

## Stability, Change, and Correlates of the Peer Relationships of Young Children With Mild Developmental Delays

Michael J. Guralnick, Mary A. Hammond, Robert T. Connor, and Brian Neville  
*University of Washington*

The peer relationships of young children with mild developmental (cognitive) delays recruited at 4–6 years of age were examined in a longitudinal study across a 2-year period. Results revealed only modest increases in children's peer interactions, a high degree of intraindividual stability, and the existence of a poorly organized and conflict-prone pattern of peer interactions. Child cognitive and language levels as well as family stress and support were associated with children's peer interactions. A subgroup was identified of initially low interactors who were at especially high risk for future peer interaction problems. These findings further underscore the importance of designing and implementing early intervention programs in the area of peer relationships for children with mild developmental delays.

For typically developing children, the preschool years constitute a period of rapid growth and development in the domain of peer relationships. Longitudinal and cross-sectional studies of children's interactions with their peers in unstructured settings reveal a pattern of increasing complexity of play and an expanding network of social contacts over time (Howes, 1988; Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005). Corresponding increases in sustained cooperative play and enhanced levels of cognitive maturity of play are also observed, especially for social pretend or dramatic forms of play. Longitudinal studies during the early childhood period have clearly suggested that these sequential changes represent an underlying social competence that is relatively stable over time and can serve as a useful index of future social adjustment (Levy-Shiff & Hoffman, 1989; Rubin et al., 2005). Children's ability to enter into peer groups and to maintain involvement with peers represent especially stable aspects of individual children's peer relationships throughout early childhood (Howes, 1988; Howes & Matheson, 1992).

The peer relationship patterns of young children with mild developmental delays stand in marked contrast to their typically developing peers. During the early childhood period, peer relationship problems for this group of children are especially evident in unstructured settings, such as organized playgroups or during free-play periods in more formal programs. As evaluated in these settings, among other problems, preschool-age children with mild developmental delays have considerable difficulty sustaining play with peers (group play), exhibit uneven and fragile growth in peer interactions over this period, and often fail to resolve conflicts in appropriate ways (e.g., Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996; Guralnick & Groom, 1987; Guralnick et al., 1998; Guralnick & Weinhouse, 1984). Peer group entry is a particularly formidable task for these children (Lieber, 1993; Wilson, 1999). A central feature of these problems appears to be an inability to organize behavior in a coherent and consistent manner to address the social tasks (e.g., peer group entry, maintaining play, resolving conflicts) confronting young children during interactions with their peers. That is, they display substantial problems in peer-related social competence (Guralnick, 1999a). Development during this early childhood period seems primarily characterized by increases in social interactions in both positive and negative forms (e.g., Guralnick & Weinhouse, 1984). Even when placed in responsive social settings containing typically developing peers, increases occur in both positive and negative interactions but no improvements

---

This research was supported by a grant from the National Institute of Child Health and Human Development (RO1 HD37429). Support from grant P30 HD02274 also facilitated our work.

The authors thank the many coders and other staff for their efforts across the various components of this project. The authors also thank the families for their participation and assistance in helping us understand the peer relationships of young children with developmental delays.

Correspondence concerning this article should be addressed to Michael J. Guralnick, Center on Human Development and Disability, University of Washington, Seattle, WA 98195-7920. Electronic mail may be sent to [mjgural@u.washington.edu](mailto:mjgural@u.washington.edu).

are evident in the ability to engage in more complex, extended, and goal-directed social exchanges (Guralnick et al., 1996).

Many of these problems appear to persist into the elementary school years, as suggested by cross-sectional studies of school-age children with developmental delays and disabilities (Howell, Hauser-Cram, & Warfield, 2001; Taylor, Asher, & Williams, 1987). However, no longitudinal studies examining changes from the preschool/kindergarten period to the early elementary years have been conducted for this group of children. Patterns of change over time involving positive and negative social interactions as well as children's ability to engage in complex forms of play, such as maintaining social exchanges (group play), are of special interest. An important related issue is whether children with mild developmental delays exhibit intraindividual stability over this time period. In view of the evidence indicating that, as a group, peer competence problems are likely to persist over time, high levels of intraindividual stability would help identify those children during the early childhood period at especially high risk of future peer relationship problems. Successful interventions during the early childhood/kindergarten period would then be of value in minimizing the peer rejection that children would likely experience as they make a transition to the elementary years. This earlier intervention is especially important because it is following this transition that reputations regarding children's qualities as play partners are established, often placing children on a negative trajectory that may be difficult to alter (Ladd & Price, 1987).

Young children with mild developmental delays constitute a heterogeneous group who usually first come to the attention of professionals during the preschool years. The etiologies for these children's difficulties are often uncertain or unknown, and children frequently exhibit co-occurring developmental problems (Gallimore, Keogh, & Bernheimer, 1999; Vig, Kaminer, & Jedrysek, 1987). Children with mild developmental delays also exhibit considerable stability in cognitive functioning over time, especially from the preschool period (3–5 years of age) to the kindergarten or early elementary years (6–8 years of age) (Bernheimer & Keogh, 1988; Keogh, Bernheimer, & Guthrie, 1997; Vig et al., 1987). Advances in cognitive and language development provide a foundation for developmental changes in young children's peer relationships (Howes, 1987). Consequently, relatively high levels of stability in peer relationships can be expected for this group of children, assuming the expected high levels of stability in cognitive and language domains.

Accordingly, the primary purpose of this investigation was to examine various aspects of the stability and change of peer relationships of children with mild developmental delays from early childhood/kindergarten to early elementary periods. Although this appears to be the first longitudinal study of peer relationships for this group of children across this important time period, on the basis of previous findings of problematic interaction patterns we expected children to demonstrate only modest changes across this transition with considerable stability evident for both positive and negative aspects of their peer interactions. To evaluate these hypotheses, comprehensive and detailed observations of the peer interactions of an initial sample of 4–6-year-old children with mild developmental delays were obtained as children participated in a series of laboratory playgroups with unfamiliar peers. Playgroups were organized such that they approximated a peer group entry task. Children were reassessed in an identical situation approximately 2 years later.

In addition to the potential value of measures of intraindividual stability as a means of identifying children at especially high risk for poor peer relationships during the early childhood period, other child and family predictors as well as concurrent correlates were examined. From the child perspective, a major factor of interest was children's cognitive and language development. Verbal aspects of intelligence quotient (IQ) appear to be particularly important contributors to children's social adjustment for typically developing children (Levy-Shiff & Hoffman, 1989; Rubin & Daniels-Beirness, 1983). A number of previous studies of children with mild delays have also found a positive association between cognitive level (IQ) and language development and more effective peer relationships during the preschool period (Booth, 1999; Guralnick & Groom, 1985). In addition to verbal ability, the association between peer relationships and children's behavior problems, particularly externalizing problems, was of interest. Especially during peer group entry situations, children with delays display more intrusive and disruptive styles and utilize fewer emotion regulation strategies than do appropriately matched groups of typically developing children (Kopp, Baker, & Brown 1992; Lieber, 1993; Wilson, 1999).

