
Qualities of Caregiver–Child Interaction During Daily Activities of Children Born Very Low Birth Weight With and Without White Matter Disorder

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OBJECTIVE. The purpose of this study was to examine qualities of caregiver–child interactions during daily activities of healthy children born full-term and of children born prematurely and very low birth weight with and without white matter disorder.

METHOD. Three groups of 12 caregiver–child dyads, representing three levels of child biological risk, were matched on birth history, maternal education, ethnicity, and child gender. Ten expert clinicians used videotapes to rate behaviors of caregivers and their 30-month-old children engaging in dressing and snack activities. Correlations between ratings of three qualities were examined: caregiver directiveness, caregiver engagement, and child engagement.

RESULTS. There were no significant differences between groups for the average caregiver and child ratings. However, correlations between caregiver directiveness and caregiver engagement ranged across the three groups from greatest to least biological risk (i.e., $r = .63, .35, -.67$, respectively). In the full-term group, correlations between the caregiver qualities of directiveness and engagement and child engagement were $r = .62$ and $-.69$, respectively. In contrast, the correlations between the caregiver and child qualities were small in the two very-low-birth-weight groups.

CONCLUSION. Results suggest patterns of caregiver interactions during daily activities may vary according to the child's level of biological risk. Caregivers of children with the greatest risk (i.e., white matter disorder) were both engaging and directive of their children during the activities, whereas caregivers of full-term children were less engaging when directive. The findings suggest that caregivers may be adjusting the level of their social and emotional assistance during caregiver–child interactions to the level of their children's abilities.

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Children born prematurely and very low birth weight (< 1500 gm birth weight) with white matter disorder are at risk for developmental delays as a result of shorter gestational age and accompanying medical conditions (Lorenz, Wooliever, Jetton, & Paneth, 1998; Melhem et al., 2000; Thompson et al., 1997). Children with white matter disorder are typically identified in the perinatal period using serial ultrasounds or 3-dimensional magnetic resonance imaging, which identify the presence of intraventricular hemorrhage or periventricular leukomalacia (Holling & Leviton, 1999). Evidence links white matter disorder with subsequent increased physical impairments on neurological assessments and standardized measures, and suggests that these children and their caregivers face increased challenges in their daily lives (Pinto-Martin, Whitaker, Feldman, Van Rossem, & Paneth, 1999; Thompson et al., 1997).

Daily activities are the architecture of everyday life in which adult–child interaction is embedded. Occupational therapists are often a part of the support system that assists families of children with developmental delays to enable optimal participation in daily activities (Coster, 1998; Kellegrew, 1998, 2000; Primeau & Ferguson, 1999). However, our understanding of how caregivers adapt their routines

and interactions to facilitate their children's participation is limited. Many studies have described the subtleties of caregiver-child interactions, with emphasis on caregiver responsiveness, sensitivity, and directiveness to children's behavior (Hauser-Cram, Warfield, Shonkoff, & Krauss, 2001; Landry, Smith, Miller-Loncar, & Swank, 1998; Mahoney, Boyce, Fewell, Spiker, & Wheeden, 1998; Smith, Swank et al., 1996). Although some studies of children born very low birth weight with biological and medical risks report observations of children and caregivers while engaged in daily activities, the nature of these activities has not been specified (Landry et al.; Smith, Swank et al.). Thus, the extent to which these interactions may be affected by the nature of the activities or tasks themselves is unclear. Parent-child transactions and the activities in which they engage are dynamic, complex, and may shift rapidly, making it difficult to reliably identify relevant behaviors. Video methods offer a solution to the challenge of coding behaviors in vivo (as they occur) by capturing real time interactions within the context of activities and preserving them for subsequent analysis.

