

Relations Among Child Care Quality, Teacher Behavior, Children's Play Activities, Emotional Security, and Cognitive Activity in Child Care

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Eight hundred forty children (435 girls) enrolled in full-time, center-based child care participated in the study. Children ranged in age from 10 to 70 months. Sixty-six percent of the children were European American, the remainder African American. Children's play activities and cognitive activities as well as their relationships with caregivers were observed within the child care setting. The study tested the prediction that variation in children's cognitive activities could be directly and indirectly explained by child care quality, positive social interaction with teachers, and children's play activities and attachment security with their child care teachers. The prediction was examined and at least partially supported in eight subsamples of infant-toddler and preschool age European American and African American children in subsidized and nonsubsidized child care. Specifically, in seven of the eight subsamples, 15 to 30% of the variability in children's cognitive activities could be predicted from positive social interaction with teachers, attachment security, and participation in creative play activities.

Children's play with objects in their caregiving environment has a long history as a measure of their cognitive activity (Cheyne & Rubin, 1983; Christie & Johnson, 1987; Pepler & Ross, 1981; Rubin & Maioni, 1976). These studies are based on the Piagetian notion that children's cognitive development can be "seen" or assessed by observing the complexity of activity with objects. The assessment of cognitive play in child care centers is possible because child care centers in the United States, regardless of their

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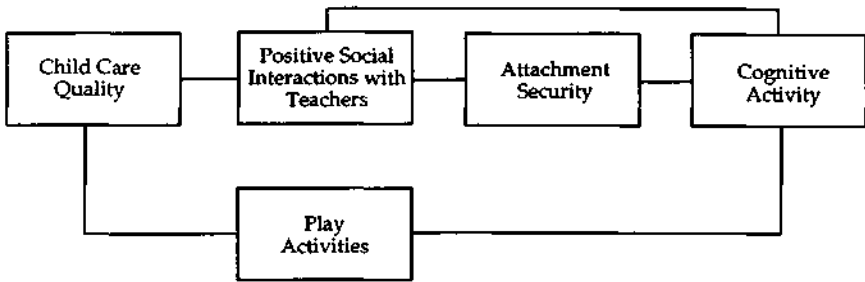


Figure 1. Predicted relations among child care quality, positive social interaction with teacher, children's play activity, and attachment security, and children's cognitive activity.

educational philosophy, tend to provide children with daily learning and play opportunities that encourage or prescribe actions on objects. Within child care centers, children are commonly exposed to language arts experiences including acting out stories and putting words to music, creative activities involving blocks, dramatic play and art material, and puzzles and other manipulatives designed to exercise fine motor skills and spatial coordination. It is assumed that through engaging in these learning and play activities, children's cognitive play will develop increasingly complex forms (Christie & Johnson, 1987).

Furthermore, a second common assumption in child care programs and in early childhood education classes is the Vygotskian notion that more competent cognitive activities will occur when there is both a varied and rich environment, and teachers who enhance, through social interaction, individual children's activities in the environment (Vygotsky, 1978). Therefore, cognitive play or cognitive activity is seen by practitioners and researchers not as an aspect of the early childhood environment, but as the product of an interaction between the classroom environment and the social interaction within that classroom. Despite these common assumptions and the large literature using cognitive play or activity in child care settings as an outcome measure assessing cognitive development, there is surprisingly little research evidence on which to base these claims. The current study is designed to examine the support for these assumptions.

The conceptual framework of the study is presented in Figure 1. The theoretical support for the study comes from three major theories: Piaget, Vygotsky, and Attachment. Empirical support for the direct and indirect predictions is drawn from these theories and from research more specific to child care.

A rich literature on child care quality (see Howes & Hamilton, 1993, for a review of this literature) suggests that child care centers are heterogeneous in their ability to enhance child development. Child care quality is usually

defined as including both structural and process quality (Howes & Hamilton, 1993). Structural quality refers to regulatable aspects of care including adult:child ratio, group sizes, and teacher characteristics including education and training in early childhood education. Process quality refers to the child's experiences in care, particularly teacher provision of developmentally appropriate or inappropriate activities and whether their social interactions with the teacher are positive or harsh. In many recent child care studies, process quality is represented by a global quality measure, the Early Childhood Environment Rating Scale (ECERS) (Harms & Clifford, 1980). Research linking quality of child care to child outcomes suggests that process quality has stronger relations with child outcomes than does structural quality (Howes, Phillips, & Whitebook, 1992) and that social development outcomes are more likely to be predicted by quality variations than cognitive development outcomes (Kontos, Hsu, & Dunn, 1994). In several studies, however, teacher behaviors (e.g., positive interactions with children) were predicted by measures of both structural and process quality (e.g., Roupp, Travers, Glantz, & Coelen, 1979; Whitebook, Howes, & Phillips, 1990). Therefore, we predicted that teacher behaviors would be associated with child care center quality.

In contrast to the literature linking child care quality to teacher behaviors, there is almost no literature linking child care quality to the particular play activities of children within classrooms. However, an unspoken assumption within some of the literature on child care process quality is that activities similar to those highlighted in NAEYC's Developmentally Appropriate Practice guidelines (Bredekamp, 1987; e.g., blocks, open-ended art, dramatic play, sand and water, story reading) equal high-quality care. Indeed, classrooms get "credit" on the ECERS for having blocks and a wood working bench. Furthermore, measures of developmentally appropriate practice correlate highly with the ECERS (Hyson, Hirsh-Pasek, & Rescorla, 1990). Therefore, we expected classroom quality to be associated with children's play activities. We did not expect child care quality to directly predict attachment security or cognitive activities. Instead, child care quality was expected to indirectly influence security and cognitive activities through its influence on teacher positive interaction and play activities.

Based on Piagetian assumptions, we expected children who spent a greater proportion of their time in activities believed to stimulate creative and divergent thought (e.g., block building or fantasy play) to be more likely to exhibit high levels of cognitive activity (Christie & Johnson, 1987). Literature on preschool children's play suggest that the complexity of cognitive activity during play is, in part, dependent on the materials available and on classroom organization (Christie & Johnson, 1987).

