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# A Comparison of Motor Behaviors, Interaction, and Playfulness During Mother-Child and Father-Child Play with Children with Motor Delay

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**ABSTRACT.** The purpose of this investigation was to compare motor behavior, parent-child interactions, and child's playfulness during mother-child and father-child play with children with motor delay. Play sessions of 20 children (ages 7 to 36 months) and their parents were videotaped in the families' homes. Interval recording was used to measure the children's motor behaviors, the parents' handling/positioning, and the children's position of play. The Maternal Behavior Rating Scale and the Test of Playfulness were used to measure the parents' interactive behaviors and children's playfulness, respectively. Mean differences were

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analyzed using paired t-tests. Children demonstrated similar occurrence of motor behaviors and degree of playfulness when playing with their mothers and their fathers. Mothers and fathers had similar occurrence of carrying their children, using adaptive positioning equipment, and manually positioning their children. Fathers held their children on their lap for a greater proportion of the play intervals compared with mothers. Mothers were more responsive than fathers during the play sessions but both parents demonstrated similar achievement orientation, affect/animation, and directiveness. Children's playfulness was related to their developmental abilities and to parents' responsiveness. Therapists are encouraged to consider the interactive styles of both parents, capitalize on the unique strengths of each parent and child, and partner with parents to promote interactions with their children and children's playfulness. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2006 by The Haworth Press, Inc. All rights reserved.]

**KEYWORDS.** Parent-child interactions, play, early intervention therapy

Parent-child interaction and play are important components of family-centered early intervention and provide a natural context for pediatric therapy interventions (Blanche, 1997; Calhoun, Rose, Hanft, & Sturkey, 1991; Chiarello, Effgen, & Levinson, 1992; Chiarello & Palisano, 1998; Effgen, Bjornson, Chiarello, Sinzer, & Phillips, 1991; Humphrey, 1989; Schultz-Krohn, 1997). The parent-child relationship contributes to many aspects of development for children with and without disabilities (Ainsworth & Bell, 1974; Beckwith, Cohen, Kopp, Parmelee, & Marcy, 1976; Bee et al., 1982; Clarke-Stewart, 1973; Hartup, 1989; Mahoney, Finger, & Powell, 1985; Yarrow, Rubenstein, Pedersen, & Jankowski, 1972). Parents, practitioners, and leaders in the field of early intervention have reported enhancement of the parent-child relationship and play as expected outcomes of early intervention (Early Childhood Outcomes Center, 2005; Summers et al., 1990). Mahoney and colleagues (1998) reviewed the results from four studies of early intervention and concluded that intervention effects on child development occurred when mothers became more responsive to their children. The authors recommended that intervention efforts should focus on encouraging and supporting parent-child interaction.

For infants and toddlers, parent-child interactions often occur in the context of sensorimotor activity. Play is the primary occupational behavior of childhood. Play is a naturally occurring situation during which children learn and develop new skills. Providing families with suggestions for motor learning through play provides a natural context for practice and repetition but it is also important to be sensitive to promoting positive parent-child interactions and playfulness of children. Family-centered care strives to foster involvement of the entire family, including both mothers and fathers. Thus, it is important to acknowledge the unique role each parent plays when nurturing and caring for a child.

For children with typical development, researchers have compared roles of parents, quality of interaction, mode of play, and sensitivity of parents to the child's needs during mother-child versus father-child interactions. The results indicate that mothers spend more time in caretaking whereas father-child interactions are more playful (Belsky, 1979; Clarke-Stewart, 1978; Lamb, 1977; Stukey, McGhee, & Bell, 1982). Qualitative differences have been noted when directly comparing mother-child play to father-child play. Fathers have exhibited a more physical style of play. In contrast, play with objects and conventional social games such as peek-a-boo were more common during mother-child play. The focus during mother-child play tended to be toy mediated, verbal, and non-physical. Play interaction with fathers involved more intense physical stimulation (Belsky, 1979; Clarke-Stewart, 1978; Lamb, 1977; Power & Parke, 1983; Stukey et al., 1982).

In terms of responsiveness and sensitivity, Power and Parke (1983) noted that mothers were more likely to respond appropriately to attention cues of 8 month-old infants than fathers. In addition, a trend was observed in which fathers were more likely than the mothers to attempt to change the child's behavior with other objects, whereas mothers facilitated or elaborated on the presently displayed behavior of the child. Similarly, Power (1985) also found mothers to be more apt to encourage their child's natural curiosity by letting the child choose the object of play. These findings were markedly different for observations of the fathers. Fathers often disregarded the cues of interest of the child and directly interfered with the child's present behavior.