Contemporary models also emphasize the importance of family influences on children's peer relationships (Ladd & Pettit, 2002). Lower levels of parental stress and higher levels of social support are likely to positively affect many aspects of parenting relevant to the promotion of their child's peer

relationships. This includes various features of parent-child interactions, such as parental control strategies, responsiveness, and scaffolding, and perhaps the ability to provide adequate support and coaching focusing on peer issues as well (Guralnick & Neville, 1997; Ladd & Pettit, 2002). Preliminary evidence suggests that levels of parental stress and support are consistent with this hypothesis for young children with mild developmental delays, at least for broader measures of social competence (Guralnick, Neville, Connor, & Hammond, 2003). The influence of family stress and support was examined in this study in relation to observational measures of children's peer relationships.

Finally, we determined whether a family's involvement in their child's peer relationships, as reflected by the extent to which parents arrange playdates, was correlated with and predictive of future peer relationships. Greater parental efforts to arrange play for their child has been positively associated with higher levels of peer relationships for young, typically developing children (Ladd & Golter, 1988). For preschool-age children with mild developmental delays, however, only minimal associations with children's general social competence have been obtained (Guralnick, Connor, Neville, & Hammond, in press). Of special interest in this study was the relationship of this direct form of parent action (arranging) to children's observed social interactions with peers. Accordingly, we expected that children's cognitive/language development, externalizing behavior, family risk as assessed by stress and support measures, and parental involvement in arranging play would each be associated with children's peer interactions at both time periods and may have predictive value as well. These hypotheses were evaluated through a series of multiple regression analyses.

## Method

### Participants

Young children with mild developmental delays participating in inclusive (mainstreamed) programs were recruited through contact with local school districts in a large metropolitan community. To be included in the sample, a child had to meet the following criteria: (1) be between 48 and 78 months of age, (2) have a current individual education program for children with special needs, (3) be experiencing difficulties in peer-related social competence as expressed by parent concerns in a structured phone interview, (4) have a primary female caregiver

(minimum of a 6-month relationship, as mothers were our primary informants), and (5) obtain a full scale IQ (FSIQ) score between 50 and 80 on the Wechsler Preschool and Primary Scale of Intelligence-revised (WPPSI-R; Wechsler, 1989). In addition to child demographic information, standard demographic information about the family (marital status, number of children, ethnicity, educational and occupational status, and income) was gathered via self-reports from mothers. The Hollingshead Four Factor Index of Social Status (Hollingshead, 1975) was used to calculate a measure of family social status (range 8-66) (see Table 1).

A number of exclusionary criteria were also established. On the basis of the Child Behavior Checklist (CBCL; Achenbach, 1991) completed by the mother (or other female caregiver) for each child, children who scored in the clinical range were excluded from the study (a *T* score above 70 was established for children with developmental delays to adjust to items focusing on developmental functioning). This rarely occurred as a phone screening interview for mothers eliminated children described as exhibiting major behavior problems. Similarly, exclusion occurred if mothers scored at or above the 95th percentile on the parent domain of the Parenting Stress Index (PSI; Abidin, 1995). Finally, children were

Table 1  
Family and Child Demographics

	<i>M</i> or %	<i>SD</i>
<i>Family demographics (Time 1)</i>		
Social status <sup>a</sup>	51.46	13.01
Mother's age (years)	37.06	5.05
Marital status (% partnered)	92.1	
<i>Child demographics</i>		
Time 1		
Age at playgroup (months)	63.52	7.65
Gender (% male)	71.4	
Ethnicity (% Caucasian) <sup>b</sup>	73.0	
Birth order (% firstborn)	33.3	
Grade in school		
Preschool (%)	52.4	
Kindergarten (%)	47.6	
First grade (%)	0.0	
Time 2		
Age at playgroup (months)	83.75	7.54
Grade in school		
Preschool (%)	4.8	
Kindergarten (%)	52.4	
First grade (%)	42.9	

<sup>a</sup>Hollingshead Four-Factor Index of Social Status; *N* = 63.

<sup>b</sup>Black, 1.6%; Hispanic, 4.8%; Asian, 6.3%; Native American, 1.6%; Biracial, 12.7%.

excluded if English was not their primary language or if they had significant sensory or motor problems.

Over the course of 7 years, a final sample of 63 subjects enrolled in either preschool or kindergarten completed the study (see Table 1). Following the initial assessments, children were randomly assigned to an intervention or control condition at time 1 as part of a larger study investigating the effects of a comprehensive intervention intended to promote children's peer-related social competence (see Guralnick et al., in press, for details). Identical assessments of all 63 subjects were obtained nearly 2 years later (time 2).

Although children were selected strictly on the basis of developmental characteristics, information with respect to child diagnosis was also obtained. Because the diagnostic status of children with mild developmental delays is subject to change over time, parents provided information at the end of the study (2 years later). Most children received only categorical diagnoses (e.g., static encephalopathy or developmental delay) or no diagnosis whatsoever, with meaningful etiologic diagnoses infrequently reported.

#### Child Measures

Children were evaluated by psychologists with extensive prior experience working with young children with developmental delays. The following child measures were administered: (1) WPPSI-R (Wechsler, 1989). FSIQ scores as well as verbal IQ (VIQ) scores were of interest. Older children were assessed with the Wechsler Intelligence Scale for Children-Third Edition (WISC-III; Wechsler, 1991). The standard battery of tests (five verbal and five performance) was administered; (2) Test for Auditory Comprehension of Language-Revised (TACL-R; Carrow-Woolfolk, 1985). Although the TACL-R yields four standardized scores, only the total score was used in the analysis; and (3) The Expressive One Word Picture Vocabulary Test-Revised (EOWPVT-R) (Gardner, 1990). The obtained raw score was converted to a standard score, which was used for analysis.

To provide an estimate of children's adaptive behavior, the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984) survey form was administered to each mother (or primary female caregiver, but hereafter referred to only as mother) by trained interviewers. Standard scores were obtained for each of the four domains (communication, daily living skills, socialization, and motor skills) as well as for the total adaptive behavior score. The time 1 total adaptive behavior score was  $M = 69.46$ ,

( $SD = 8.63$ ). The  $\alpha$  coefficient for this study, averaged across the four domains, was .75.

Mothers also assessed their child's behavior problems based on the CBCL (Achenbach, 1991). Mothers rated the frequency of different behavior problems from a 118-item questionnaire using a 3-point scale. Only the broad-band externalizing scale ( $T$  scores) was used for analysis. Higher scores indicate greater perceived behavior problems. The  $\alpha$  coefficient for this study was .85 for externalizing.