In contrast to the assumptions drawn from Piagetian theory that an environment rich in materials would be sufficient to elicit cognitive activity, Vygotskian theory suggests that more complex cognitive activity develops

from the children's experiences in socially structured activity with adults and peers (Vygotsky, 1978). Following this perspective, research on parents and their children suggests that joint activity involvement in which parents are involved with their children's play with materials can enhance children's cognitive activity (Schaffer, 1992). Similar processes occur within child care classrooms. Children in classrooms and family day care homes in which adults were often positively involved with the children as the children played were observed to be more competent in cognitive activity (Howes & Stewart, 1987; Rubenstein & Howes, 1979). Therefore, our model predicts that children who experience more positive social interactions with teachers also will engage in more competent cognitive activity as they play in child care.

Attachment theory (Bowlby, 1982) provides the theoretical framework for the predicted links between positive social interaction with teachers, attachment security, and cognitive activity. Increasing research attention is focused on the child-caregiver attachment relationship (Goosen & van IJzendoorn, 1990; Howes & Hamilton, 1992). Teacher-child relationships in child care have characteristics of attachment relationships in that they develop from recurrent interactions in the context of caregiving and are nonconcordant with maternal attachment (Goosen & van IJzenhoorn, 1990; Howes & Hamilton, 1992; Howes, Hamilton, & Althusen, *in press*; van IJzendoorn, Sagi, & Lambermon, 1992). Children who experience more positive interaction with their teachers are more likely to be securely attached to these teachers (Goosen & van IJzendoorn, 1990; Howes & Hamilton, 1992). Attachment theory suggests that children with secure maternal attachments use their mothers as a secure base for exploring the environment (Ainsworth, Blehar, Waters, & Wall, 1978). The prediction, derived from attachment theory and based on empirical studies of maternal-child attachments, that children with more secure attachments with teachers will be more socially competent with peers, is supported by the teacher-child attachment literature (Howes, Matheson, & Hamilton, 1994). Therefore, we expected that children with secure attachments to teachers would also engage in more competent cognitive activity in child care because they would use their teacher as a secure base for competent exploration of the environment.

A second goal of this study was to examine whether relations predicted by the model are similar for children who vary in ethnicity and social class. The literature linking child care quality to children's development could be criticized for having an imposed etic stance (Geertz, 1984). That is, researchers have adopted a single, supposedly normative meaning system and employed this system to all settings regardless of ethnicity and social class. In contrast, an emic approach attempts to understand and represent indigenous meaning systems (Geertz, 1984). Ethnographic studies of child care settings with other than European American middle-class children (e.g., Corsaro & Rosier, 1993; Hale-Benson, 1989) suggest that behaviors and the

meanings of these behaviors may differ with the ethnicity and social class of the teachers and children served. Therefore, the measures and the conclusions derived from research on middle-class European American children may not be valid for these settings. The current study represents an attempt to examine subcultural patterns in relations using measures frequently applied in child care research. If the model only explains relations in one subcultural group, then further work is needed to develop more culturally appropriate measures.

We chose to examine both social class and ethnicity because most of the research linking child care experiences with children's development has been completed with middle-class European American children enrolled in community-based center care (Hayes, Palmer, & Zaslow, 1990) or with low-income African American children enrolled in center-based intervention programs (c.f., Bryant & Ramey, 1987). Thus, we know considerably more about the experiences of European American children in child care than we know about the experiences of African American children, particularly middle-class African American children. This is unfortunate given that African American mothers have traditionally been employed outside of the home and that African American families tend to use center-based community child care (Bureau of the Census, 1987). Because ethnicity and social class have confounded in prior research, we selected a sample with variation on both of these dimensions.

Sample

One hundred fifty child care programs in Florida, representative of center-based, licensed child care programs within the state, participated in this study. Four counties, each representing different and representative child care regulatory climates within the state, were selected. Within each county we randomly selected child care programs to match the distribution of programs serving subsidized and nonsubsidized families in urban and rural areas and under for-profit and not-for-profit auspices. Programs with at least 50% subsidized children were considered to serve subsidized families. Programs with less than 50% subsidized children were considered to serve non-subsidized families.

The design of the study was to randomly select an infant, toddler, and preschool classroom. Infants were defined in the study, but not necessarily in the centers, as children between 10 and 13 months of age, toddlers as children between 13 and 36 months of age, and preschoolers as children over 36 months of age. If the center did not serve all three age groups, three classrooms were randomly selected from the available age groups. One hundred-forty centers had at least three classrooms. In only 30 of these centers was it possible to select an infant, toddler, and preschool classroom. In 61 of the centers, two preschool classrooms and a toddler classroom were selected as

Table 1. Number of Children in Each Age, Race, and Center Type

Age Group and Race	Center Type			
	Subsidized		Nonsubsidized	
	<i>n</i>	<i>M</i> age (<i>SD</i>)	<i>n</i>	<i>M</i> age (<i>SD</i>)
10 to 35 months				
European American	38	22.5 (9.9)	154	23.5 (6.8)
African American	68	21.1 (7.6)	22	21.1 (7.7)
36 to 70 months				
European American	76	49.1 (9.4)	282	49.4 (9.3)
African American	148	48.1 (9.2)	52	48.9 (8.8)

there were no infant classrooms and only one toddler classroom. In 35 of the centers, three preschool classrooms were selected as there were no infant or toddler classrooms. In 13 centers, two toddler classrooms and one preschool classroom were selected as there were no infant classrooms. In one center, two infant rooms and one toddler classroom were selected as there were no preschool rooms. In the remaining 10 centers, there were only two classrooms in the entire center. Six of these consisted of a toddler and a preschool classroom. The other four centers had two preschool classrooms.

Within each selected classroom two children (one girl, one boy) were randomly selected. Our child sample consisted of 840 children (435 girls). All children were enrolled at least 20 hr per week in center-based child care and had been cared for by their primary caregiver for at least two months prior to our observations. Children ranged in age from 10 to 70 months ($M = 34.07$, $SD = 15.67$). For the purpose of analysis, two age groups were created: infants and toddlers and preschoolers. Sixty-six percent of the children were European American and 34% African American. Forty percent of the sample was enrolled in child care centers serving subsidized children. Table 1 presents the sample breakdown by age, ethnicity, and attendance in a subsidized or nonsubsidized center.