Comparison studies of mother-child and father-child interactions with the child with developmental delays or disabilities are sparse. Studies have limited their scope to language interactions (Girolametto & Tannock, 1994; Maurer & Sherrod, 1987), teaching interactions (Ganadaki & Magill-Evans, 2003), and parental role (Stoneman, Brody, & Abbott, 1983).

Girolametto and Tannock (1994) found that fathers and mothers of children with developmental delay and language impairments participated in reciprocal interactions and were responsive to their children. However, fathers were more likely to change the topic when children were not interested and also demonstrated more directives that required a response from their children. Maurer and Sherrod (1987) reported that the amount of directives used by mothers and fathers during play with their children with Down syndrome were similar. Ganadaki and Magill-Evans (2003) concluded that compared to fathers, mothers' interactions with their children with motor delay during a teaching task were more contingent to their children's behaviors and fostering of cognitive growth. Children in their study demonstrated similar interaction skills with mothers and fathers. Stoneman and colleagues (1983) found that mothers of children with Down syndrome assumed the role of teacher more frequently than did fathers. During an intervention study for parent-child interactions with infants and toddlers with disability, Kelly (1982) noted that the sole father in her study demonstrated differences in play style such that he used less play with objects and more game play and physical activity.

The purpose of this investigation was to describe and compare children's motor behavior, parents' handling/positioning, parent-child interactions, and children's playfulness during mother-child and father-child play with children with motor delay. Specific research questions included: (1) Children's motor behavior: Is there a difference in the occurrence of locomotion, movement transitions, reach, and grasp/manipulation in children with motor delay during play with mothers versus fathers?; (2) Parents' handling/positioning: Is there a difference in the occurrence that parents hold their children in their lap, carry their children, use adaptive positioning equipment, or manually position their children with motor delay during play with mother versus fathers?; (3) Parent-child interactions: Is there a difference in parent responsiveness, achievement orientation, affect/animation, and directiveness between mothers and fathers during play with their children with motor delay; and (4) Play: Is there a difference in the playfulness of children with motor delay during play with mothers versus fathers? Knowledge of how parents interact and play with their children will help therapists collaborate with families to develop appropriate intervention plans and guidance activities to promote children's development and function, children's playfulness, and parent-child relationships.

## METHODS

### *Subjects*

Twenty children and their mothers and fathers participated in this study. The children and parents were recruited from early intervention programs and therapists in southeastern Pennsylvania and New Jersey. The children's ages ranged from 7 to 36 months. The children had a variety of diagnoses including developmental delay, Down syndrome, cerebral palsy, and prematurity. All children had a documented motor delay, at least two standard deviations below the mean on the Gross Motor and/or Fine Motor Scale of the Peabody Developmental Motor Scales First Edition (Folio & Fewell, 1983). None of the children were independent ambulators. Ten of the children also demonstrated a cognitive delay as reported by their early intervention program evaluations. The mean age of the parents in the study was 31.7 years for the mothers and 37.6 years for the fathers. This difference was not statistically significant. Mothers and fathers had similar education levels but more fathers were employed ( $\chi^2$ ,  $N = 40$ ) = 15.9,  $p < .001$ ). Demographic information is presented in Table 1.

The children had been receiving early intervention therapy services for an average of 10 months, with a range of 1 to 30 months. All of the children were receiving physical and/or occupational therapy and some children were also receiving speech therapy and special instruction. Fifteen of the children were receiving services in their home. The mother was most often the caregiver present during early intervention therapy for 15 children and the father was most often present for 1 child. Both parents were typically present for 2 children and neither parent was typically present for 2 children.

### *Procedures*

Both parents gave written informed consent to participate in the study. Mother-child and father-child play sessions were videotaped in the family's home. Parents were read standardized instructions directing them to play with their child as they usually do at home. As the purpose of this study was to examine how parents and their children typically play together at home, the location within the home and toys, objects, or equipment for play enhancement were left to the parents' discretion. The decision not to use a standardized set of toys was based

TABLE 1. Subject Demographic Information

**Children**

<b>Age</b>	Mean = 17.7 months, SD 10.0	
<b>Cognitive Age Equivalent*</b>	Mean = 11.4 months, SD 4.8	
<b>Gross Motor Age Equivalent</b>	Mean = 8.0 months, SD 2.8	
<b>Fine Motor Age Equivalent</b>	Mean = 10.0 months, SD 4.2	
<b>Race</b>	18	Caucasian
	1	Hispanic
	1	Asian
<b>Gender</b>	11	Males
	9	Females
<b>Diagnosis</b>	6	Developmental Delay
	3	Down syndrome
	3	Cerebral Palsy
	2	Prematurity
	6	Other