#### Parent Measures

To obtain overall estimates of parenting stress, the PSI was administered to mothers (Abidin, 1995). The PSI is a 101-item questionnaire which yields scores for child and parent domains that differentiate sources of stress with good discriminant validity (Bigras, LaFreniere, & Dumas, 1996). Only the parent domain was included in this study ( $\alpha = .89$ ; test-retest = .81 from standardization sample) and focuses on mothers' reactions to the experience of being a parent. Summing across the seven subscales (e.g., sense of competence, social isolation, etc.), the parent domain represents perceived adverse impact on maternal functioning that may affect their parenting role and general well-being. Only the total raw score for the parent domain was used for analysis. The  $\alpha$  coefficient for this study was .85 for the parent domain.

Mothers' social support was measured with the Inventory of Parental Experiences (IPE; Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983). This is a self-report measure of the social support mothers receive and has been used with families of children with disabilities (Booth, 1999; Guralnick et al., 2003). A total score based on assessments of the amount of support and satisfaction with support was calculated from the scale's dimensions (e.g., parental role support, extended family support, etc.). The  $\alpha$  coefficient for total support for this study was .85.

Finally, the *arranging* questionnaire was administered, which consisted of a single item in which mothers were asked to indicate how often in a typical month they were responsible for arranging for their child to play with another child (rating scale: 1 = *less than once/month*; 2 = *less than once/week*; 3 = *1-2 times/week*; 4 = *2-3 times/week*; 5 = *4 or more times/week*).

#### Procedure

Mothers were scheduled to bring their children to the laboratory for time 1 observations of child-child

social interactions with a similar scheduling process followed for time 2, approximately 2 years later. Mothers were administered all interviews during the laboratory visits and received scales and questionnaires in the mail.

#### *Laboratory Observations of Child–Child Interactions*

Observations of focal children's play interactions with peers were carried out within a laboratory playroom designed to be similar to a typical play area in a classroom. All observations were obtained at both time 1 and time 2 assessment periods. To record play interactions, the room was equipped with two video cameras operated by remote control, a radio telemetry microphone for the focal child, and an overhead microphone. A control panel with mixers balanced the auditory signals, allowing use of split screen technology for video input. Child–child interactions were observed in playgroups (quartets) with unfamiliar, typically developing peers.

Typically developing children participating in the playgroups were recruited by distributing study announcements to local preschools, daycare centers, and schools. To be included, at time 1 typically developing children needed to be between the ages of 48 and 78 months (same as the focal children), have no known developmental, sensory, motor, or behavioral problems, and have English as a primary language. To assure that the children were typically developing, the TACL-R and the EOWPVT-R were administered to each child (minimum standard score required was 90 for each test). Children whose raw scores were greater than 2 SDs above the mean based on the 6½-year-old norms were excluded to eliminate excessive developmental differences between the typically developing children and the children with developmental delays. Mothers of typically developing children also completed the CBCL for their child. Those children who obtained *T*-scores above 66 were excluded from the sample. Typically developing children were assigned on an availability basis but matched for gender with the focal child. None of the typically developing children had any prior contact with focal children. The average peer age at time 1 was 56.52 months, about 6 months younger than the focal children.

Inclusion criteria for the typically developing children at time 2 were the same as at time 1, except that children were required to be between the ages of 70 and 96 months at the time of the playgroups. To assure that the children were developing typically, the communication domain of the Vineland Adaptive Behavior Scales was administered to mothers on

the phone and mothers also completed the CBCL. To participate, children needed to obtain a standard score of 90 or above on the communication domain and a *T* score of 66 or below on the CBCL. For time 2, a new group of typically developing children was recruited and again assigned on an availability basis but matched for gender with the focal child. None of the typically developing peers at time 2 had prior contact with the focal children. The average age in months of peers at time 2 was 82.61, similar to that of the focal children.

*Playgroup observations.* On the basis of this matching process (chronological age and gender), each of the focal children participated in three 1-hr sessions with three typically developing peers in our laboratory playroom during each time period. This allowed naturalistic peer group interactions to be evaluated as they emerged. Although all four children were unfamiliar with one another before the playgroups, the three typically developing children were introduced to one another and allowed to play together for 30 min one day before the first session. The purpose of this procedure was to further challenge the focal child by approximating a peer group entry task. The successive 1-hr periods allowed the focal child opportunities to become integrated within the group and permitted detailed observations of those interactions.

Playgroups were supervised by an experienced teacher in early childhood education. Children participated in a number of activities within each 1-hr session typical of young children's programs, including circle time, music, and snack. During the 30-min free-play period, the children had access to an extensive array of toys and equipment found in the playroom. Separate areas provided opportunities for housekeeping, blocks, puzzles, games, and manipulative toy play activities. During the free-play period, teacher interactions were limited to providing assistance to ensure the children's safety. Focal children were videotaped during the 30-min free-play periods that took place during each of the three sessions in each time period.

*Child-peer play coding schemes.* Only the play interactions of the focal child were coded. The 30-min playgroup observations were coded using two well-established schemes: (a) the Play Observation Scale (POS) and (b) the Individual Social Behavior Scale (ISBS).

For the revised version of the POS (Rubin, 2001), coders recorded the quality of social participation and levels of cognitive play during each 10 s interval. This scale consists of 10 mutually exclusive and exhaustive social participation categories, with the cognitive play measures (e.g., dramatic play) nested

within the main social participation categories of solitary, parallel, and group play (see Rubin, 2001, for detailed definitions of the measures). Variations of this scale have been applied effectively to children with disabilities similar to those in this study for playgroups (e.g., Guralnick et al., 1996). Evidence with respect to convergent and discriminant validity suggests that the scale of social participation constitutes a useful index of a more general construct of peer competence (Provost & LaFreniere, 1991).

Videotapes were sent to the laboratory of Kenneth Rubin at the University of Maryland where highly trained staff coded all sessions. Training for POS coding was extensive and initially took place utilizing playgroup tapes from a separate study. For pre-study reliability for the full variable matrix, including cognitive play categories nested within the social participation categories, all raters reached the minimum criterion and obtained an overall Cohen's  $\kappa$  of .77. After training was completed, interrater reliability on approximately 20% of randomly selected playgroup sessions was calculated between pairs of coders and produced an overall  $\kappa$  of .70. Inter-coder differences were resolved through review and discussion.

Each videotape was reviewed a second time by our research group to examine specific peer-related social behaviors of the focal child. For this purpose, the ISBS, based on the work of White and Watts (1973) and adapted in a manner similar to Doyle, Connolly, and Rivest (1980) and to Guralnick and Groom (1985, 1987), was used. A version of this scale has been applied successfully to preschool-age children with mild delays and to typically developing children as they interacted in playgroups similar to those described in this study (Guralnick et al., 1996).