Sixty-three percent of the children had primary teachers of the same ethnicity as themselves. Older and younger children were similarly likely to have primary teachers of the same ethnicity as themselves. Children in non-subsidized care were more likely than children in subsidized care to have primary teachers of the same ethnicity as themselves, $\chi^2(1, N = 840) = 16.41$, $p < .0001$. Specifically, 50% of the African American children in subsidized care had European American teachers and 38% of the European American children in subsidized care had African American teachers. In nonsubsidized

care, 74% of the European American children and 69% of the African American children had primary teachers the same ethnicity as themselves.

Procedure and Measures

Each child was observed by two different observers. One observer was responsible for the Attachment Q-Set, the other for the observations of teacher interaction, children's play activities, and cognitive activities. The child observations were usually conducted on the same day, but not necessarily at the same time. Therefore, the time frame used for observing teacher interaction, children's play activities, and cognitive activities was not necessarily the same as the time frame for observing attachment behaviors. Within the same week as the child observations, a third person interviewed the teacher and completed the ECERS or its infant-toddler equivalent Infant-Toddler Environmental Rating Scale (ITERS).

Observer training was based in part on the Anti Bias Curriculum (Derman-Sparks & the ABC Task Force, 1989) in order to make the observation and ratings culturally sensitive. Training sessions included work on recognizing and putting aside personal biases when entering a classroom. Observers were also trained to look for the meaning and emotional tone of social interaction in the classroom, rather than focusing on interactive style, for example, to pay less attention to the actual words a teacher uses and more to her emotional tone. In as many observations as possible (90%), we matched the ethnicity of the observer to the ethnicity of the head teacher in the classroom.

Attachment Q-Set. The Attachment Q-Set (AQS) was completed on the relationship between the child and the child's primary teacher. When there was more than one adult present in a child care center, the director of the center was asked to identify the child's primary caregiver. If, after an hour of observation, it appeared that another caregiver was the adult to whom the child directed attachment behaviors, we began our observations over again with the newly identified primary caregiver. This need to reidentify the primary caregiver only occurred in 8% of the observations. Observations lasted a minimum of 2 hr ($M = 2.5$ hr, range 2-5 hr). Prior work with the AQS (Howes et al., in press) suggests that 2 hr is the minimum amount of time needed to reliably complete the sort. If the observer was unable to complete the AQS because the 2-hr time frame did not permit seeing sufficient attachment behaviors, the observer continued to observe either on that morning or on a subsequent day. AQS observations began after the target child's parent had departed and finished before nap time. The observer watched as the child and caregiver pursued normal activities in the child care setting. Following the observation, the observer completed the 90-item AQS (Waters, 1990). If an item was not seen, it was placed in the middle pile. For no item was the modal score 5, which would have indicated that the item was usually placed in the middle pile.

Observers were trained to an 85% exact agreement criterion on each item prior to data collection. Interobserver reliability checks were conducted throughout data collection. Median interobserver reliability was $Kappa = .83$ (range $Kappa = .80-.92$).

To obtain security scores, the raw scores from the AQS were correlated with the criterion scores provided for security by Waters (1990). The correlation coefficients are the children's security scores. Security scores can vary from -1.0 to 1.0 . A higher score indicates greater security.

Teacher Interaction, Children's Play Activities, and Cognitive Activities.

An observer observed each child for 2 hr in the child care setting. During this period the observer coded four 5-min time samples of the behavior of the child with teachers and objects. The time samples were spaced evenly throughout the observation period. Each 5-min time sample was broken into fifteen 20-s intervals.

Interobserver reliability on the behavior was established to an 82% agreement (agreements/agreements + disagreements) for all behaviors in an interval prior to data collection. Interobserver reliability was then reestablished at monthly intervals throughout the entire period of data collection. Median reliability scores from these reliability checks ranged from $kappa = .87$ to $kappa = .95$ (median = $.91$).

Teacher Interaction. Within each 20-s interval the child's proximity to the adult was coded. The child was considered to be in proximity if he or she was within 3 feet of the adult. If the child was in proximity, teacher interaction was rated on the adult involvement scale (Howes & Stewart, 1987). This scale has six levels: (a) ignoring the child; (b) routine caregiving, in which the caregiver provides routine care, for example, blowing nose; (c) minimal caregiving, occurring when the caregiver talks to or touches the child in order to discipline her or him, to answer direct requests for help, or to give verbal directives with no reply encouraged, to more responsive caregiving; (d) simple responsive, in which the child's social bids are answered in a positive but brief manner; (e) elaborative, extending and elaborating the child's social bids; and finally, (f) intense caregiving, holding or hugging the child to provide comfort, engaging the child in prolonged conversation, or playing interactively with the child. A single composite score was created from the frequency counts of adult involvement. *Percent elaborated caregiving* was the percent of intervals in which the child was within 3 feet of the adult, and the adult involvement was simple responsive, elaborative, or intense.

Several additional behavior codes were used in the child care center samples to describe caregiving. These were: (a) *positive initiations*—the number of intervals in which the caregiver smiled, vocalized, or touched the child; (b) *positive responses*—the number of intervals in which the caregiver re-

sponded in a positive manner to a social bid from the child; and (c) *positive management*—the number of intervals in which the caregiver verbally intervened, redirected the child, or reminded the child of the rules for behavior.

A measure of *positive social interaction with teachers* ($\alpha = .69$) was created by summing the standardized scores for percent of elaborated caregiving, positive initiation, positive responses, and positive management.

Children's Play Activities. Children's play activities were recorded in each interval. We created 11 coding categories for children's play activities in child care based on pilot observations. These were: (a) open-ended art (e.g., coloring, painting, or play dough with no model or finished product intended); (b) product-oriented art (adult-directed art activities, art with models such as coloring books or paint with water books); (c) manipulatives (puzzles, Legos™, table toys, bristle blocks, shape sorters, etc.); (d) blocks (any block activity including unit, large cardboard, hollow blocks, etc.); (e) fantasy play (play with action figures, dolls, dress-up clothes, housekeeping corner, etc.); (f) looking at or reading books to self; (g) being read to; (h) listening to a story (on record, tape, or video); (i) music (dancing or using instruments); (j) gross motor (running, skipping, wheel toys, climbing, etc.); group (a short circle time); and (k) rote (drill and practice on academic tasks).