**Mothers**

<b>Age</b>	Mean = 31.7 years, SD 5.0	
<b>Race</b>	18	Caucasian
	1	Hispanic
	1	Asian
<b>Education</b>	7	High school degree
	13	College degree or higher
<b>Employment Status</b>	10	Non-employed
	3	Part-time
	7	Full time

**Fathers**

<b>Age</b>	Mean = 37.6 years, SD 13.8	
<b>Race</b>	18	Caucasian
	1	Hispanic
	1	Asian
<b>Education</b>	5	High school degree
	1	Associate degree
	14	College degree or higher
<b>Employment Status</b>	1	Non-employed
	19	Full time

\*Based on n = 18, data missing from two children

on the primary investigator's previous work (Chiarello & Palisano, 1998) which found that when a set of toys were provided, mothers often felt compelled to have their children play with all the toys provided. This caused the children's direction of attention to be changed quite frequently and unnaturally. In addition, Mash and Terdal (1991) reported that although variations in play materials may prompt different kinds of play interaction, the social content and structure of the mother-child interaction studied was a more salient feature than the play materials.

Parents were also instructed that no interaction between themselves and the observers would take place during the filming session. However, parents were provided the opportunity to discuss any questions, concerns, or comments related to the study prior to or after the filming session. The play interaction was also restricted to the child and parent; the other parent, siblings, or other family members or friends were asked to leave the room and remain out of sight during the filming session. A coin toss determined if mother or father was videotaped first for the first set of subjects, order of participation then alternated throughout the study.

Each play interaction was filmed for twelve-minutes. The observer operated a hand held video camera to allow parents and children to move about freely in their environments. Following the first play session, approximately a five minute break was provided for the children before they participated in the play session with the second parent. After each play session, the parent completed the Maternal Observation Interview to assess the validity of the interaction (Eheart, 1976). After both play sessions were videotaped, the primary investigator administered the Peabody Development Motor Scales (Folio & Fewell, 1983) to establish a gross motor and fine motor level for the child.

## ***Measures***

### *Observational Methodology*

Observational methodology and interval recording (Bakeman & Gottman, 1987) were used to measure the children's motor behaviors, the parents' handling/positioning, and the children's positions for play. The coded activities included child behaviors: movement transitions, locomotion, reach, and grasp/manipulation, and parent behaviors: holding the child, carrying the child, use of adaptive positioning equipment, and manually positioning the child. This behavioral coding system has previously been used by the primary investigator (Chiarello & Palisano,



1998) and the behavior codes are based on physical, observable events. Appendix A provides the operational definitions for these behaviors. The positions in which the children were playing were also recorded: supine, prone, sidelying, sitting, quadruped, kneeling, or standing.

Prior to data collection the raters established inter-rater reliability. Four 12-minute play sessions (two with mothers and two with fathers) were videotaped following the data collection procedure. The raters underwent 10 hours of training in the coding procedures with the primary investigator. The play sessions were coded using ten-second intervals, marked by an audio taped signal. One coder (physical therapy student) coded the child behaviors of movement transitions, locomotion, reach, and grasp/manipulation. A second coder (physical therapy student) coded the parent behaviors of holding in lap, carrying, use of adaptive equipment, and manual positioning as well as the play position of the child. A tally was recorded within an interval if the specified behaviors occurred any time during that interval. If an interval could not be noted due to obstruction of view, the interval was considered invalid. The first valid sixty intervals (10 minutes) were used for data analysis. Inter-rater reliability was assessed by comparing the proportion of the intervals coded by the raters and the primary investigator. Inter-rater reliability was rechecked during the study for two subjects. Inter-rater reliability was assessed using intra-class correlation coefficient (ICC 2,1). Correlations varied from .92 to .99 which is interpreted as good reliability (Portney & Watkins, 2000).