The purpose of this study was to examine caregiver-child interaction qualities associated with activities representative of daily routines by children born premature and very low birth weight with and without white matter disorder as well as children born full-term and healthy. Video methods were employed as a means to examine the qualitative aspects of interactions between caregivers and children with varying risk factors using a behavioral rating system. This paper presents one of two studies designed to describe caregiver and child interaction behaviors while dyads were participating in dressing and eating activities. The second study focused on the description of caregiver assistance and child performance during these two activities and is reported elsewhere (Kadlec, 2003).

Caregiver-Child Interactions

Particular qualities of caregiver behaviors are associated with developmental outcomes of children born prematurely with very low birth weight and with intraventricular hemorrhage. In a study by Moore, Saylor, and Boyce (1998), caregivers and their 2-year-old preterm children were videotaped during a play session and the amount, quality, and appropriateness of the caregivers' responsiveness and directiveness were measured. When caregiver responsiveness and directiveness were of superior quality and appropriateness, the children scored higher on measures of intelligence at 5 years of age (Moore et al.). Qualitative aspects of the children's behaviors were not measured during this study; however, similar findings were reported in two intervention

studies. Maternal responsiveness predicted approximately a 10-month advantage in communication skills for children with developmental delays and motor impairments, and improved cognitive skills for children born low birth weight, respectively, as reported in a longitudinal study of children and families receiving early intervention services (Hauser-Cram et al., 2001; Mahoney et al., 1998). Scores on cognitive and language measures have also been related to the frequency with which mothers of children born very low birth weight with high and low medical risk factors maintained their children's attention during daily living activities (Smith, Swank et al., 1996).

Caregiver directiveness has been viewed as both a supportive and inhibitive strategy in relation to at-risk children's participation in play and daily activities (Marfo, 1990; Marfo, Dedrick, & Barbour, 1998; Moore, Saylor, & Boyce, 1998; Smith, Swank et al., 1996). Marfo proposes that caregiver directiveness can be an effective strategy of caregivers of children with developmental disabilities. He argues that caregivers' directiveness may include responsiveness and sensitivity and that it may be adaptive, serving to repair and facilitate their children's participation.

In a study of mother-child interactions, Smith, Swank et al. (1996) defined maternal directiveness as verbal and nonverbal behaviors used to direct the child's attention to an object with which he or she was already visually and physically engaged. Mothers interacting with their children born very low birth weight with high- and low-risk factors were compared with children born full-term who were typically developing during unspecified daily activities at 12 months of age. Mothers in all three groups used the same frequency of directiveness throughout the activities. However, there was a large negative correlation between caregiver directiveness and speed of acquisition of daily living skills over a 6-month period for the high-risk children. Findings from other studies of children with cerebral palsy, mental retardation, and developmental disabilities have also suggested that mothers' use of directiveness has inhibited the progress of the child's verbal and physical involvement in free play (Hanzlik, 1989, 1990; Mahoney et al., 1998). Hanzlik (1990) found that mothers of children without disabilities provided significantly less physical contact and guidance during free play at home as the children's cognitive or mental ages increased, whereas the mothers of children with disabilities did not decrease their physical contact or guidance based upon the child's cognitive level. The author hypothesized that the mothers of children with disabilities were attempting to elicit more responses from their children who were less capable of physically engaging with the toys.

Concurrent evidence suggests that children's abilities may influence the way caregivers adjust their behaviors in

various contexts. Compared to parents of typically developing children, parents of children with language or communication disorders used less demanding cognitive strategies, asked more questions, and spent more time interacting with their children during a teaching task (Pellegrini, Brody, & Sigel, 1985). In other research, maternal responsiveness and less restrictive behaviors predicted positive social and cognitive outcomes for 24-month-old children born full-term as well as children born premature with high- and low-risk factors (Smith, Landry, & Swank, 2000). These findings suggest that caregivers adapt their behaviors to the level of their children's developmental functioning, thereby providing more optimal patterns of interactions and supporting more optimal development.