We reduced these 11 play activities into five clusters. These play activities clusters were: (a) *Creative*—fantasy play, blocks, and open-ended art; (b) *Language arts*—looking at or reading books to self, being read to, listening to a story (on record, tape, or video), music, and group; (c) *Didactic teaching*—rote and product-oriented art; (d) *Gross motor*; and (e) *Manipulatives*. Each child received a score for the percent of the observation period involved in these activities.

Cognitive Activity. The child's activity with objects in each observational interval was rated on a 5-point scale devised by Rubenstein and Howes (1979). The scale rates increasing complexity of cognitive play from (1) oral contact and passive holding through (3) active manipulation and (5) the exploiting of the unique property of the object for creative or unusual uses. This scale is based on Piagetian notions of cognitive development, increasingly complex play is assumed to represent increasingly complex cognitive activity. Mean scores on this measure are positively correlated with the Bayley Mental Development Index (Bond, Kelly, Teti, & Gibbs, 1983). The *mean level of cognitive activity* was used to describe cognitive play complexity. Mean level of cognitive activity was calculated by weighting the frequency of play at each level by the scale point, summing the weighted frequencies, and dividing by the total frequency of play.

Classroom Quality. Classrooms were observed using the ECERS and the ITERS (Harms, Clifford, & Cryer, 1988). Each classroom was observed

for a total of 2 hr spaced over an entire day. Interobserver reliability on the ECERS and the ITERS ranged from kappa = .82 to kappa = .96, median = .89. ECERS and ITERS items are rated on 7-point scales with a 3 indicating barely adequate quality, a 5 indicating good quality, and a 7 indicating excellent quality. An average item score was calculated for each classroom. This score was then categorized so that classrooms with mean scores less than 3 were considered unacceptable in quality; classrooms with mean scores of 3 or more, but less than 5, were considered acceptable in quality; and classrooms with mean scores of 5 or more were considered good in quality.

The head teachers in each classroom were interviewed individually. Two interview items were used in the current analysis: years of education and a rating of specialized training in early childhood education (ECE) or its equivalent. The weighted training categories were: (0) no training; (1) in-service workshops at the center; (2) workshops in the community; (3) workshops at professional meetings; (4) high school courses; (5) vocational school courses; (6) CDA training; (7) community college courses; (8) AA degree in ECE; (9) courses in a four-year college; (10) BA or BS in ECE; (11) graduate level ECE courses; and (12) graduate degree in ECE. Each teacher was given a summed, weighted score for training. A composite measure representing teacher characteristics was created by summing standardized scores for education and training ($\alpha = .62$).

Counts of the number of adults and children present in the classroom were made every 15 min by the person making behavioral observations. These were averaged to create a mean group size and a mean ratio score for each classroom.

Analytic Strategy

There were no gender differences in the variables selected for study. Therefore, girls and boys were combined to create eight subsamples varying in age (infant, toddler, or preschool), ethnicity (European American or African American) and subsidization of center (subsidized or nonsubsidized). Comparisons were made among these subsamples. Direct and indirect associations predicted by the model guiding the research were examined.

RESULTS

Classroom Quality

On the average, child care quality was only minimally adequate. ECERS scores averaged 4.25 ($SD = 1.01$, range = 1.30–6.51). ITERS scores averaged 3.93 ($SD = 1.28$, range = 1.40–6.57). Both ECERS and ITERS scores were skewed to the left with more classrooms in the inadequate range than in the

good range. Descriptive statistics for each subsample and each measure used in the analysis are presented in Table 2. More infants and toddlers (22%) than preschoolers (15%) were in child care classrooms categorized as inadequate, $\chi^2(2, N=840)=7.46, p<.02$. There were no significant differences in ECERS or ITERS scores between children in subsidized and nonsubsidized classrooms and no significant differences by child ethnicity.

Infants and toddlers had teachers with less education and training than preschool children, $F(1,789)=18.73, p=n.s.$ There were no subsidy or ethnicity differences in these teacher characteristics. Infants and toddlers were cared for in smaller groups, $F(2,679)=9.00, p=.003$, (M [infant-toddler] = 10.2, M [preschoolers] = 14.1), and with fewer children per teachers, $F(2,679)=38.18, p=n.s.$, (M [infant-toddler] = 7.14, M [preschoolers] = 9.41) than preschoolers. There were no subsidy or ethnicity differences in ratio or group size scores.

Classrooms with more educated and trained teachers had higher ITERS ($r=.25, p<.01$) and ECERS scores ($r=.26, p<.01$). Infant-toddler classrooms with more educated and trained teachers also had fewer children ($r=.36, p<.01$). Preschool classrooms with more educated and trained teachers had fewer children ($r=.19, p<.01$) and fewer children per adult ($r=.13, p<.05$).

Relations Between Classroom Quality and Teacher Positive Social Interaction. Differences between the positive social interaction with teacher experiences of European American and African American children in subsidized and nonsubsidized classrooms were compared using a 2 (ethnicity) \times 2 (subsidy) \times 2 (age) analysis of variance (ANOVA). (See descriptive statistics in Table 2.) There were significant age by ethnicity, $F(2,829)=11.26, p=.001$, and age by subsidy, $F(2,829)=6.67, p=.01$, interactions. European American infant-toddlers experienced more positive interaction than European American preschoolers (Scheffe = .01). There were no age differences for African American children. Younger children in subsidized centers experienced more positive interaction than older children (Scheffe = .05). In nonsubsidized centers, older children experienced more positive interaction than younger children (Scheffe = .05). There were also significant main effects for ethnicity, $F(2,829)=9.41, p=.002$, and age, $F(2,829)=3.92, p=.05$. European American children experienced more positive interaction than African American children and younger children more than older.

In order to test our prediction that classroom quality would be associated with teacher behavior and to examine whether the pattern of association would be similar for children of different ethnic backgrounds in subsidized and nonsubsidized centers, we calculated correlations separately for eight groups: subsidized and nonsubsidized European American and African American infant-toddlers and preschoolers. Z tests were used to test for differences between correlations. These correlations are in Table 3.