#### *Maternal Behavior Rating Scale*

The quality of the interactive behavior patterns of the parents was assessed with the Maternal Behavior Rating Scale (Mahoney, 1992). The scale consists of 12 items that are rated on a 5-point Likert scale after viewing the play session in its entirety. These items are organized under four factors as follows: affect/animation (acceptance, enjoyment, expressiveness, inventiveness, and warmth); achievement orientation (achievement, praise); responsiveness (effectiveness, responsiveness, sensitivity); and directiveness (directiveness, pace). A parent's score on the factor construct is the average of the ratings of the individual items under that particular factor with a range of scores of 1 being the lowest and 5 being the highest. Previous research with the scale has shown responsiveness to change (Mahoney & Powell, 1988). Inter-rater agreement within one scale point has averaged 98% for each item, with a range between 93% to 100% (Mahoney et al., 1985). The rater in this

study, the second author, a pediatric occupational therapist with 18 years of clinical experience and a master's degree in family therapy, achieved inter-rater reliability with the primary investigator before the start of the study, using seven pilot play sessions. Intra-class correlation coefficient (ICC 2,2) was used to calculate reliability for ratings on the factor constructs, and these were as follows: affect/animation, .97; achievement orientation, .78; responsiveness, .64; and directiveness, .96. During the study, all ratings were performed by a single rater and thus intra-rater reliability was confirmed during the study for four play sessions. ICC (3,3) was used and the values were found to be good (Portney & Watkins, 2000): affect/animation, .89; achievement orientation, .95; responsiveness, .97; and directiveness, .97.

### *Test of Playfulness*

The Test of Playfulness (Bundy, 1997; Bundy, 1998) (Version 3) was used to measure the child's contribution to the play interaction. The assessment was designed to be scored from videotapes of children from 6 months to adolescence engaged in free play. For infants and toddlers, the Test of Playfulness is intended to measure children's play with their caregivers and has been used on children as young as 3 months of age with and without disabilities (Okimoto, Bundy, & Hanzlik, 2000). The measure consists of 24 items rated on a 4-point ordinal scale that reflects extent, intensity or skillfulness of specific behaviors. The items reflect the process and playfulness of play and include observations related to enjoyment, engagement, responsiveness, provision of appropriate cues, and locus of control. The measure score represents the relative playfulness of the child with an average score equaling 0.0. Higher scores indicate the child is more playful. The Test of Playfulness was scored two times for each child, one time after viewing the mother-child play session in its entirety and one time after viewing the father-child play session in its entirety.

Adequate reliability and validity information is available on the measure (Bundy, 1997; Bundy, 1998; Okimoto et al., 2000; Bundy, Nelson, Metzger, & Bingaman, 2001). The Test of Playfulness was developed using Rasch analysis (Bond & Fox, 2001), a procedure for converting ordinal data to interval level. Three assumptions apply to the Rasch model: easy items are easy for all children; more capable (playful) children are more apt to receive high scores on hard items, and more lenient raters are more apt to award high scores. Bundy, Nelson, Metzger, and Bingaman (2001) evaluated these assumptions as they apply to the Test

of Playfulness on 141 children; 93% of the items, 98% of the children, and 100% of the raters conformed to the expectations of the Rasch model. The rater in this study, the second author, underwent training and her reliability in using the instrument was established through standard procedures by the developer of the test (i.e., scoring of videotapes that had been previously scored by other raters, entering the data into the normative data set, and checking the data for conformance to Rasch model expectations).

#### *Maternal Observation Interview*

The Maternal Observation Interview is an 11-item survey designed to assess the parent's perceptions regarding the validity and reliability of the observation session (Eheart, 1976). The parent is asked to ascertain how the observed interactions compare to usual behavioral style and to report any behavioral occurrences which were not representative of typical patterns. The questionnaire was modified to reflect both maternal and paternal observations. All parents in this current study indicated that their videotaped play sessions were representative of typical play interactions.

#### *Peabody Developmental Motor Scales*

The Peabody Gross Motor and Fine Motor Developmental Scales First Edition (Folio & Fewell, 1983) was used to assess the children's motor development to provide demographic information on the subjects to indicate the degree of motor delay. The Peabody Developmental Motor Scales is a standardized, norm-referenced tool used to assess motor developmental level in children from birth to 83 months of age. A major purpose of the test is to identify gross and fine motor delays. The items are scored on a three-point scale (0 = unsuccessful, 1 = clear resemblance to item criterion but criterion not fully met, and 2 = successful performance, criterion met). Reported correlations for interrater reliability for the Gross Motor Scale were .97 and for the Fine Motor Scale were .94 (Folio & Fewell, 1983). Prior to the start of this study, the primary investigator established interrater reliability for the Peabody Developmental Motor Scale with another pediatric physical and occupational therapist on five children who met the inclusion criteria for this study. An intra-class correlation coefficient (ICC 2,1) of .99 was achieved.

