability to learn language skills through dyadic interaction with a parent as well as to learn about the properties of objects.

The long gazes toward people displayed by children with William syndrome may also indicate a slower rate of processing information about faces. Mobbs, Garrett, Menon, Rose, Bellugi, and Reiss (2004) studied the performance of 11 adults with DS in comparison to other similar-aged adults on following facial processing. They found that those with DS were less accurate in determining the direction of gaze and had longer response latencies, as well as a different pattern of cortical activation. Thus, longer gazes during the infant and toddler years may relate to the need for increased time to process facial features.

Another interpretation of the long gazes displayed by infants and toddlers with DS is that they are due to difficulties in disengaging attentional focus. Brown et al. (2003) found that infants and toddlers (ages 23–37 months) with DS in comparison to those with DS, as well as with those with similar CA's or similar developmental ages (12–21 months), had difficulty with disengagement from the stimulus. It is possible that mothers (and other caregivers) attribute such fixation on faces as indicative of interest in social interaction. Alternatively, the attentional focus on faces may challenge maternal efforts to engage her child in joint attention toward objects outside the mother–child dyad.

The highly social tendencies of children with DS might be expected to assist such children in the development of friendships, but it appears that they have difficulty developing and maintaining friendships (Gosh & Pankau, 1994; Udwin & Yule, 1991). A potential reason for such difficulties derives from the proposal by Tager-Flusberg and Sullivan (2000) that the acquisition of theory of
mind (i.e., social knowledge) is comprised of two components, and children with WS show a weakness in one of these components. Such children are relatively successful with the social-perceptual component, which involves the perception of people and evaluation of their affective (especially positive) states. This claim is supported by studies indicating that children with WS express high levels of empathy (Tager-Flusberg & Sullivan, 2000) and abnormally positive ratings of the approachability of human faces (Bellugi, Adolphs, Cassady, & Chiles, 1999). Thus, success in the social-perceptual component underlies children's tendencies to readily attempt to engage others. In contrast, children with WS appear to be much less successful with the social-cognitive components of social knowledge, which involves understanding the representational aspects of mind (Fidler et al., 2007; Järvinen-Pasley et al., 2008; Tager-Flusberg & Sullivan, 2000); representational understanding is crucial for recognizing the intentions of others, a necessary skill for friendship maintenance.

Researchers have also focused on another domain of development—expressive language—which, similarly to facial recognition, has been associated with an area of relative strength for children with WS. Although children with WS show delays of 24 months in vocabulary acquisition during early childhood (at levels similar to those of children with DS), they improve rapidly and display a relative strength in language skills (in relation to spatial skills) by school age. Bellugi, Lichtenberger, Jones, Lal, and St. George (2000) described children with WS as “talkative to the point of being loquacious” (p. 11) and indicated that they have a proclivity for understanding and using vocabulary that is unusual (e.g., “canine, abrasive, solemn,” p. 14) given their general cognitive functioning. Various studies have found that adolescents with WS use unusual vocabulary and social evaluative devices to enrich narrative content (e.g., “He was so sad”) as well as vocal prosody (e.g., pitch changes) when telling a story. They also found that even during middle childhood, individuals with WS tend to use social engagement devices to attract the listener (“Lo and behold . . .”) (Järvinen-Pasley et al., 2008; Jones et al., 2000). Although children with WS appear to have strengths in the use of social evaluative language, they show deficits in pragmatic language skills, such as appropriate initiation of topics (LaCroix, Bernicot, & Reilly, 2007). Moreover, the quality of their conversations suggests a lack of understanding of the perspective of their conversational partners (LaCroix, Bernicot, & Reilly, 2007).

Children with WS display an unusual sequence in the use of gestures and language, and this sequence raises questions about the essential role of mother-child joint attention in language development (Laing et al., 2002). In typically developing children, as in children with DS, speech production follows the use of specific gestures, such as pointing, yet the opposite sequence has been found to occur for children with WS (Mervis, Morris, Bertrand, & Robinson, 1999). Unlike other children, it appears that, in children with WS, aspects of joint attention, such as referential gestures, occur only after vocabulary is well developed (Laing et al., 2002). Mervis and Bertrand (1997) posited that this developmental sequence may partially reflect the visual–spatial deficits of children with WS, since pointing requires rudimentary spatial skills. Nevertheless, the unusual sequencing of the acquisition of verbal expression before referential gestures in children with WS is puzzling and deserves extensive research. It raises questions about the role of joint attention and perspective taking in the overall development of children with WS.