Table 2. Descriptive Statistics for Subsamples and Measures

Measures	Infants and toddlers				Preschoolers			
	Subsidized		Nonsubsidized		Subsidized		Nonsubsidized	
	E-A	A-A	E-A	A-A	E-A	A-A	E-A	A-A
Quality								
ITER/ECERS								
<i>M</i>	3.99	3.90	3.64	4.91	4.32	3.99	4.30	4.35
<i>SD</i>	1.14	1.31	1.21	1.03	1.03	.94	1.02	1.04
Teacher characteristics								
<i>M</i>	-.40	-.74	-.15	-.42	.22	-.13	.31	.29
<i>SD</i>	1.18	1.36	1.54	1.54	1.81	1.55	1.83	1.84
Ratio								
<i>M</i>	7.11	6.18	7.48	7.07	9.71	9.60	9.25	9.68
<i>SD</i>	3.62	2.62	4.01	3.71	4.28	4.29	4.33	5.52
Group size								
<i>M</i>	13.47	13.58	16.69	14.31	16.28	17.34	17.06	17.60
<i>SD</i>	5.61	6.83	11.45	6.95	7.55	6.99	7.91	7.40
Children's play activities								
Creative								
<i>M</i>	.13	.12	.13	.17	.24	.16	.19	.15
<i>SD</i>	.22	.21	.19	.21	.24	.23	.25	.23
Language								
<i>M</i>	.19	.17	.16	.21	.19	.26	.25	.24
<i>SD</i>	.26	.21	.20	.32	.25	.28	.26	.28
Children's play activities								
Gross-Motor								
<i>M</i>	.16	.20	.19	.12	.21	.20	.12	.18
<i>SD</i>	.23	.28	.23	.23	.30	.27	.19	.26
Manipulatives								
<i>M</i>	.15	.16	.17	.13	.14	.15	.11	.11
<i>SD</i>	.20	.22	.22	.22	.23	.21	.18	.22
Didactic								
<i>M</i>	.05	.01	.02	.00	.04	.08	.07	.08
<i>SD</i>	.11	.05	.08	.00	.10	.14	.16	.15
Teacher positive social interaction								
<i>M</i>	1.48	-.62	.40	-.61	-.61	-.68	-.09	.12
<i>SD</i>	5.95	1.88	3.25	3.69	1.43	1.67	2.06	2.31
Attachment security								
<i>M</i>	.21	.20	.16	.16	.17	.15	.21	.21
<i>SD</i>	.26	.20	.22	.17	.21	.21	.20	.20
Cognitive activity								
<i>M</i>	2.22	2.05	2.47	2.33	2.57	2.65	2.86	2.55
<i>SD</i>	1.29	1.35	.97	1.16	1.52	1.35	1.23	1.40

The largest magnitude and the only significant correlations were found between ECERS/ITERS scores, our measure of global process quality, and positive interaction in African American subsamples. Correlations between

Table 3. Relations Between Classroom Quality and Teacher Behavior

	Classroom quality			
	ITERS/ECERS	Teacher characteristics	Ratio	Group size
Positive Social Interaction				
Infants and toddlers				
Subsidized				
European American	.05	.06	.11	.11
African American	.26*	.11	-.17	-.03
Nonsubsidized				
European American	.01	.01	.08	-.03
African American	.65*	.07	-.10	.06
Preschool				
Subsidized				
European American	.18	.01	.01	-.06
African American	.20*	.02	.10	-.15
Nonsubsidized				
European American	.10	.08	.05	.07
African American	.30*	.22	-.18	-.17

* $p < .05$.

ITERS/ECERS scores and positive interaction for European American subsamples were not significantly different than those African American subsamples.

Relations between Classroom Quality and Children's Play Activities. Differences between the play activities of European American and African American children in subsidized and nonsubsidized classrooms were compared using a 2 (ethnicity) \times 2 (subsidy) \times 2 (age) multivariate analysis of variance MANOVA. Descriptive statistics are in Table 2. There was a significant multivariate main effect for age, $F(5,826) = 9.22$, $p = n.s.$ Older children engaged in more creative, $F(1,830) = 4.51$, $p = .03$, language, $F(1,830) = 4.95$, $p = .03$, and didactic, $F(1,830) = 15.18$, $p = n.s.$ play activities than younger children. There were no other significant main effects or interactions.

In order to test our prediction that classroom quality would be associated with children's play activities and to examine whether the pattern of association would be similar for children of different ethnic backgrounds in subsidized and nonsubsidized centers, we again calculated correlations separately for eight groups: subsidized and nonsubsidized European American and African American infant-toddlers and preschoolers. Only correlations between ECERS/ITERS scores and classroom activities were significant. These correlations are in Table 4. For infant-toddlers in every group, children in classrooms with higher ITES scores engaged in more creative play activities. African American infant-toddlers in nonsubsidized care with higher ITES scores also engaged in more language and fewer gross motor

Table 4. Relations Between Classroom Quality and Children's Play Activities

	Children's Play Activities				
	Creative	Language	Gross-motor	Manipulatives	Didactic
ITERS/ECERS					
Infants and toddlers					
Subsidized					
European American	.46*	.24	-.15	.03	-.08
African American	.35*	-.09	-.16	.08	-.20
Nonsubsidized					
European American	.20*	.03	.03	.11	-.13
African American	.34*	.35*	-.70**	.16	.01
Preschool					
Subsidized					
European American	.20*	.03	.10	-.25*	-.18
African American	.02	.03	-.02	.15	-.06
Nonsubsidized					
European American	.05	.03	-.04	.03	.01
African American	.13	-.05	.05	-.03	-.05

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

play activities. For preschool children, there were significant relations between ECERS scores and children's play activities only in the European American subsidized group. Children in this group with higher classroom ECERS scores engaged in more creative and less manipulative play activity.

Attachment Security

Attachment security scores averaged .18 ($SD = .21$) indicating low levels of emotional security. Differences between the attachment security of European American and African American children in subsidized and nonsubsidized classrooms were compared using a 2 (ethnicity) \times 2 (subsidy) \times 2 (age) ANOVA. Descriptive statistics are in Table 2. There was a significant interaction between age and subsidy, $F(1,791) = 5.41$, $p = .02$. In subsidized centers infant-toddler children ($M = .20$) had higher security scores than preschool children ($M = .15$) (Scheffe = .05). In nonsubsidized centers preschool children ($M = .21$) had higher security scores than infant-toddler children ($M = .15$) (Scheffe = .05). There were no other main effects or interactions.