### *Cognitive Age Equivalent*

The child's cognitive age equivalent was calculated from the child's most recent early intervention program evaluation. Based on the child's developmental rate, age equivalents were adjusted to estimate the child's level at the time of the study. This measure is an estimate, not a standardized statistic, and is being reported for descriptive information.

### *Data Management and Analysis*

The data from the Test of Playfulness measure were entered into the data set for the normative sample, which includes both children with typical development and children with disabilities. The data were analyzed using the Rasch analysis computer program, Facets (Linacre, 2001). The data were inspected for conformance to the expectations of the Rasch model by evaluation of the fit statistics that determine goodness-of-fit of the items, rater, and children. Data from only 1 of the 40 observations (2%) failed to conform to the expectations of the model, lower than the accepted expectation that 5% of the observations will fail to fit the model.

The dependent variables for the study are the proportion of intervals during which the following behaviors occurred: locomotion, movement transitions, reach, grasp/manipulation, holding in lap, carrying, use of adaptive positioning equipment, and manual positioning; child playfulness ratings; and parental behavior ratings. Separate paired two-tailed t-tests were calculated for each dependent variable. Paired t-tests were used because the same children's interactions were being compared under two conditions, with their mothers and with their fathers. An alpha level of .05 was used for each analysis. It is acknowledged that this decision increases the risk of a type I error because multiple tests were performed. However, because this research is exploratory in nature, that is, to determine which aspects of mother-child and father-child play interactions may be similar or different, a correction factor was not used.

## **RESULTS**

### *Motor Behaviors*

Table 2 presents the mean proportions of children's motor behaviors during mother and father play sessions. Children demonstrated similar occurrence of motor behaviors when playing with either parent. Chil-

dren demonstrated reaching and grasping activities during an average of 71-76% of the play intervals. In contrast, children demonstrated changing positions and locomotion during an average of 17-20% of the play intervals. Table 3 presents the mean proportions of play positions during mother and father play sessions. Children most frequently played in sitting during sessions with either parent. Standing was the second most common position during both play sessions.

Table 4 presents the mean proportions of parents' handling and positioning behaviors. Mothers and fathers demonstrated similar occurrence of carrying their children, using adaptive positioning equipment, and manually positioning their children during play. However, on average, fathers held their children on their laps for a greater proportion of the play intervals compared with mothers (16.2 versus 9.7) [ $t(19) = -2.38, p = .03$ ].

TABLE 2. Mean Proportions of Children's Motor Behaviors During Mother and Father Play Sessions\*

Behavior	Mother Play Session			Father Play Session		
	Mean	SD	Minimum/Maximum	Mean	SD	Minimum/Maximum
Locomotion	16.6	20.3	0-73.3	16.5	19.8	0-62.5
Movement Transitions	20.3	5.9	0-43.3	17.7	20.4	0-76.7
Reach	76.2	18.1	20-98.3	71.2	22.3	10-100
Grasp/Manipulation	73.5	26.6	5-100	71.5	29.3	0-98.3

\*Paired t-tests were not significant

TABLE 3. Mean Proportions of Positions that Children Played In During Sessions

Position	Mother Play Session			Father Play Session		
	Mean	SD	Minimum/Maximum	Mean	SD	Minimum/Maximum
Supine	6.6	10.2	0-36.7	2.7	6.1	0-25.0
Prone	11.4	13.2	0-40.0	9.8	15.7	0-50.0
Sidelying	3.5	7.0	0-28.3	.75	2.1	0-8.3
Sitting	61.5	26.9	8.3-98.3	68.7	28.3	1.7-100
Quadruped	10.8	11.4	0-35.0	9.1	12.7	0-48.2
Kneeling	3.2	7.7	0-28.3	3.7	6.6	0-26.7
Stand	26.5	25.6	0-85.0	25.1	27.0	0-83.3

### *Parents' Interactive Behaviors*

Table 5 presents the mean ratings for parents' interactive behaviors. On the average, parents demonstrated a moderate level of interactive behaviors, though the range indicates that parents vary in their interactive abilities. Mothers were more responsive than fathers during the play sessions [ $t(19) = 3.44, p = .003$ ]. However, mothers and fathers demonstrated similar achievement orientation, affect/animation, and directiveness.