Conceptual Framework

Coster (1998) proposed an occupation-centered model of assessment in pediatric occupational therapy, which focuses on a child's overall pattern of occupational engagement or participation in relation to a particular context of importance. This model emphasizes the critical importance of social context for supporting children's physical safety and emotional well-being as well as the development of abilities or skills. Therefore, in accord with this model, effective occupational therapy requires an in-depth understanding of how caregiver-child interactions influence children's performance of daily occupations (Kellegrew, 2000; Larson, 1995; Mori, 1997; Primeau & Ferguson, 1999). It is important to clarify the specific aspects of social interactions that are most effective in supporting the outcome of participation for different cohorts of children, in order for intervention to facilitate occupational performance with maximum success (Hanzlik, 1993; Lawlor & Mattingly, 1998). Video methods provide a means for capturing the interactions between caregivers and their children engaged in activities relevant to their participation within their social context.

Purpose

The purpose of this study was to examine similarities and differences in the qualitative behavior of three groups of caregivers and their young children during activities representative of daily routines. The three groups were: (a) caregivers and their children born prematurely and very low birth weight with white matter disorder, (b) caregivers and their children born prematurely and very low birth weight without white matter disorder, and (c) caregivers and full-term, healthy children. Caregivers and children were videotaped together while dressing and while preparing, eating,

and cleaning up two snacks. The study expands on previous work in two key ways. First, by comparing caregiver-child interactions in three groups with different levels of medical risk, this study allows the examination of interaction trends related to the degree of this risk factor. Second, this study examines caregiver-child interactions in the context of tasks that occur in typical family routines.

Research questions:

- (1) Do the three risk groups differ in caregiver and child interaction qualities during daily routines?
- (2) What is the relation among caregiver and child interaction qualities between the three risk groups during daily routines?
- (3) Are the patterns of relations between caregiver and child interactions similar or different in the three risk groups during daily routines?

Method

This was a descriptive-correlational study of qualitative aspects of caregiver-child interaction observed during dressing and snack activities. Caregiver and child behaviors during interactions were measured from videotapes using behavioral ratings, as described below.

Participants

The sample consisted of 36 caregivers and their 30-month-old (post-term) children who were also participants in a larger prospective study of the effects of white matter disorder on infant neuromotor functioning conducted at an urban hospital and university in New England. The children were assigned at intake to one of three groups: (a) born premature and very low birth weight with white matter disorder, (b) born premature and very low birth weight without white matter disorder, or (c) born full-term (37–41 gestational weeks) with no significant medical history. All infants born very low birth weight (< 1500 gms) had a gestational age of less than 32 weeks; white matter disorder status was confirmed through a repeated neonatal ultrasound, a 3-dimensional magnetic resonance imaging at birth and at 1-month chronological age, or both.

Data for the current study were collected for each caregiver-child dyad as they came for a 30-month follow-up visit, based on the child's term date. The child's primary caregiver interacted with the child in the research protocol. There were 12 parent-child dyads in each diagnostic group, ($N = 34$ mothers, 2 fathers). In this sample, children in the two very-low-birth-weight groups were case-matched for number of gestational weeks, and children in all three groups were matched for level of maternal education, maternal ethnicity, and child gender (see Table 1). The

Table 1. Demographic Characteristics and Developmental Status of Participants: Comparisons Among Groups

	Child Group ^a			<i>F</i> (2, 33) ^b <i>X</i> ² (2, <i>N</i> = 36)
	WMD	NoWMD	FT	
Child Variables				
Birth weight (g) <i>M</i> (<i>SD</i>)	1,093 (316)	1,001 (314)	3,472 (329)	229.71*** ^c
Gestational age (wks) <i>M</i> (<i>SD</i>)	27 (2.37)	27.17 (1.99)	39.08 (1.24)	155.08*** ^c
Age ^d (mos) <i>M</i> (<i>SD</i>)	30.62 (.96)	30.67 (.98)	30.38 (1.02)	.30
Gender				
Female/Male	4/8	3/9	3/9	.28
BSID-II				
MDI <i>M</i> (<i>SD</i>)	77.17 (32.58)	96.50 (14.45)	101.92 (9.79)	4.46* ^e
PDI <i>M</i> (<i>SD</i>)	72.58 (28.55)	87.17 (18.03)	100.67 (7.78)	5.91*** ^c
Maternal Variables				
Ethnicity				
Black	1	1	1	.00
White	11	11	11	
Education				
<High school	1			3.25
High school/GED	2	1	2	
Technical	2	3	3	
College	4	5	2	
Graduate/Professional	3	3	5	