Relations Between Teacher Positive Social Interaction and Attachment Security. In order to test our prediction that teacher positive social interaction would be associated with attachment security and to examine whether the pattern of association would be similar for children of different ethnic backgrounds in subsidized and nonsubsidized centers, we again calculated

correlations separately for eight groups: subsidized (sub) and nonsubsidized (non-sub) European American (EA), and African American (AA) infant-toddlers (IT) and preschoolers (P). All correlations were positive and significant ($r(I-T, Sub, E-A) = .34$; $r(I-T, Sub, A-A) = .23$; $r(I-T, Nonsub, E-A) = .49$; $r(I-T, Nonsub, A-A) = .57$; $r(P, Sub, E-A) = .33$; $r(P, Sub, A-A) = .39$; $r(P, Nonsub, E-A) = .28$; $r(P, Nonsub, A-A) = .34$).

Relations Between Classroom Quality and Attachment Security. In order to test our prediction that classroom quality would be only indirectly associated with attachment security and to examine whether the pattern of association would be similar for children of different ethnic backgrounds in subsidized and nonsubsidized centers, a series of hierarchical multiple regressions were used, entering positive social interaction with the teacher on the first step and then entering ECERS or ITERS scores. ECERS/ITERS scores were selected to represent quality because previous analyses (Table 3 and Table 4) suggested that it was most likely to be associated with attachment security. Adding classroom quality to teacher positive social interaction did not result in a significant R^2 change for any subsample. This suggests that classroom quality has an indirect rather than a direct association with attachment security.

Cognitive Activity

The mean level of cognitive activity was 2.58 ($SD = 1.28$), which corresponds to functional play. Differences between the mean level of cognitive activity of European American and African American children in subsidized and nonsubsidized classrooms were compared using a 2 (ethnicity) \times 2 (subsidy) \times 2 (age) ANOVA. Descriptive statistics are in Table 2. There was a significant main effect for age, $F(1, 830) = 10.99$, $p = .001$. Older children had higher mean cognitive activity levels than younger ($M[I-T] = 2.32$; $M[P] = 2.73$).

Relations Between Cognitive Activity and Positive Teacher Social Interaction. In order to test our prediction that teacher positive social interaction would be associated with cognitive activity level and to examine whether the pattern of association would be similar for children of different ethnic backgrounds in subsidized and nonsubsidized centers, we again calculated correlations separately for eight groups: subsidized and nonsubsidized European American and African American infant-toddlers and preschoolers. Z tests were used to test for differences between correlations. These correlations are presented in Table 5. All correlations were positive and six of the eight were significant. There were no significant differences among correlations.

Relations Between Cognitive Activity and Attachment Security. In order to test our prediction that attachment security would be associated with cognitive activity level and to examine whether the pattern of associa-

Table 5. Relations Between Teacher Positive Social Interaction and Children's Attachment Security and Children's Cognitive Activity

	Positive interaction	Attachment security
Cognitive Activity		
Infants and toddlers		
Subsidized		
European American	.27	.25
African American	.29*	.18
Nonsubsidized		
European American	.17*	.17*
African American	.21	.21
Preschool		
Subsidized		
European American	.43**	.28*
African American	.26**	.23**
Nonsubsidized		
European American	.47**	.23**
African American	.27*	.35*

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

tion would be similar for children of different ethnic backgrounds in subsidized and nonsubsidized centers we again calculated correlations separately for eight groups: subsidized and nonsubsidized European American and African American infant-toddlers and preschoolers. Z tests were used to test for differences between correlations. These correlations are also presented in Table 5. All correlations were positive and five of the eight were significant. There were no significant differences among correlations.

Relations Between Cognitive Activity and Children's Play Activity. In order to test our prediction that play activity would be associated with cognitive activity level and to examine whether the pattern of association would be similar for children of different ethnic backgrounds in subsidized and nonsubsidized centers, we again calculated correlations separately for eight groups: subsidized and nonsubsidized European American and African American infant-toddlers and preschoolers. Z tests were used to test for differences between correlations. These correlations are presented in Table 6. There were significant and negative correlations between gross motor play activity and cognitive activity level for infant-toddler children in all groups. For all infant-toddler groups there was a positive association between creative play activities and cognitive activity level. Although this association reached significance only in European American infant-toddler children in nonsubsidized center groups, there were no significant differences between the correlations of the groups.

Table 6. Relations Between Children's Play Activities and Children's Cognitive Activity

	Children's Play Activities				
	Creative	Language	Gross-motor	Manipulatives	Didactic
Cognitive Activity					
Infants and toddlers					
Subsidized					
European American	.23	.05	-.37*	.04	-.02
African American	.20	.06	-.24*	.19	.11
Nonsubsidized					
European American	.30**	-.09	-.16*	-.11	.07
African American	.28	.01	-.33*	.05	.00
Preschool					
Subsidized					
European American	.35**	-.07	-.32**	.02	.13
African American	.36**	-.32**	-.28**	.20	.12
Nonsubsidized					
European American	.39**	-.12*	-.06	.07	-.04
African American	.47**	-.31*	-.29*	.08	.14

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

There were significant and positive correlations between creative play activity and cognitive activity level for preschool children in all groups. There were significant and negative correlations between language play activity and cognitive activity level and between gross motor play activity and cognitive activity in three of the four groups. The nonsignificant correlation in the fourth group, in each case, was not significantly different than the other correlations.