**Williams Syndrome: Studies on Mother–Child Interaction**

The studies reviewed in this section illustrate points of entry into investigations of dyadic interactions of mothers of children with WS. Researchers in the first study consider children's reactions during separation from the parent, and those in the second study focus on maternal directives. The results of each study are suggestive of areas of future investigation.

Jones et al. (2000) used a parent separation task to examine attachment styles among children with WS aged 15–58 months, matched on CA and gender to one comparison group and on developmental age and gender to a second group of comparison children (mean MA of 18.5 months). They found that the children with WS exhibited negative facial expressions less frequently, and showed less intense vocal and facial distress as their parents left the room in comparison to both groups. Upon being reunited with their parents, the children re-engaged in play and needed less consoling than did their typically developing peers. Similar to speculations about the behavior of children with DS during separations, these findings suggest either that signals of distress might be muted and less readable in such children, or that situations of separation are not as stressful for children with WS as they are for typically developing children. Future studies may help to determine the interpretation of these findings.

Ly and Hodapp (2005) examined parental effectiveness in parent interactions with children with Williams syndrome. In a comparison of children with Williams syndrome and children with Prader-Willi syndrome, children engaged in more direct or social interactions in visual–spatial tasks such as making 3D puzzles, and the children with Williams syndrome were more likely to engage in more direct or social interactions. Parental engagement in a more direct or social interaction with children with Williams syndrome was associated with better behavior and socialization outcomes. Nevertheless, the findings of this study suggest that parental engagement in more direct or social interaction with children with Williams syndrome may be associated with better behavior and socialization outcomes.

**Williams Syndrome: An Investigation of Mother–Child Interactions**

Despite having intellectual disabilities, children with Williams syndrome tend to have higher social and emotional development, which in turn has led to increased social interactions with caregivers. Such interactions are often observed in the form of whether the child is engaging in a shared activity with a caregiver, or if the child is engaging in a socially oriented activity with their peers. Research has shown that children with Williams syndrome tend to engage in more social interactions with caregivers, which in turn has been linked to increased socialization. Additionally, joint attention is an important component of social interactions, and children with Williams syndrome tend to engage in more joint attention with caregivers, which in turn has been linked to increased socialization. Overall, interactions between caregivers and children with Williams syndrome tend to be more social and less directive.
Ly and Hodapp (2005) examined the role of directives in parent interactions with children with WS. In a comparison of children with WS to children with Prader-Willi syndrome, parents (primarily mothers) and children were observed during a puzzle completion task. Contrasts were expected as children with WS tend to exhibit relative weaknesses in visual–spatial tasks such as puzzles, whereas children with Prader-Willi syndrome have relative strengths in this domain. Parents of children with WS engaged in a more directive style of interaction, and provided more help and reinforcement, although within both groups, parents provided more directives to children with lower puzzle skills. Ly and Hodapp (2005) reasoned that parents of children with WS may have provided more helping behaviors and reinforcement as strategies to engage the child in an area of perceived weakness. They speculated that these findings illustrate not only the direct effects of a syndrome on a child’s behavior and parents’ perceptions of their child’s competence, but also the indirect effect of etiology on children’s behaviors through parental attributions.

Williams Syndrome: An Agenda for Research on Mother–Child Interaction

Despite having intellectual disabilities, children with WS tend to have patterns of relative strengths in areas that have implications for mother–child interaction. Such strengths might be enhanced or diminished through interactions with caregivers, and research is needed to determine the extent to which this occurs, as well as to delineate the process by which this occurs. For example, the role of maternal directives and the situations in which such directives appear to be beneficial to the development of children with WS deserves careful attention. Additionally, investigations on the avenues to joint attention between children with WS and their caregivers are likely to yield information about the role of shared activities in children’s developmental trajectories. How does such activity serve to enhance the development of children with WS? What types of scaffolding or instructional strategies are used by parents, and in what contexts is this most beneficial for learning? Do children with WS display attentional disengagement difficulties in a variety of situations, or only within certain contexts? What interventions can occur to assist children with WS with such disengagement?

In relation to attachment research, the same questions about the validity of the Strange Situation paradigm are likely to emerge for children with WS as they have for children with DS. Other approaches to measuring attachment have been developed. In particular, the Q-sort relies on ratings of mothers’ interactions with children when asked to attend to a task not involving the child (Pederson & Moran, 1996). This may provide a more ecologically valid approach than the Strange Situation in measuring the attachment of mothers and children with WS. Because of their relevance to application, the qualities that mothers bring to the interaction, especially warmth and sensitive responsiveness, deserve to be further studied in relation to predicting the development of children with WS. Research that also captures the child’s contributions to the interaction and the transactional waves of interaction would advance understanding of mutually adaptive dyads (Sameroff & MacKenzie, 2003). Finally, examination of how mothers advance a child’s development through scaffolding and other forms of cognitive and socioemotional growth promotion would contribute to an understanding of potential sources of intervention support for mothers and their children with WS.