Observers recorded continuously the occurrence of individual social behaviors defined by 25 categories. Categories were designed to record the social interactions of the focal child as directed to peers (e.g., seeks attention, leads peer, expresses hostility) as well as to record the social behaviors of the focal child in response to directed activities of peers (e.g., follows lead of peer). Through the application of this scale, the frequencies of both positive and negative social behaviors could be identified both directed to and in response to peers. In addition, with the exception of one category (defends property), each of the focal child individual social behaviors was classified as to whether it was an initiation. A focal child initiated event is one in which no prior verbal or nonverbal interaction occurred for at least 3 s. Nine of the 25 categories were also judged as either successful or unsuccessful, with definitions specific to

each social behavior category. The ISBS coding manual with detailed definitions and coding rules can be obtained by contacting the first author.

Coders were free to review any segment of the tape as often as needed. The coding protocol was divided into 30-s intervals following the time codes superimposed on the tape. Although coding was continuous, these divisions provided a structure for the coding task and served as a framework for establishing reliability within the event-based system. Coders were considered to be in agreement if codes matched within a specified 10-s interval using the "best fit" matching method (Hollenbeck, 1978). A reliability manual describing this method is available from the first author. In addition to the 25 ISBS categories, a "no interaction" event was included to complete the possible options within each 30-s interval.

Before coding, four coders were trained for a period of 10–12 weeks on the ISBS. Videotapes of pilot or related playgroups were used for training and final pretesting of reliability assessments. For pre-study reliability, calculated in this manner, all coders achieved the minimum average criterion for individual social behaviors necessary for participation of 75% (overall  $\kappa = .70$ ) on two consecutive 30 min tapes. Mean reliabilities for playgroup observations carried out during the course of the study on 20% of the total were as follows: individual social behaviors,  $\kappa = .73$  (range = .54–.83),  $M$  percent agreement = 81.7% (range = 73.6–92.0), agreement on successful/unsuccessful,  $M = 92\%$  (range = 80.0–100), and agreement on initiations,  $M = 85\%$  (range = 42.8–100). To minimize observer drift, weekly coding meetings were held and interobserver disagreements were resolved by discussion and reviewing tapes.

*Representative measures of peer-related social interactions.* Ten measures were selected from the POS and ISBS codes to provide a broad representation of children's peer-related social interactions (see Guralnick et al., 1996). Measures selected from the POS were solitary play (playing alone), parallel play (playing next to another child), group play (playing with another child), and peer conversation (talking, questioning but not playing). Measures selected from the ISBS were the frequencies of successful social bids and initiations, as well as the composite measures of positive directed to peer (leads peer positive—direct and indirect, uses peer as resource, joins peer, seeks peer's attention, seeks peer's agreement;  $\alpha = .82$ ), negative directed to peer (leads peer negative—direct and indirect, expresses hostility, takes unoffered object;  $\alpha = .70$ ), responsive to peer positive (follows peer's social bids to gain attention, to lead positively—direct or indirect, to use

as a resource, and to seek agreement;  $\alpha = .84$ ), and nonresponsive to peer positive (fails to follow peer's social bids for same categories in prior measure;  $\alpha = .74$ ). Intraclass correlation coefficients were calculated for each of these ten measures to index interrater reliability and were high in all instances,  $M = 0.95$  (range 0.86–0.99).

A principal components analysis was then carried out for the 10 measures. A single factor accounted for 61% of the variance at time 1 and 57% of the variance at time 2. All measures loaded positively except for solitary play. A composite measure of overall peer interaction at each time point was computed by converting each component measure to a scaled score ranging from 0 to 100 and averaging the 10-scaled measures (POS solitary play was reversed).

## Results

As noted earlier, approximately half the children participated in an intervention to promote their peer-related social competence following time 1 observations (Guralnick, Connor et al., in press). The primary focus, however, of this study was the stability, change, and predictors of peer interactions over time for the total sample. Consequently, all analyses reported here were first carried out controlling for condition (intervention vs. control), which produced negligible effects.

### Stability of Peer Interactions

Stability coefficients (Pearson correlation coefficients) were computed for time 1 and time 2 for the

overall peer interaction measure and the 10 representative measures (see Table 2). As seen in Table 2, all stability coefficients were statistically significant except for nonresponsive to peer positive. Significant correlations ranged from moderate to high, with a stability coefficient for the overall peer interaction composite of  $r = .53$ ,  $p < .001$ . Of note, the most stable measures across the 2-year period ( $r > .50$ ) were those representing positive peer interactions involving group play, successful bids, peer conversation, and positive directed to peer. Stability coefficients were also calculated for the nested categories of solitary-dramatic play ( $r = .33$ ,  $p < .01$ ) and parallel-dramatic play ( $r = .42$ ,  $p < .01$ ). Stability coefficients for the overall peer interaction measure were equally high for children initially enrolled in preschool,  $r = .54$ ,  $p < .001$ , and those enrolled in kindergarten,  $r = .60$ ,  $p < .001$ .

### Changes in Peer Interactions Over Time

A MANOVA conducted for the 10 peer interaction measures produced a significant time effect,  $F(10,53) = 2.90$ ,  $p < .01$ . Follow-up  $t$  tests for each measure (Table 2) showed that there were significant changes over time for 7 of the 10 measures (all except for frequency of initiations, negative directed to peer, and nonresponsive to peer positive). Six of the measures showed significant increases over time and solitary play significantly decreased over time. In addition, the overall peer interaction composite showed significant improvement over time.

To examine whether these changes over time were related to children's initial level of peer interactions,

Table 2  
Stability and Change of Peer Interaction Measures Over Time

Peer interactions measures	Time 1		Time 2		Stability coefficients	Change over time ( $t$ -tests)	Effect size $d$
	$M$	$SD$	$M$	$SD$			
Overall peer interaction composite	25.11	16.42	31.95	17.22	.53***	3.32**	.59
POS solitary play	252.71	120.67	195.13	127.61	.46***	-3.55**	.63
POS parallel play	78.33	50.46	96.78	57.65	.31*	2.29*	.41
POS group play	28.05	41.95	46.89	58.60	.56***	3.61**	.64
POS peer conversation	34.89	33.77	53.17	48.54	.55***	3.52**	.63
ISBS successful bids	38.06	38.44	50.95	41.53	.59***	3.21**	.57
ISBS initiations	19.25	15.09	20.67	18.24	.39**	NS	—
ISBS positive directed to peer	56.56	59.05	71.22	55.20	.57***	2.65*	.47
ISBS negative directed to peer	18.14	18.80	19.70	18.06	.41**	NS	—
ISBS responsive to peer positive	24.25	22.01	36.40	24.78	.27*	3.40**	.61
ISBS nonresponsive to peer positive	18.03	14.03	20.48	14.55	.20	NS	—