Note. VLBW = Very low birth weight; WMD = White matter disorder; NoWMD = No white matter disorder; FT = Full-term; BSID-II = *Bayley Scales of Infant Development—Second Edition* (Bayley, 1993); MDI = Mental Developmental Index; PDI = Psychomotor Developmental Index.

^a*n* = 12 for each group.

^bContinuous variables were compared between the groups using analysis of variance; categorical variables were compared using chi-square tests.

^cSignificant difference between both VLBW groups and FT.

^dChild age in months at time of study corrected for gestational age.

^eSignificant difference between VLBW/WMD group and the VLBW/NoWMD and FT groups.

* *p* < .05. ** *p* < .01. *** *p* < .001.

institutional review board of the hospital approved study procedures and all parents signed informed consent forms prior to participating.

Procedure

Study Protocol

The 30-month visit took place in an observational lab at the hospital. Children were first administered the *Bayley Scales of Infant Development—Second Edition* (BSID-II) (Bayley, 1993) by trained examiners masked to children's white matter disorder status. This assessment was selected to examine the children's mental and psychomotor development by group assignment. Then, caregiver-child dyads were observed during a dressing and snack protocol. Both activities were videotaped in a lab playroom from behind a one-way mirror. During administration of the BSID-II, caregivers completed questionnaires regarding the child's health status, language development, functional abilities, and maternal emotional well-being.

Prior to the 30-month visit, caregivers were contacted to gather the following information regarding mealtimes: (a) seating arrangements at home during meals, (b) food allergies, (c) soft food snack preference (yogurt, pudding),

(d) spreading snack preference (peanut butter, jelly), and (e) type of spoon used for eating soft foods. Caregivers were given the option to make specific requests for their children. Individual preferences were accommodated across dyads to arrange a familiar context while still preserving some standardization.

The dressing and snack protocol was specifically developed for the lab setting to explore aspects of caregiver-child interactions that typically occur during daily activities. The activities were expected to be familiar to all participants, although the particular materials used might not be identical to the materials they had used before. Although the setting was not naturalistic in the sense of not being in the child's home or community environment, conducting this initial study within a lab setting allowed the researcher to control environmental influences (e.g., the variation in home physical environments that may or may not be related to the interaction). The dressing and snack activities consisted of tasks with which a 30-month-old child could be successful as well as tasks that were beyond the child's ability. Thus, the child would need to seek assistance from the caregiver to accomplish some tasks successfully. For example, most typically developing 30-month olds are capable of zipping and unzipping but are unable to hook the zipper. At the beginning of the snack, the caregiver was instructed

verbally to allow the child to do as much of the tasks as possible in order to observe the child's abilities. However, the caregiver was also directed to offer the type of assistance she or he typically would provide at home to help the child. In addition to the verbal instructions prior to beginning the protocol, a card listing the sequence of the protocol was on the table for review. The caregiver was instructed to ask the child to put on a smock with a zipper upon entering the room, then sit at a table to have two snacks (one soft and one with a spread on a cracker). After the child was done with the two snacks, the caregiver was asked to help the child to clean up and then have the child remove the smock.