### *Children's Playfulness*

Children demonstrated similar degree of playfulness during mother (Mean =  $-.85, SD = .58$ ) and father (Mean =  $-1.05, SD = .99$ ) play sessions [ $t(19) = 1.46, p = .16$ ]. While a group difference was not found, six children performed differently when playing with their mothers versus their fathers. Figure 1 depicts that these children's Test of Playful-

TABLE 4. Mean Proportions of Parent Handling Behaviors During Play Sessions

Behavior	Mother			Father		
	Mean	SD	Minimum/Maximum	Mean	SD	Minimum/Maximum
Holding*	9.7	14.4	0-58.3	16.2	23.1	0-98.3
Carrying the Child	1.5	2.8	0-10.0	1.4	2.4	0-8.3
Use of adaptive positioning/equipment	6.4	8.5	0-21.7	14.2	21.8	0-73.3
Manually positioning the child	30.9	31.2	0-100	25.7	24.7	0-100

\* $p = .03$

TABLE 5. Mean Ratings for Parent Interactive Behaviors During Play Sessions on Maternal Behavior Rating Scale

Behavior	Mother			Father		
	Mean	SD	Minimum/Maximum	Mean	SD	Minimum/Maximum
Achievement Orientation	2.6	.84	1.0-4.0	2.3	.92	1.5-4.5
Affect/Animation	3.2	.56	2.2-4.0	3.0	.55	1.8-4.0
Directiveness	3.1	.48	2.0-4.5	3.4	.84	1.5-5.0
Responsiveness*	3.6	.61	2.7-4.7	3.1	.71	1.7-5.0

\* $p = .003$

ness scores, plus and minus one standard error, did not overlap for their scores when playing with their mothers versus their fathers. In four cases, the children were more playful while playing with their mothers and in two cases with their fathers.

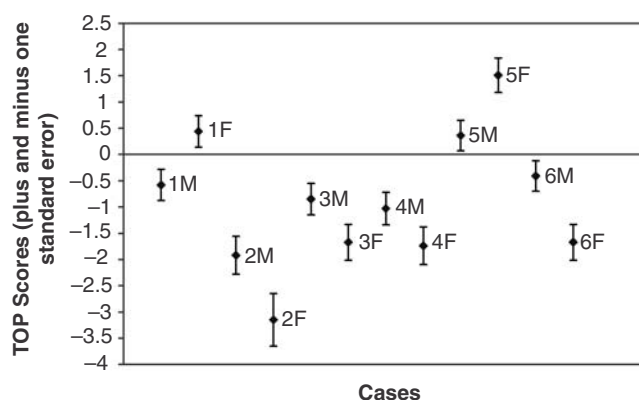
While not the focus of this study, the children in this study were less playful than the normative sample on the Test of Playfulness including children with disability (normative sample Mean = 0.0, children with disability in normative sample Mean =  $-.38$ ). Ninety-five percent of the children while playing with their mothers and 85% of the children while playing with their fathers scored below the average for the entire normative sample.

### *Relationships Among Interaction, Playfulness, and Child Characteristics*

To explore the relationship between parents' interactive abilities and children's playfulness, post hoc Pearson correlation coefficients were calculated (Table 6). Parents' ratings on Responsiveness were moderately correlated with the children's Test of Playfulness scores,  $r = .62$  for mothers and  $r = .51$  for fathers.

To explore the relationship between the children's age, cognition, and motor abilities and their playfulness post hoc correlation coefficients were calculated (Table 7). Cognitive and gross and fine motor age equivalents were moderately correlated with Test of Playfulness

FIGURE 1. Six Individual Cases Where Test of Playfulness Scores Were Significantly Different Between Mother and Father Play Sessions



scores. Correlations between parents' interactive ratings and the children's age, cognitive, gross and fine motor age equivalents were not significant.

### DISCUSSION

Children with motor delay demonstrated similar occurrence of motor behaviors with mothers and fathers and fathers showed a higher occurrence of holding their children in their laps than mothers. This is not congruent with reports for children with typical development who engage in more physical activities when playing with their father (Belsky, 1979; Clarke-Stewart, 1978; Lamb, 1977; Stukey et al., 1982; Power & Parke, 1983). Fathers in this current study may have accommodated their play style by holding children in their lap to account for their children's motor limitations. Though fathers did display behaviors characteristic of rough and tumble play, such as lifting their children in the air, they may have restrained from rough housing given that a "therapist" was watching their play.