Note.  $N = 63$ ; POS = Play Observation Scale; ISBS = Individual Social Behavior Scale.  
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

two subgroups were formed (median split) based on the overall peer interaction composite at time 1. The low subgroup ( $N = 31$ ) had a mean score based on the composite of 11.15 ( $SD = 5.09$ ) at time 1 but increased substantially at time 2,  $M = 24.99$ , ( $SD = 14.55$ ). In contrast, the high subgroup ( $N = 32$ ) had a similar composite score both at time 1,  $M = 38.63$ , ( $SD = 11.42$ ), and time 2,  $M = 38.69$  ( $SD = 17.42$ ). A mixed-model ANOVA for subgroup (high vs. low) and time was carried out and revealed a significant Time  $\times$  Subgroup interaction,  $F(1, 61) = 13.41$ ,  $p < .01$ ,  $\eta^2 = .18$ . Follow-up tests confirmed that the low subgroup increased significantly over time,  $t(30) = 5.59$ ,  $p < .001$ ,  $d = 1.42$ , but that the high subgroup did not change,  $p > .05$ . Of note, the high initial level subgroup remained significantly higher than the low initial subgroup at time 2,  $t(61) = 4.42$ ,  $p < .01$ ,  $d = 0.86$ .

#### Stability of Child and Family Characteristics Measures

Stability coefficients were also calculated for each of the child and family measures (see Table 3). As can be seen, all stability coefficients for the child measures were high and statistically significant. High levels of stability for all family measures were also obtained. However, very little change occurred over time for either the child or family characteristics measures ( $p > .05$ ). Only two significant changes occurred over time; increases in the parent arranging

play,  $t(62) = 5.85$ ,  $p < .01$ ,  $d = 1.04$ , and EOWPVT-R Expressive Language,  $t(62) = 4.75$ ,  $p < .001$ ,  $d = 0.85$ , measures.

A composite measure of cognitive/language development was then computed as the mean of the standard scores of the verbal IQ, TACL-R total, and EOWPVT-R measures. The standardized  $\alpha$  coefficient was .71 at time 1 and .85 at time 2. Similarly, a family risk composite measure was calculated. In this instance, the PSI parent domain and the IPE total social support measures were converted to scaled scores ranging from 0 to 100. The IPE total social support score was reversed and the two-scaled scores were then averaged. Standardized  $\alpha$  coefficients were .73 for time 1 and .77 for time 2. As seen in Table 3, stability coefficients were high for both composites.

These two composite scores (cognitive/language development and family risk), plus the measures of CBCL externalizing (externalizing behavior) and parents arranging play dates for their child (arranging), served as the four independent measures for a series of regressions. The overall peer interaction measure was chosen as the sole dependent variable as it accounted for approximately 60% of the variance for the 10 measures in the factor analysis noted earlier. To examine more closely the association between positive and negative behaviors, a positive composite (consisting of the mean of the scaled scores from the positive directed and response to

Table 3  
Child and Family Characteristics at Time 1 and Time 2 and Stability Coefficients

	Time 1		Time 2		Stability coefficients
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Child characteristics					
cognitive/language composite	71.34	10.22	73.21	15.18	.73***
Verbal IQ <sup>a</sup>	67.76	9.88	67.95	13.25	.63***
TACL-R total scale <sup>b</sup>	68.38	15.73	66.59	21.10	.49***
EOWPVT-R expressive language <sup>c</sup>	77.87	12.73	85.08	17.82	.74***
CBCL externalizing <sup>d</sup>	52.46	8.92	50.75	10.25	.57***
Family characteristics					
family risk composite	35.13	11.15	33.67	10.95	.80***
PSI parent domain <sup>e</sup>	124.63	24.70	122.59	25.06	.74***
IPE total support (5 sources) <sup>f</sup>	2.87	0.41	2.93	0.38	.80***
arranging play (rating) <sup>g</sup>	2.00	0.92	2.65	0.92	.54***

<sup>a</sup>Weschler Preschool and Primary Scale of Intelligence-Revised.

<sup>b</sup>Test of Auditory Comprehension of Language-Revised, standard score.

<sup>c</sup>Expressive Oral Word Picture Vocabulary Test-Revised, standard score.

<sup>d</sup>Child Behavior Checklist, *T* score.

<sup>e</sup>Parenting Stress Index, raw score.

<sup>f</sup>Inventory of Parental Experiences, raw score.

<sup>g</sup>Scale: 1 = less than once per month; 2 = less than once per week; 3 = 1-2 times per week; 4 = 2-3 times per week; 5 = 4 or more times per week.

\*\*\* $p < .001$



peer-positive measures) was correlated with a negative composite (consisting of the negative directed and nonresponsive to peer-positive measures). The correlations were significant both at time 1 ( $r = .64$ ,  $p < .001$ ) and time 2 ( $r = .70$ ,  $p < .001$ ).

#### *Concurrent Correlates of Overall Peer Interactions at Time 1 and Time 2*

The four child and family measures were then entered into a hierarchical multiple regression with the overall peer interaction measure as the dependent variable at time 1. Measures were entered in the following order: cognitive/language development (composite), externalizing behavior, family risk (composite), and arranging. In this way, the effect of family influences could be examined after accounting for critical child characteristics. It was also of interest to determine if externalizing behavior contributed to the composite measure after controlling for children's cognitive and language development. Results revealed that none of the variables significantly correlated with the overall peer interaction measure. Only a trend was observed for the cognitive/language development composite,  $F(1,61) = 4.40$ ,  $p < .10$  ( $\Delta R^2 = .05$ ,  $\beta = .23$ ). However, when this analysis was repeated separately for the high and low initial level of interaction subgroups, a significant association was obtained but only for the cognitive/language development composite for the high subgroup,  $F(1,30) = 4.82$ ,  $p < .05$ ,  $\Delta R^2 = .14$ ,  $\beta = .37$ .

In contrast, when the regression analysis was repeated for time 2 (entire sample), all measures except arranging play yielded significant associations (see Table 4). As expected, the cognitive/language development composite was positively associated with children's peer interactions and the family risk composite was negatively associated with that measure. However, externalizing behavior was positively associated with the peer interaction measure. These variables accounted for approximately 30% of the variance.