Judgment Study Methodology

Judgment studies are a standard and well-established method to obtain reliable ratings of behavioral qualities, in which the average of the ratings of a group of judges is used as the data point for a particular participant on a particular scale. We used the "thin slice" methodology in the present study, in which judges viewed and rated selected videoclips (Ambady, Bernieri, & Richeson, 2000; Ambady & Rosenthal, 1992). A thin slice is defined as a brief segment of videoclips (video or audio or both) with the length of the videoclips determined a priori by the theoretical underpinning and purpose of the study. Using the average rating of the videoclips has been shown to be a valid approach for studying the interpersonal quality of behavior (Rosenthal, 1987). Ratings of relevant behaviors in a particular situation have been found to predict social outcomes (Ambady & Rosenthal). In the present study, judges rated the verbal and nonverbal behaviors of the participants in each clip on a set of interactive behavioral qualities provided on a response sheet.

A group of 10 expert clinicians (nine occupational therapists and one physical therapist, all with more than 4 years of experience working with children and families) were recruited from local practice settings to provide ratings of the videotape segments. In preliminary analyses, the number of judges was based on the mean reliability (the average of intraclass correlations) and the desired effective reliability (Rosenthal, 1987). Clinicians experienced in working with children were selected as judges because the ultimate intent of this research is to understand caregiver-child interactions that therapists commonly address when providing occupational therapy services. The judges were masked to the purpose of the study and the medical history of the children.

Caregiver-Child Rating Scales

The Caregiver-Child Rating Scales (CCRS), specifically designed for this study, consists of 18 qualities of caregivers' socioemotional and task-related behavior and children's

affective behavior during parent-child interaction. The eight caregiver qualities chosen for this study were Affection, Directiveness, Disinterest, Encouragement, Engaged, Playfulness, Responsiveness, and Supportiveness. The 10 child qualities were Confidence, Disinterest, Effort, Engaged, Enthusiasm, Frustration, Playfulness, Responsiveness, Self-Directedness, and Skillfulness. These qualities were selected based upon the conceptual framework used for this study (Coster, 1998) and on prior research findings where caregivers' behaviors were associated with children's performance when the dyads were engaged in play scenarios and daily activities (Mahoney et al., 1998, Smith, Swank et al., 1996). In addition, these qualities were adapted from those used in two prior judgment studies: a study of caregiver-child interaction among homeless families (Ray & Tickle-Degnen, 1999) and therapist-child interactions during sensory integration treatment sessions (Coster, Tickle-Degnen, & Armenta, 1995). Further refinement of the CCRS was based upon a review of the literature (Mahoney et al.) and relevance to the present context. The perceived presence of each behavioral quality in each videotape segment was rated on a scale of 1 to 6, from "not at all" to "extremely" present. The final measure of caregiver and child qualities was the average of the ratings across the 10 judges, reducing the operation of individual biases among judges in the final scores (low raters cancel high raters).

Three short video segments (clips) from each of the 36 dyads in the sample were selected for analysis (total = 108 videoclips, randomized): the first 30 seconds of dressing and snack, the first 60 seconds of putting a spread on a cracker; and the last 30 seconds of the snack and clean up. The content and length of video segments were selected to provide an opportunity for the judges to observe interactions across activities in which the identified qualities could be rated. The judgments were averaged across the three videoclips to achieve a rating of general interactive qualities for that dyad. The software program Observer Video-Pro for Digital Video 3.0 (Noldus Information Technology, 1995) was used to create the videoclips in the judgment study. The videoclips were transferred to CD-ROMs that were then viewed by the judges in their entirety on a computer monitor using both video and audio channels. Following Rosenthal (1987), each of the 10 judges rated videoclips from each of the 36 dyads based on their personal definition of the specific qualities as observed in a particular videoclips. Theoretically, although therapists used "personal" definitions, these definitions were formed upon a common cultural and professional background. In judgment studies, it is assumed that therapists would tend to implicitly share to some degree a common understanding of terms.