Prediction of Cognitive Activity From Teacher Positive Social Interaction, Children's Play Activity, and Attachment Security. The next step in the analysis was to examine the relative contributions of teacher positive social interaction, children's play activity, and attachment security to the prediction of children's cognitive activity using multiple regression procedures. We computed regression equations separately for each of the eight groups. Our strategy was to select the play activity with the highest simple correlation with cognitive activity and to enter it simultaneously with positive teacher social interaction and attachment security into the regression equation. Because the group size of African American infant-toddler in nonsubsidized centers was only 22, only two predictors could be entered into the equation without violating the assumption that there are at least 10 participants per predictor variable in a regression. We used positive interaction and attachment security as predictors rather than activity because of

Table 7. Standard Multiple Regression of Positive Social Interaction, Children's Play Activities, and Attachment Security on Cognitive Activity

Predictor	<i>R</i>	<i>R</i> ²	β	<i>sr</i> ²
Infant-toddler				
Subsidized				
European American	.45*	.20		
interaction			.25*	.26
security			.22*	.21
gross motor			.14	-.14
African American	.40*	.16		
interaction			.26*	.26
security			.14	.15
gross motor			.16	-.15
Nonsubsidized				
European American	.39**	.15		
interaction			.23**	.25
security			.20*	.23
creative			.29**	.29
African American		.25	.06	
interaction			.16	.15
security			.14	.14
Preschool				
Subsidized				
European American	.51**	.26		
interaction			.38**	.38
security			.24**	.15
creative			.38**	.38
African American	.48**	.23		
interaction			.23**	.26
security			.23**	.24
creative			.40**	.42
Nonsubsidized				
European American	.40**	.16		
interaction			.02	.02
security			.21*	.22
creative			.38**	.38
African American	.55**	.30		
interaction			.13	.16
security			.27*	.30
creative			.39*	.42

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

the stronger theoretic rationale for their inclusion. Table 7 displays the regression analysis.

From 15 to 30% of the variability in children's cognitive activity could be predicted from positive social interaction with teachers, attachment security, and participation in creative play activities in seven groups: infant-

toddler, European American children in nonsubsidized centers, and all groups of preschool age children. Infant-toddler children's cognitive activity in subsidized centers was predicted by positive social interaction with teachers, attachment security, and less participation in gross motor play activities.

The pattern of squared semipartial correlations suggested that for European American infant-toddler children in subsidized and nonsubsidized centers and African American preschoolers in subsidized centers, both positive social interaction with teacher and attachment security made positive unique contributions to cognitive activity. For some children in subsidized centers—African American infant-toddlers and European American preschoolers—the unique contribution of positive social interaction with teacher to predicting cognitive activity was greater than that for attachment security. In contrast, for preschool children in nonsubsidized centers, the unique contribution of attachment security to predicting cognitive activity was greater than that for positive social interaction with the teacher. Participation in creative play activities made a large, unique contribution to predicting cognitive activity in all groups in which it was entered as a predictor. The unique contribution of gross motor play activity in the two infant-toddler groups enrolled in subsidized centers was less than the contribution from positive teacher social interaction.

Prediction of Cognitive Activity From Classroom Quality. In order to address the issue of whether classroom quality has a direct association with cognitive activity versus an indirect association through positive social interaction with the teacher, attachment security, and play activities as predicted by the model, a series of hierarchical multiple regressions, were used entering positive social interaction with the teacher, attachment security, and the play activity used in the previous analysis on the first step and then entering ECERS or ITERS scores. ECERS/ITERS scores were again selected to represent quality because previous analyses (see Tables 3 and 4) suggested that it was most likely to be associated. These analyses could not be conducted on two subsamples, European American infant-toddlers in subsidized care and African American infant-toddlers in nonsubsidized care because the number of predictor variables in the equations would have violated the assumption that there are at least 10 subjects per predictor variable in a regression. Adding classroom quality to the equation did not result in a significant R^2 change for any subsample. This suggests that classroom quality has an indirect rather than direct association with cognitive activity.

DISCUSSION

In general, the results of this study found support for the assumption that children's cognitive activity is enhanced within child care classrooms rich in

creative play activities and staffed by teachers who engage the children in positive social interaction. Furthermore, these ingredients—play activities and positive teacher social interaction—were associated with complexity in cognitive activity in child care centers serving subsidized children as well as nonsubsidized children, and for African American children and teachers as well as European American children and teachers.

These findings suggest that the etic measures—positive teacher interaction, play activities, attachment security, and cognitive activity—used in this study can be used to study children and teachers who vary in ethnicity and social class. We suspect that one reason for the success of these measures was the cultural sensitivity training provided for observers. It is also important to note that our measures were fairly global. That is, we were interested in capturing the underlying warmth and sensitivity or harshness in teacher-child interactions rather than assessing cultural styles of interaction (e.g., eye contact or none; a teasing, bantering tone versus a more formal voice; use of home language, etc). We expected that research designed to observe the specific ways in which the ethnic and social class backgrounds of the teachers and children are incorporated into their social interaction will yield very different results.

Activities that enhance child-initiated, complex cognitive play and individualized positive interaction with teachers are essential parts of NAEYC's concept of developmentally appropriate practice (DAP); (Bredekamp, 1987). Concerns about the cultural sensitivity or insensitivity of DAP have been raised in the early childhood education community. In light of these concerns, it is important that we found similar relations among creative activities, positive interaction, and complex cognitive activity for both European American and African American children. It would be misleading, however, to consider the results of this analysis as an unequivocal assessment of DAP. Our measures did not capture some of the elements of DAP including the extent to which activities were child-initiated and to which teacher-child interaction around cognitive activity was individualized to the child's zone of proximal development.

One of the unique contributions of this analysis is that it describes links between teacher-child attachment relationships and children's cognitive activity in child care. Previous research has found relations between the security of children's attachment to their teacher and their social competence with peers (Howes et al., 1992, 1994). Our work extends this previous work by suggesting that children whose child care teacher provided them with emotional security were able to use her as a secure base for competent exploration of the environment and thus enhanced cognitive activity.

Although relations between security of attachment and cognitive activity were positive for all children, security did not make a unique contribution apart from positive social interaction with the teacher in two groups, both

in subsidized centers, and cognitive activity could not be predicted from attachment security in one group, African American infant-toddlers in nonsubsidized centers. Jackson (1993) has argued that traditional attachment research, examining only mother-child attachment security, is inconsistent with African American family organization. A more emic approach would consider multiple attachments. The African American infant-toddlers in nonsubsidized centers were primarily cared for by European American teachers. Perhaps this ethnic mis-match interfered with the process of teacher attachment formation in this group. These findings suggest that further work is needed to examine the role of attachment security in child care for children varied in race and social class.