#### *Predictors of Overall Peer Interactions at Time 2*

Another multiple regression analysis was carried out to determine whether these four child and family measures at time 1 could provide additional information with respect to children's peer interactions at time 2, above and beyond peer interactions at time 1. Specifically, with the time 2 overall peer interaction measure as the dependent variable, the time 1 overall peer interaction measure was entered first followed by the child and family measures entered in the same

Table 4  
*Hierarchical Multiple Regression Analysis: Concurrent Associations of Child and Family Factors With the Overall Peer Interaction Measure at Time 2*

Variable	$\Delta R^2$	<i>df</i>	$\Delta F$	$\beta$
Step 1: cognitive/language development	.11	61	7.76**	.34
Step 2: externalizing behavior	.09	60	6.39*	.29
Step 3: family risk	.07	59	4.52*	-.29
Step 4: arranging play	.02	58	1.47	.14

\* $p < .05$ . \*\* $p < .01$ .

order as in the concurrent analyses. None of the child and family measures were predictive of children's overall peer interactions at time 2 after accounting for overall peer interactions at time 1 ( $p > .05$ ).

#### *Predictors of Improvement Over Time*

As noted above, no increment in predictability of the overall peer interaction composite at time 2 was achieved by knowledge of child and family measures at time 1 above and beyond the initial measure of peer interactions obtained at time 1. In order to improve our ability to identify children at highest risk for persistent peer interaction difficulties at time 1, the sample was divided into children who increased their peer interactions over time and those who did not. Membership in these two groups was based on the median percent improvement for the entire group based on the overall peer interaction composite (median increase for the total sample was 29% from time 1 to time 2). A discriminant function analysis was conducted for the four child and family measures (cognitive/language development, externalizing behavior, family risk, and arranging play) and the overall peer interaction composite at time 1. Consistent with the regression analysis predicting time 2 peer interactions, the only measure that significantly discriminated between children who improved over time and those who did not was the overall peer interaction composite at time 1, Wilk's,  $\lambda = .65$ ,  $F(1, 61) = 32.93$ ,  $p < .001$ . Specifically, 87% of those children who increased their peer interactions over time and 77% of those who did not were correctly classified.

## Discussion

Previous research has clearly indicated that preschool/kindergarten-aged children with mild

developmental delays manifest unusual problems in the domain of peer-related social competence. Cross-sectional research or data from samples of older children suggested that these problems tended to persist over time (Guralnick, 1999a). The results from this longitudinal study are consistent with those findings, and confirm our hypothesis that increases in peer interactions over an important transition period from early childhood to early elementary years are modest at best. In fact, the only subgroup in our sample that made substantial gains over the 2-year period based on the overall peer interaction measure was comprised of children whose peer interaction level was unusually low initially. Moreover, the increase achieved by these initially low interactors still fell considerably below that of the high interaction subgroup. In conjunction with our findings of high stability over time for both positive and negative peer interaction measures (as discussed below), our results clearly underscore the unusual nature of the peer interaction problems experienced over time by children with developmental delays. To emphasize this point further from another perspective, it should be noted that the absolute level of complex forms of play, such as group play, was very low in our sample, approximately 8% of total play, even at time 2. This percentage is not substantially different from other, even younger samples of children with developmental delays evaluated under similar circumstances and about half that found for same-age typically developing children (Guralnick & Groom, 1987).

These subgroup differences in changes over time, combined with the high levels of intraindividual stability and the findings of the regression and discriminant function analyses, clearly indicate our ability to identify those young children with mild developmental delays who are at especially high risk of future peer interaction difficulties. Perhaps highly supportive interventions during the preschool/kindergarten period can be of value in helping children in the initially low interaction subgroup to better organize their emerging involvement with peers to achieve more competent forms of social play and perhaps accelerate growth as well. However, we will need to know much more about the social-information processing and emotional regulation abilities of these children as applied to interactions with peers for this to occur (Guralnick, 1999a). Of equal concern is the initially high interaction subgroup, as they did not achieve any significant increases in peer interactions over the 2-year period. This important finding highlights the fragile nature of these children's peer interactions, especially when encountering

challenging social circumstances as occurred in the playgroup setting.

Substantial levels of intraindividual stability were found for both sociable as well as negative and otherwise nonsociable or problematic aspects of their peer interactions. Even solitary and parallel forms of dramatic play, generally associated with maladaptive behavior or low sociometric status during preschool (Rubin, 1982) and the early elementary years (Rubin & Daniels-Beirness, 1983), showed moderate stability. Comparable longitudinal studies for typically developing children show considerably less stability for sociable forms of behavior but substantial stability for those children who exhibit higher levels of withdrawn or aggressive behavior during early childhood (Howes & Phillipsen, 1998; Rubin, Hymel, & Mills, 1989). Relatedly, longitudinal studies of the peer relationships of young children drawn from at-risk groups, such as children in Head Start, or from clinical populations such as children with behavior disorders, have also revealed a pattern not only of more problematic peer relationships but of relatively high levels of stability of those problem behaviors over time (Campbell, 1995; Campbell, Shaw, & Gilliom, 2000; Webster-Stratton & Reid, 2004). The high levels of stability for even sociable forms of peer interaction by children with mild delays found in this study may yet be another indicator of their unusual pattern of social behavior. As revealed in this study, not only are patterns of developmental growth over time modest at best, but also children do not appear to be able to make substantial changes in that pattern relative to other children with mild developmental delays. Moreover, as indicated, positive and negative social behaviors are highly correlated with one another at both time points and are consistent with the high level of conflicts observed for this group of children (Guralnick et al., 1998).

For the entire sample, none of the child or family variables were associated with children's peer interactions at time 1 and were not predictive of peer interactions at time 2 after accounting for children's initial levels of peer interactions. Perhaps the lack of association in time 1 reflects the poor organization (e.g., limited group play) and low level of peer interactions evident in preschool/kindergarten-aged children with mild developmental delays. In support of this interpretation, separate analyses for the high and low initial interaction subgroups at time 1 revealed that the cognitive/language composite was significantly associated with the peer interaction composite, but only for the initially high interactors. However, over time, as peer interactions for the low

subgroup increased, the cognitive/language composite as well as measures of externalizing behavior and family risk became correlated with children's peer interactions, accounting for over 25% of the variance at time 2. It is important to point out that the peer interactions of the initially low interaction subgroup in particular were far less stable than those of the child and family composites, providing an opportunity for this influence to be realized over time as these children's peer interactions increased and became more organized. Of note, externalizing behavior accounted for significant variance after controlling for children's cognitive and language levels, as children with higher levels of externalizing behavior engaged in more extensive play with peers. Although somewhat counterintuitive, this finding is consistent with the overall poor quality of the play of children with developmental delays. Recalling that children in the clinical range for behavior problems were excluded from this sample, the level of externalizing behavior likely corresponds to a higher level of assertiveness, albeit often negative in form.