Preliminary Reliability and Variable Development Analyses

Reliability of the Caregiver–Child Rating Scales

Effective reliability analysis involved the average of the judges' ratings for the CCRS and was calculated using an intraclass correlation coefficient (ICC) (formula 3, k) (Shrout & Fleiss, 1979), using a criterion for adequate effective reliability of $\geq .80$. The ICCs for the eight caregiver qualities ranged from .72 to .94 ($M = .85$); all but the Disinterest scale met the effective reliability criterion. The reliabilities for the 10 child qualities ranged from .84 to .94 ($M = .89$). Thus, effective reliability was acceptable for all.

Principal Component Analyses

To reduce the number of variables for subsequent analyses, principal component analyses with rotated solutions were performed (separately) on both the caregiver and child variables to create composite caregiver and child dependent variables. The correlation coefficient or factor loading of $|r| > .60$ was set as the standard for this study, which indicates a strong relationship between individual variables and the overall factor. "Caregiver Positive Engagement" was created from seven of the eight variables that loaded onto one component whereas "Caregiver Directiveness" remained a separate variable. One child composite, "Child Optimal Engagement," was created from all the variables that loaded onto one component. The effective reliability for each of the final variables used in subsequent analyses was: Caregiver Positive Engagement = .85, Caregiver Directiveness = .82, and Child Optimal Engagement = .89.

Data Analysis

One-way analysis of variance (ANOVA) was used to compare the three child group means for child birth weight, gestational age, age at time of study, and scores on BSID-II (Bayley, 1993). Chi-square analysis was used to compare group differences for gender, maternal ethnicity, and education.

One-way ANOVA followed by post-hoc tests was also used to evaluate group differences in the average ratings for the two caregiver and one child composites from the CCRS: Caregiver Positive Engagement, Caregiver Directiveness, and Child Optimal Engagement. Correlational analyses were performed between the two caregiver variables and between the two caregiver variables and the child composite from the CCRS within each of the three groups: very low birth weight with white matter disorder, very low birth weight without white matter disorder, and full-term.

An alpha level of .10 was used for all statistical tests in order to provide adequate power to detect a true effect with statistical significance, given the sample size.

Results

Demographic Characteristics and Developmental Status of Participants

In Table 1, descriptive statistics for biologic and demographic variables broken down by the three child groups are provided, along with results from the statistical tests. Results showed that there were no significant group differences on biologic and demographic characteristics between the three groups or on biologic (birth weight, gestational age) and medical variables (days on ventilator, days hospitalized) between the two very-low-birth-weight groups except for white-matter-disorder status. In addition, 5 of the 12 (42%) children in the white-matter-disorder group had been diagnosed with cerebral palsy whereas none in the very-low-birth-weight without white-matter-disorder group had received this diagnosis.

In Table 1, descriptive statistics and ANOVA results for children's BSID-II scores (Bayley, 1993) in each group are provided. Results showed that children in the three groups differed significantly in their general developmental skills as measured on both the Mental Developmental Index (MDI) and Psychomotor Developmental Index (PDI). Post-hoc tests indicate that the full-term group scored significantly higher than the very-low-birth-weight with white-matter-disorder group on the MDI $t(22) = 2.52, p = .05$, and that the full-term group scored significantly higher than both the very-low-birth-weight with white-matter-disorder and the very-low-birth-weight without white-matter-disorder groups on the PDI $t(22) = 3.29$ and $t(22) = 2.38, p = .05$, respectively.

Descriptive Data for Measures

There were no significant differences between groups for the average caregiver and child CCRS ratings.

Correlations Between Caregiver Variables Within Child Groups

Table 2 shows that Caregiver Positive Engagement was strongly, positively, and significantly correlated with Caregiver Directiveness ($r = .63, p < .05$) for the caregivers of children born very low birth weight with white matter disorder, and moderately positively correlated for the caregivers of the children born very low birth weight without white matter disorder ($r = .35$). In contrast, the correlation between these two variables for caregivers of children born full-term was large, negative, and significant ($r = -.63, p < .05$).