Children demonstrated higher occurrence of fine motor skills (reaching and grasping) than gross motor skills (changes in position and locomotion) during the play sessions with both mothers and fathers. While not specifically examined, play was commonly associated with interactions with objects. Therapists may want to explore parents' understand-

TABLE 6. Correlations Between Children's Test of Playfulness (TOP) Scores and Parents' Interactive Behaviors on Maternal Behavior Rating Scale

	Responsiveness Rating	Achievement Orientation Rating	Affect/Animation Rating	Directiveness Rating
Children's TOP Measure during play with Mother and Mothers' Interactive Behaviors' Ratings	.62**	.41	.47*	.29
Children's TOP Measure during play with Father and Fathers' Interactive Behaviors' Ratings	.51*	-.04	.07	-.19

\*p < .05

\*\*p < .01



TABLE 7. Correlations Between Children's Age, Cognitive Age Equivalent, Gross Motor and Fine Motor Age Equivalents on the Peabody and Test of Playfulness (TOP) Scores

	Chronological Age	Cognitive Age Equivalent	Gross Motor Age Equivalent	Fine Motor Age Equivalent
TOP Score with Mother	.22	.67**	.48*	.53*
TOP Score with Father	.16	.52*	.52*	.52*

\* p <.05

\*\* p <.01

ing of play and share information with them on various types of play. The results suggest that children have more opportunities to spontaneously practice fine motor skills during play with parents and that therapists may need to provide suggestions for practice of gross motor skills. However, it is important to balance this with an understanding that when children are truly playing, they are likely to engage in activities where they can achieve some degree of competence.

The finding that sitting was the most common position for play is consistent with the finding of a greater occurrence of fine motor behaviors. During play, children appear to naturally have opportunities to work on postural control in sitting. However, children also spent time in the more posturally challenging position of standing. Therapeutic recommendations for play that can be embedded in sitting and standing are more likely to occur spontaneously.

Both mothers and fathers in this study provided manual support for their children on average of 26 to 31 percent of the play intervals. Parents appear to be responsive to their children's physical needs and this may reflect guidance provided from early intervention. Therapists may want to monitor this occurrence to ensure that the children's physical needs do not become the focus of play and disrupt social interactions between children and their parents (Bundy, 1999). Parents in this study infrequently used adaptive equipment during the play sessions; these resources may not meet the families' needs during spontaneous play. Information is needed on actual use of adaptive equipment and types of adaptive equipment most likely to promote children's participation in play.

On the average, mothers and fathers were not overly directive or focused on skill performance during play and maintained a reasonable degree of affect while playing with their children. The finding that both

mothers and fathers are skilled in interacting with their children with motor disabilities in a positive manner is encouraging and their strengths need to be acknowledged by service providers.

There was only one difference between maternal and paternal interactive behaviors; mothers were more responsive than fathers during play. This is in accordance with reports by Power and Parke (1983) for young children with typical development and by Ganadaki and Magill-Evans (2003) for children with motor delay. To interpret the finding that mothers in this study were more responsive to their children during play, one needs first to ask if there is a meaningful difference between a mean rating of a 3.6 versus a 3.1. Eight mothers compared to only two fathers in this study demonstrated a responsiveness score of a 4 or higher (a score indicating appreciable levels of responsiveness). In this light it does appear appropriate to consider what factors may be related to the mothers demonstrating higher levels of responsiveness. One explanation is that mothers may culturally be more responsive to young children than fathers. However, alternate explanations are compelling. More mothers compared to fathers did not work outside the home and participated in their children's early intervention program. The greater time spent caring for their children and receiving guidance from early intervention providers may have been an asset in responding to their children's cues. Therapists may offer families early intervention visits during times when fathers can participate and therapists can provide support for fathers' play activities with their children. This practice reflects family-centered care and may maximize children's learning and play opportunities through their daily routines with both mothers and fathers.

The importance of the parents' responsiveness was highlighted by the finding that it was the only interactive behavior that was moderately related to the children's playfulness with both mothers and fathers. Despite differences in responsiveness, children demonstrated a similar degree of playfulness with their mothers and fathers, a positive finding. Ganadaki and Magill-Evans (2003) also found that children demonstrated similar interaction skills with mothers and fathers. Children potentially have opportunities to be playful with either their mothers or fathers. From this current study, though, it is not clear if children at this young age have the ability to adapt to different players or if both parents adapt to meet their children's abilities and play styles.