With respect to family factors at time 2, children whose families were at lower risk as indicated by stress and support had higher levels of peer interactions, even after accounting for child characteristics. This finding for observational measures of peer interactions confirms previous findings for broader measures of social competence (Guralnick et al., 2003). As noted earlier, many mechanisms have been suggested through which low family risk can exert influence on children's peer relationships (Guralnick & Neville, 1997; Ladd & Pettit, 2002) and should be incorporated as part of any comprehensive intervention program. The high stability of both family and child characteristics measures over time suggests that these factors gradually exert their influence as children's peer interactions develop.

Finally, parents arranging peer play opportunities for their child was unrelated at any time to children's peer interactions. Although a positive influence of parent arranging has been obtained for typically developing children (Ladd & Golter, 1988), this does not appear to be the case for children with delays, despite the fact that mothers substantially increased arranging from time 1 to time 2. For these children, increased parent arranging may turn out to be a necessary but not sufficient condition to promote their children's peer relationships, as considerable knowledge and skills specific to this domain of development may be required as well (Guralnick et al., 2003).

A number of issues must be considered in interpreting these findings and understanding their lim-

itations. As noted earlier, this sample of children with mild developmental delays excluded those with significant behavior problems. Recent research indicates that about 25% of children with developmental delays within the cognitive range of those in our sample are likely to exhibit clinically significant behavior problems and that there is considerable continuity over time (Baker, Blacher, Crnic, & Edelbrock, 2002; Baker et al., 2003). Our sample also consisted of a high proportion of intact families interested in improving their child's peer-related social competence. At the same time, it should be noted that the vast majority of young children with mild developmental delays exhibit peer competence difficulties (Guralnick, 1999b). In addition, selecting children only from inclusive programs initially may have resulted in including more children with less severe difficulties. Of note, however, playgroups used for evaluation contained only typically developing children, thereby increasing the similarity in the social composition of the school and testing environments. We also did not examine gender differences because of the relatively small number of girls in our sample. Given the complex gender patterns evident for typically developing children (Rubin et al., 2005; Underwood, 2004), future work on gender differences that is conceptually grounded is certainly warranted.

Another important issue to consider is that children's peer interactions were evaluated in only one situation; that is, with a small group of unfamiliar typically developing peers in an unfamiliar setting. This certainly poses a considerable challenge for children with mild developmental delays, especially given the demands of a peer group entry task. A different pattern may have emerged under less demanding circumstances. Nevertheless, as discussed earlier, correspondingly low levels of peer interactions, including group play, are evident in many different settings for children with mild developmental delays.

In summary, in this first longitudinal study of the peer relationships of young children with mild developmental delays across the transition between the preschool/kindergarten and early elementary periods, we found only modest increases in children's peer interactions but considerable intraindividual stability. Over a 2-year period, based on initial levels of peer interactions, two subgroups of children demonstrated different patterns of change with only the low interactors increasing interactions with peers over time. Positive and negative peer interactions were highly intercorrelated with one another, and stability occurred for sociable as well as nonsociable

and problematic aspects of peer interactions. This latter pattern is quite different from that found for typical, at-risk, or other clinical samples, and appears to be an indicator of the poor organization of children's peer-related social behavior. In addition, child and family factors, although associated concurrently with children's peer interactions at the second time point for the entire sample, did not contribute to the prediction of children's peer interactions from the first time point over and above children's initial level of interactions with peers. Consequently, children's levels of peer interactions during the early childhood years serve as the primary means of identifying children in need of more intensive intervention. Future work will determine whether this low interaction group is more responsive to intervention in view of the more rapid changes in peer interactions they spontaneously display over time. Taken together, these results provide additional insight into the nature of the peer competence problems experienced by children with mild developmental delays and further emphasize the need for comprehensive interventions.

### References

- Abidin, R. R. (1995). *Parenting stress index* (3rd ed.). Odessa, FL: Psychological Assessment Resources, Inc.
- Achenbach, T. M. (1991). *Manual for the child behavior checklist/4-18 and 1991 profile*. Burlington: Department of Psychiatry, University of Vermont.
- Baker, B. L., Blacher, J., Crnic, K. A., & Edelbrock, C. (2002). Behavior problems and parenting stress in families of three-year old children with and without developmental delays. *American Journal on Mental Retardation*, 107, 433–444.
- Baker, B. L., McIntyre, L. L., Blacher, J., Crnic, K., Edelbrock, C., & Low, C. (2003). Pre-school children with and without developmental delay: Behavior problems and parenting stress over time. *Journal of Intellectual Disability Research*, 47, 217–230.
- Bernheimer, L. P., & Keogh, B. K. (1988). Stability of cognitive performance of children with developmental delays. *American Journal on Mental Retardation*, 92, 539–542.
- Bigras, M., LaFreniere, P. J., & Dumas, J. E. (1996). Discriminant validity of the parent and child scales of the parenting stress index. *Early Education and Development*, 7, 167–178.
- Booth, C. L. (1999). Beliefs about social skills among mothers of preschoolers with special needs. *Early Education and Development*, 10, 455–474.
- Campbell, S. B. (1995). Behavior problems in preschool children: A review of recent research. *Journal of Child Psychology and Psychiatry*, 36, 113–149.
- Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, 12, 467–488.
- Carrow-Woolfolk, E. (1985). *Manual for the test for auditory comprehension of language—revised*. Allen, TX: DLM Teaching Resources.
- Crnic, K. A., Greenberg, M. T., Ragozin, A. S., Robinson, N. M., & Basham, R. B. (1983). Effects of stress and social support on mothers and premature and full-term infants. *Child Development*, 54, 209–217.
- Doyle, A., Connolly, J., & Rivest, L. (1980). The effect of playmate familiarity on the social interactions of young children. *Child Development*, 51, 217–223.
- Gallimore, R., Keogh, B. K., & Bernheimer, L. P. (1999). The nature and long-term implications of early developmental delays: A summary of evidence from two longitudinal studies. In L. M. Glidden (Vol. Ed.), *International review of research in mental retardation* (Vol. 22, pp. 105–135). San Diego, CA: Academic Press.
- Gardner, M. F. (1990). *Expressive one word picture vocabulary test-revised*. Novato, CA: Academic Therapy Publications.
- Guralnick, M. J. (1999a). Family and child influences on the peer-related social competence of young children with developmental delays. *Mental Retardation and Developmental Disabilities Research Reviews*, 5, 21–29.
- Guralnick, M. J. (1999b). The nature and meaning of social integration for young children with mild developmental delays in inclusive settings. *Journal of Early Intervention*, 22, 70–86.
- Guralnick, M. J., Connor, R., Hammond, M., Gottman, J. M., & Kinnish, K. (1996). Immediate effects of mainstreamed settings on the social interactions and social integration of preschool children. *American Journal on Mental Retardation*, 100, 359–377.
- Guralnick, M. J., Connor, R. T., Neville, B., & Hammond, M. A. (in press). Promoting the peer-related social development of young children with mild developmental problems: Effectiveness of a comprehensive intervention. *American Journal on Mental Retardation*.
- Guralnick, M. J., & Groom, J. M. (1985). Correlates of peer-related social competence of developmentally delayed preschool children. *American Journal of Mental Deficiency*, 90, 140–150.
- Guralnick, M. J., & Groom, J. M. (1987). The peer relations of mildly delayed and nonhandicapped preschool children in mainstreamed playgroups. *Child Development*, 58, 1556–1572.
- Guralnick, M. J., & Neville, B. (1997). Designing early intervention programs to promote children's social competence. In M. J. Guralnick (Ed.), *The effectiveness of early intervention* (pp. 579–610). Baltimore: Brookes.
- Guralnick, M. J., Neville, B., Connor, R. T., & Hammond, M. A. (2003). Family factors associated with the peer social competence of young mildly delayed children. *American Journal on Mental Retardation*, 108, 272–287.
- Guralnick, M. J., Paul-Brown, D., Groom, J. M., Booth, C. L., Hammond, M. A., Tupper, D. B., et al. (1998). Conflict resolution patterns of preschool children with and