Correlations Between Caregiver and Child Variables Within Child Groups

As shown in the right hand column of Table 2, the correlation between Caregiver Positive Engagement and Child

Table 2. Correlations Between Caregiver and Child Composite Ratings Within Each Diagnostic Group

Group ^a	Caregiver Directiveness	Child Optimal Engagement
VLBW/WMD		
Caregiver Positive Engagement	.63*	.11
Caregiver Directiveness	—	.02
VLBW/NoWMD		
Caregiver Positive Engagement	.35	.27
Caregiver Directiveness	—	.07
FT		
Caregiver Positive Engagement	-.63*	.62*
Caregiver Directiveness	—	-.69*

Note. VLBW = Very low birth weight; WMD = White matter disorder; NoWMD = No white matter disorder; FT = Full-term.

^a*n* = 12 for each group.

^bComposite ratings created from principal component analyses of caregiver rating scale and child rating scale from all three groups combined.

**p* < .05.

Optimal Engagement was small and positive within each very-low-birth-weight group ($r = .11$ and $.27$) but large and positive within the full-term group ($r = .62$, $p < .05$). In addition, Caregiver Directiveness and Child Optimal Engagement were negatively and significantly correlated in the full-term group ($r = -.69$, $p < .05$), but showed almost no association in the two very-low-birth-weight groups ($r = .02$, and $.07$). The differences between the full-term group and the two very-low-birth-weight groups for the Caregiver Directiveness and Child Optimal Engagement correlations were statistically significant ($p < .10$, and $p < .08$, respectively).

Conclusion

The results of this study revealed group related variations in the patterns of caregiver–child interactions during snack and daily activities in a lab setting. The diagnosis of white matter disorder, separate from the medical complications associated with prematurity, is a useful distinction for understanding these group differences. The children with white matter disorder scored significantly lower than the other two groups on both the cognitive and motor BSID-II indices, which indicates that these children are at increased risk for developmental difficulties. It is hypothesized that the developmental risk factors associated with white matter disorder are also related to patterns of caregiver–child interactions during daily activities.

The average caregiver and child ratings on the composite variables of the CCRS did not differ significantly across the three groups. Therefore, groups did not differ in the degree of Caregiver Positive Engagement or Caregiver Directiveness, but rather in the relation between these qualities within groups. The correlations between Caregiver

Positive Engagement and Caregiver Directiveness within each of the three groups indicate that clinician raters perceived unique patterns of relations between child and caregiver behaviors for each group during functional tasks. For caregivers of children born very low birth weight with white matter disorder, the association between Directiveness and Positive Engagement during the tasks was large and significant ($r = .63$). As a group, these children displayed both cognitive and motor challenges associated with the white matter disorder, as indicated by their generally lower BSID-II scores. The findings suggest their caregivers may be adjusting the level of their social and emotional assistance during caregiver–child interactions to the level of their children’s abilities. By being both positive and directive, these caregivers may be interacting in ways that facilitate and sustain their child’s engagement with activities. A similar interactional pattern was observed for caregivers of children born very low birth weight without white matter disorder, although the correlation was not as strong ($r = .35$). This contrast suggests that these caregivers may also be demonstrating positive engagement while directing the child to participate in the activities, but not with the same degree of consistency as caregivers of children with white matter disorder. These findings are similar to those of Levine (1993) who found that caregivers of children between 31 and 44 months of age with developmental delays adjusted their language use during a sorting task at home to match their child’s level of comprehension (zone of proximal development) (Vygotsky, 1978), which facilitated the child’s successful completion of the task. Similar findings were reported in other studies of children with developmental delays (Marfo, 1990, 1998; Pellegrini et al., 1985).