Research on Mother–Child Interaction: Neglected Avenues and Future Paths

Consideration of the research literature reviewed in this chapter reveals several prominent themes that deserve more attention. Mothers are not the only caregivers of young children, and the extent to which knowledge about mother–child interactions is relevant to other caregiver–child interactions needs careful investigation. Although in this chapter we have focused on research involving mothers and their children, a few studies have also been conducted with fathers. For example, in a comparison of both mothers and fathers of toddlers with DS, cleft lip and/or palate and typically developing children, Pelchat, Bisson, Bois, and Saucier (2003) found that the child’s type of disability predicted variance in sensitivity only for fathers of children with DS. Even less studied than father–child interaction is the three-way interactions that frequently take place involving mother, father, and child. A promising model for studying such complexity has been suggested by Frascarolo et al. (Frascarolo, Favez, Carneiro, & Fivaz-Depeursinge, 2004). This model includes an analysis of the functions necessary to co-construct three-way play episodes, including participation of all parties, organization of roles, focalization of attention, and affective contact.

A second prominent concern regarding the research base on mother–child interaction in families
in which a child has a disability is the chasm created between the knowledge we have and that which we need to acquire about a range of families with diverse backgrounds, cultural codes, and beliefs about parenting a child with a disability. Most research has focused on white middle-income families, making generalizations to other families questionable. Indeed, data from the National Early Intervention Longitudinal Study (Hebbeler, Spiker, Mallik, Scarborough, & Simeonsson, 2004) indicates that, in the United States, only 53% of children entering early intervention services are Caucasian. The ethnic and cultural codes related to parenting practices vary considerably based on parents' perceptions of developmental disabilities (Garcia Coll & Magnusson, 2000), parenting ethno-theories (Harkness & Super, 1996), and the role of spirituality or religiosity in the family (Raghavan, Weisner, & Patel, 1999; Rogers-Dulan & Blacher, 1995). Much research is needed that focuses on the wide range of families, including single-parent families, extended families, and blended families who have children with developmental disabilities.

Finally, during the last two decades research has certainly moved from the laboratory to the settings in which children actually learn and grow. Although studies on children with disabilities have followed this trend, a gap still exists in our knowledge base about the interactional styles of children and their caregivers in a range of normative environments. From an ecological perspective (Bronfenbrenner, 1986), policies, programs, and practices at federal, state, and community levels affect families and ultimately influence the opportunities and settings available to parents. Such broad maps are rarely captured in research studies, yet those operating from the perspective of developmental systems models highlight the multifaceted context within which caregiver–child interactions occur (Guralnick, 2005).

Future research on mother–child interaction will develop based on the theoretical perspectives of the researchers and on trends in the general field of developmental psychology. A central developmental principle that guides the field is that the proximal relationship between children and their caregivers is central to children's development. If that principle is valid, it should hold for children with biologically based syndromes. Indeed, the research on children with DS suggests that although some dyads may experience difficulties, most children are well attached to their mothers and derive developmental benefits from warm and sensitive interactions. Fundamental research needs to occur to understand the extent to which interactions among dyads in which a child has WS operate according to the same principles as those of other dyads.

Research on children with either DS or WS would benefit from more knowledge of the role that shared activity between a child and caregiver plays in the development of language, cognitive, and social skills. Further studies may help illuminate the importance of joint attention for the later language and cognitive development of children with DS and WS, and whether such children develop a means of self-regulation through social referencing or through other processes. This research is important not only for its potential to advance the development of children with DS or WS, but also for its contribution to the understanding of the full range of human development. By studying children with biologically based disabilities like DS and WS, we gain an understanding of the role of essential processes, such as attachment, but we also learn about the potential of alternative pathways to development, such as the role of gestures to speech production. Investigations of mother–child interaction provide an important avenue to such understanding.

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needs to occur to understand interactions among dyads in order to elaborate according to the same parameters.

When a child is with either DS or WS, knowledge of the role that the child and caregiver play in language, cognitive, and social development may help illuminate the interaction for the latter language development of children with DS and WS. Children develop a means of social referencing or through other research important not only for the advancement of social development itself, but also for its contributions to the full range of human development. Learning with biological kin or friends of DS and WS, we gain an appreciation of essential processes, and: we also learn about the pathways to development, and to speech production.

Child–child interaction provides such understanding.