- without developmental delays in heterogeneous playgroups. *Early Education and Development*, 9, 49–77.
- Guralnick, M. J., & Weinhouse, E. M. (1984). Peer-related social interactions of developmentally delayed young children: Development and characteristics. *Developmental Psychology*, 20, 815–827.
- Hollenbeck, A. R. (1978). Problems of reliability in observational research. In G. P. Sackett (Ed.), *Observing behavior: Vol. 2. Data collection and analysis methods* (pp. 79–98). Baltimore, MD: University Park Press.
- Hollingshead, A. B. (1975). *Four factor index of social status*. Unpublished manuscript. Department of Sociology, Yale University, New Haven.
- Howell, A., Hauser-Cram, P., & Warfield, M. E. (2001). *Preschool predictors of later peer acceptance and loneliness in children with disabilities*. Paper presented at the biennial meeting of the Society for Research in Child Development, Minneapolis, Minnesota.
- Howes, C. (1987). Social competence with peers in young children: Developmental sequences. *Developmental Review*, 7, 252–272.
- Howes, C. (1988). Peer interaction of young children. *Monographs of the Society for Research in Child Development*, 53(1, Serial No. 217).
- Howes, C., & Matheson, C. (1992). Sequences in the development of competent play with peers: Social and social pretend play. *Developmental Psychology*, 28, 961–974.
- Howes, C., & Phillipsen, L. (1998). Continuity in children's relations with peers. *Social Development*, 7, 340–349.
- Keogh, B. K., Bernheimer, L. P., & Guthrie, D. (1997). Stability and change over time in cognitive level of children with delays. *American Journal on Mental Retardation*, 101, 365–373.
- Kopp, C. B., Baker, B. I., & Brown, K. W. (1992). Social skills and their correlates: Preschoolers with developmental delays. *American Journal on Mental Retardation*, 96, 357–366.
- Ladd, G. W., & Golter, B. S. (1988). Parents' management of preschooler's peer relations: Is it related to children's social competence? *Developmental Psychology*, 14, 109–117.
- Ladd, G. W., & Pettit, C. H. (2002). Parenting and the development of children's peer relationships. In M. H. Bornstein (Ed.), *Handbook of parenting: Vol. 5. Practical issues in parenting* (2nd ed., pp. 269–304). Mahwah, NJ: Lawrence Erlbaum.
- Ladd, G. W., & Price, J. M. (1987). Predicting children's social and school adjustment following the transition from preschool to kindergarten. *Child Development*, 58, 1168–1189.
- Levy-Shiff, R., & Hoffman, M. A. (1989). Social behavior as a predictor of school adjustment in three-year-olds. *Journal of Clinical Child Psychology*, 18, 65–71.
- Lieber, J. (1993). A comparison of social pretend play in young children with and without disabilities. *Early Education and Development*, 4, 148–161.
- Provost, M. A., & LaFreniere, P. J. (1991). Social participation and peer competence in preschool children: Evidence for discriminate and convergent validity. *Child Study Journal*, 21, 57–72.
- Rubin, K. H. (1982). Nonsocial play in preschoolers: Necessarily evil? *Child Development*, 53, 651–657.
- Rubin, K. H. (2001). *The Play Observation Scale*. College Park: Author. The Center for Children, Relationships and Culture, University of Maryland.
- Rubin, K. H., Coplan, R. J., Chen, X., Buskirk, A. A., & Wojslawowicz, J. D. (2005). Peer relationships in childhood. In M. H. Bornstein & M. E. Lamb (Eds.) *Developmental psychology: An advanced textbook* (5th ed., pp. 469–512). Mahwah, NJ: Lawrence Erlbaum.
- Rubin, K. H., & Daniels-Beirness, T. (1983). Concurrent and predictive correlates of sociometric status in kindergarten and grade one children. *Merrill-Palmer Quarterly*, 29, 337–352.
- Rubin, K. H., Hymel, S., & Mills, R. S. L. (1989). Sociability and social withdrawal in childhood: Stability and outcomes. *Journal of Personality*, 57, 237–255.
- Sparrow, S. S., Balla, D. A., & Cicchetti, D. V. (1984). *Vineland adaptive behavior scales*. Circle Pines, MN: American Guidance Service.
- Taylor, A. R., Asher, S. R., & Williams, G. A. (1987). The social adaptation of mainstreamed mildly retarded children. *Child Development*, 58, 1321–1334.
- Underwood, M. K. (2004). Gender and peer relations: Are the two gender cultures really all that different? In J. B. Kupersmidt & K. A. Dodge (Eds.), *Children's peer relations: From development to intervention* (pp. 21–36). Washington, DC: American Psychological Association.
- Vig, S., Kammer, R. K., & Jedrysek, E. (1987). A later look at borderline and mildly retarded preschoolers. *Journal of Developmental and Behavioral Pediatrics*, 8, 12–17.
- Webster-Stratton, C., & Reid, M. J. (2004). Emotional competence in young children—the foundation for early school readiness and success in classroom social skills and problem-solving curriculum. *Infants and Young Children*, 17, 96–113.
- Wechsler, D. (1989). *Wechsler preschool and primary scale of intelligence—revised*. San Antonio, TX: The Psychological Corporation.
- Wechsler, D. (1991). *Wechsler Intelligence Scale for Children* (3rd ed.). San Antonio, TX: The Psychological Corporation.
- White, B. L., & Watts, J. C. (1973). *Experience and environment* (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall.
- Wilson, B. (1999). Entry behavior and emotion regulation abilities of developmentally delayed boys. *Developmental Psychology*, 35, 214–222.