In contrast, in the full-term group, a significant, negative correlation was found between Caregiver Directiveness and Caregiver Positive Engagement. Thus, clinicians judged caregivers of children born full-term as being more positive when they were less directive ($r = -.63$). This difference in correlations between the full-term and very-low-birth-weight with white-matter-disorder groups was significant. One possible explanation for this striking difference is that the caregivers of full-term children may be providing direction under different circumstances than the caregivers of the very low birth weight children with white matter disorder (Landry, Miller-Loncar, & Smith, 2002; Levine, 1993; Pellegrini, Brody, & Sigel, 1985). The full-term children may have been more capable of accomplishing the tasks, and thus did not require much caregiver support to stay engaged with the task. Rather, the parents of the full-term children were likely to become more directive, and less positive, in the context of the child ignoring or straying from the task at hand.

However, the correlations between Child Optimal Engagement and Caregiver Positive Engagement and Directiveness were low in each of the two very-low-birth-weight groups. These low correlations suggest considerable variability in the caregivers' responses to their children. Within each group, a few children demonstrated significant cognitive and physical limitations while other children were quite capable of performing components of the tasks. The low correlations may represent the variability in the children's performances within each of the very low birth weight groups, which in turn elicited variable responses by caregivers.

Taken together, the results of this study illustrate the value of evaluating variations in the patterns of associations among caregiver-child variables within diagnostic groups rather than simply comparing overall levels of the values of individual variables. In this study, the average ratings of caregiver and child behaviors did not differ significantly across groups, but the patterns of relations within each group were quite different. Traditionally, most prior studies of parent-child interactions have gathered their observations in the context of play or a specific teaching task. The goals of these activities elicit quite different caregiver and child behaviors, as suggested in a recent study by Landry, Miller-Loncar et al. (2002). In that study, the relationship between child and caregiver responsiveness was stronger for both high and low risk groups when engaged in an hour of uncategoryed daily activities when compared with responsive during toy play. One hypothesis by the study authors is that the nature of the daily activities affords different interactional opportunities based on expectations for participation. The results of the present study contribute to this literature and support continued research of parent-child interactions during daily routines, which will further clarify the relation between interactions and activity goals and demands.

This study also highlights the value of video methods as an effective means for capturing relevant caregiver-child behaviors. The "thin-slice" method, or judgment study, provided a valid and reliable method to capture impressions of qualitative behaviors made by experienced therapists when observing caregivers and their children engaged in activities typical of daily living. Clinicians are expected to assess clients reliably and quickly by using both objective tools and subjective observations. The findings of the present study suggest that clinicians' perceptions of caregiver-child interactions may reflect a range of interactional approaches that the caregivers have developed during daily activities to accommodate their children's behavior capacities and limitations (Gallimore, Weisner, Bernheimer, Guthrie, & Nihira, 1993).

As a first study, this descriptive, correlational project

was limited by a small sample, which limited power to detect true differences between groups. Moreover, the sample was limited to primarily Caucasian middle-class dyads, which limits the generalizability of findings to these groups. However, the methodology used in this study and the interesting pattern of results is promising. In future studies, replication with larger samples using the measures developed for this study would be useful. These studies would also be valuable in other populations of children (e.g., children with autism, Down's syndrome, and global developmental delays) whose performance differs on specific dimensions relevant to the activities of interest.

The use of judgment studies allows researchers in occupational therapy to study complex phenomena using cost-effective methods. Videotaping also provides the means to record interactions for later analysis that allows clinicians to compare behaviors within and between different activities, given that task requirements vary from activity to activity. Further studies using video methods are needed to identify how context influences caregiver-child interactions during daily activities. Observational studies of children participating in activities typical of daily living in a variety of settings are needed (e.g., home, day care, preschool, and community). These studies can provide more specific information regarding relevant aspects of the children's abilities and the physical and social environments and activities that support children's participation in the activities (Hanzlik, 1990; Kellegrew, 2000). These data can provide the evidence needed to help clinicians guide effective intervention programs to support optimal caregiver-child engagement in the important activities of their daily lives.▲

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