The children in this study demonstrated low playfulness scores compared to the normative sample, including other children with disabilities. Initially it was thought that the low cognitive abilities of the

children in this study may not support playfulness, however this was not necessarily the case given that one child at a very low cognitive level demonstrated average playfulness. For this particular child, both parents were responsive and this illustrates that playfulness is a multidimensional construct, influenced by many factors, including the importance of a goodness of fit between the child and his or her caregiving environment. As a group though, as cognitive and motor abilities increased, children's playfulness increased. This is in agreement with a previous report that as children's motor ability increased, children's responsiveness and clarity of cues increased (Palisano, Chiarello, & Haley, 1993). Physical and occupational therapists may be in a unique role to support the playfulness of children with motor disabilities through assistive technology, sharing information with families, and using a holistic framework to promote the children's participation in family and community activities.

The fact that in six cases, children were more playful with one parent may represent that children have different relationships with mothers and fathers. One explanation for the differences in playfulness with mothers versus fathers may have been the children's gross motor abilities. For the four cases where the child had a higher score while playing with the mother, the children had very low motor abilities; and in the two cases where they were more playful with their fathers, the children's motor abilities were higher. The mothers may have been able to support the children's play or the play style with mothers may not have been as affected by the children's motor limitations. However, there were other cases in the study where children with both low and high motor abilities were as playful with fathers and mothers. Some fathers may need more support to adjust to their children's play when their children have significant gross motor limitations. Subjectively when viewing the videotapes, for many families the mother and father appeared to have similar styles of playing with their child. For those families where the child was able to be more playful with one parent compared to the other, this discrepancy may be related to the parents' lack of communication with each other regarding effective interactive strategies.

There are several factors that have the potential to limit this study. The description of the motor behaviors during play was narrowed to occurrence data. Qualitative aspects of these behaviors were not studied and they may have an impact on the interaction. Due to the limitations inherent to observational methodology, we are unable to determine if the play behaviors studied naturally occur throughout children's daily routine and how frequently parents interact with their children. Interac-

tion was limited to separate play sessions involving one parent and the child. We did not examine how parents play together with their children, how mothers and fathers interact with each other regarding their children, how siblings influence play experiences, and how the environmental context in which the family lives may impact interactions. Limitations can be found in the collection of data since the coders were not blinded to the study's purpose. Subject recruitment occurred within a restricted geographic area and a sample of convenience was used. A final limitation may lie in any assumptions the subjects may have had regarding physical therapy and therapists. These pre-existing ideas and the presence of an observer may have jeopardized the natural element of the interaction by compelling the parents to adjust their style of play even though they were unaware of the variables being studied. Subjectively, the parents and children did not appear uncomfortable during the play sessions and objectively, they reported that their videotaped interactions reflected their typical play with their children. Future research focus is needed on how early intervention physical and occupational therapy can support children's playfulness and interactions with their families and peers.

### **CONCLUSION**

The constructs of parent-child interactions and child playfulness are multidimensional and complex. There were more similarities than differences in mother versus father play with their children with motor delay. However, mothers were more responsive than fathers during the play sessions. Young children with motor delays demonstrated low levels of playfulness. Children's playfulness was related to their developmental abilities and to parents' responsiveness. The results have implications for understanding how children and parents (both mothers and fathers) interact so therapists can partner with parents to promote play and parent-child interactions through enhancement of children's motor function; play experiences; adaptation of toys, materials, and environment; and providing information to families. Therapists are encouraged to consider the interactive styles of both parents and to capitalize on the unique strengths of each parent.

The results may help therapists to appreciate their role in promoting positive parent-child interactions and children's playfulness and to be aware of the gestalt of the parent-child relationship when making home activity recommendations. Future directions for practice and research

require therapists to reflect on (1) how play and parent-child interactions may be used as a naturally occurring context for promoting motor development, and (2) what is the balance between the therapeutic use of play and parent-child interactions as a means to achieve functional motor goals versus play and parent-child interactions as goals for their own sake.

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APPENDIX  
Operational Definitions for Coded Behaviors

**Child**

- Movement transitions: Child assists with or independently changes position such as moving from prone to sitting.
- Locomotion: Child is mobile either by sequential rolling, pivoting, crawling, creeping, scooting, cruising or assisted ambulation.
- Reach: Child raises his arm away from his body towards an object or person.
- Grasp/manipulation: Child has an object in his hand.

**Parent**

- Holding: Parent physically holding the child on his/her lap.
- Carrying the child: Parent is holding the child in his/her arms and moving from one location to another.
- Use of adaptive positioning/equipment: Parent has the child supported with a piece of adaptive equipment such as a chair or stander.
- Manually positioning the child: Parent positioning the child in appropriate postural alignment with the use of his/her hands.