It is noteworthy that in this sample the average security score for teacher-child attachment was lower than average security scores for teacher-child attachment in larger samples of children (Howes & Smith, 1995) and in samples of children attending child care of higher global quality (Howes & Hamilton, 1992), and lower than average security scores for mother-child attachment (Vaughn & Waters, 1990). Furthermore, in the current study, some preschool children in subsidized care, had lower security scores than younger children. This raises the issue of whether security scores are low because the children's behaviors indicate emotional insecurity with teachers or if the AQS measure itself is inappropriate for children in child care centers or for older children in child care centers. Previous work with security scores derived from observer AQS has found that even very low security scores represent insecure attachment rather than the lack of an attachment relationship (Howes et al., in press). In larger samples derived from more heterogeneous child care settings, security scores have not been found to vary directly with age, although some of the behavioral subscales derived from the AQS (e.g., seeking comfort from the caregiver) do vary with age (Howes & Smith, 1995). In light of this prior research and because, as theoretically predicted, security scores in the current study were associated both with positive teacher social interaction and cognitive activity, we assume that the low security scores indicate emotional insecurity and are a cause for concern.

This cause for concern must be placed within the context of the potential lack of generalizability of the findings. This study was conducted in a state that had, at the time of the study, relatively lax child care regulations. Our data show that very few classrooms in this sample provided good or excellent child care. Twenty-two percent of the infant-toddler classrooms and 15% of the preschool classrooms were rated as inadequate and potentially harmful to children's development. Consistent with prior research (e.g., Bates et al., 1994), when the distribution of child care quality in a sample is skewed towards poor quality, child outcomes tend to present a negative picture of child care. Furthermore, when the distribution of child care quality is not

normal, relations between classroom quality and teacher behaviors appear weak in magnitude, although positive. The findings illustrate a problem with correlational research on child care quality (Howes, Phillips, & Whitebook, 1992).

As predicted by the model, classroom quality was indirectly associated with both child outcome measures, attachment security, and cognitive activity, whereas teacher positive social interaction and children's play activities had more direct associations. These findings may have resulted from the nature of the distribution of classroom quality as discussed above, but they are also reasonable from a theoretical and practical viewpoint. Classroom quality may best be conceptualized as a context for the construction of teacher-child relationships and play activities. The construction of these relationships and activities is dependent, in part, on the individual characteristics brought into the context by the participants. That is, children have particular play interests and social skills and teachers vary in their responsiveness and sensitivity to the individual characteristics of each child in their group, as well as in their ability to plan and provide learning experiences. As we have seen, teachers who provide more positive social interaction are associated with greater emotional security in the children, and teachers who provide more creative play activities are associated with cognitive activity in children. Therefore, we might conclude that more global classroom quality is less important than the skills of the teacher. Many of us have observed wonderful teachers creating excellent classrooms under adverse conditions. However, the quality of the classroom also constrains the construction of relationships and activities. For example, a poorly prepared or overwhelmed teacher will be unable to individually respond to children, or a poorly equipped, crowded, and understaffed classroom will limit play activities available to both teachers and children.

REFERENCES

- Ainsworth, M., Blehar, M., Waters, E., & Wall, S. (1978). *Patterns of attachment*. Hillsdale, NJ: Erlbaum.
- Bates, J.E., Marvinney, D., Kelly, T., Dodge, K.A., Bennett, D., & Pettit, G.S. (1994). Child care and kindergarten adjustment. *Developmental Psychology, 30*, 690-700.
- Bond, L., Kelly, L., Teti, D., & Gibbs, E. (1983, April). *Longitudinal analysis of infant free play with familiar and unfamiliar toys*. Paper presented at the biennial meeting of the Society for Research in Child Development, Washington, DC.
- Bowlby, J. (1982). *Attachment and loss*. New York: Basic.
- Bredenkamp, S. (Ed.). (1987). *Developmentally appropriate practice in early childhood programs*. Washington, DC: NAEYC.
- Bryant, D.M., & Ramey, C.T. (1987). An analysis of the effectiveness of early intervention programs for high risk children. In M. Guralinick & C. Benner (Eds.), *The effectiveness of early intervention for at-risk and handicapped children* (pp. 33-78). San Diego, CA: Academic.
- Bureau of the Census. (1987). *Who's minding the kids?* (Current Population Reports, Series P-70, No. 9). Washington, DC: U.S. Department of Commerce.

- Cheyne, A., & Rubin, K. (1983). Playful precursors of problem solving in preschoolers. *Developmental Psychology, 19*, 577-584.
- Christie, J.F., & Johnson, P. (1987). Reconceptualizing constructive play. *Merrill Palmer Quarterly, 33*, 439-452.
- Corsaro, W.A., & Rosier, K.B. (1993). Documenting productive-reproductive processes in children's lives: Transition narratives of a Black family living in poverty. In W.A. Corsaro & P.J. Miller (Eds.), *Interpretative approaches to children's socialization. New Directions for Child Development, 58*, 67-91.
- Derman-Sparks, L., & the ABC Task Force. (1989). *Anti-bias curriculum*. Washington, DC: NAEYC.
- Geertz, C. (1984). "From the native's point of view": On the nature of anthropological understanding. In R.A. Schweder & R.A. Levine (Eds.), *Cultural theory: Essays on mind, self, and emotion* (pp. 124-136). Cambridge: Cambridge University Press.
- Goosen, F.A., & van IJzendoorn, M.H. (1990). Quality of infant's attachment to professional caregivers: Relation to infant-parent attachment and day-care characteristics. *Child Development, 61*, 832-837.
- Hale-Benson, J. (1989). Cultural context for child care in the Black community. In J.S. Lande, S. Scarr, & N. Gunzenhauser (Eds.), *Caring for children* (pp. 217-231). Hillsdale, NJ: Erlbaum.
- Harms, T., & Clifford, R. (1980). *Early childhood environment rating scale*. New York: Teachers College Press.
- Harms, T., Clifford, R., & Cryer, D. (1988). *Infant-toddler environment rating scale*. New York: Teachers College Press.
- Hayes, S., Palmer, J.L., & Zaslow, M. (1990). *Who cares for America's children: Child care policy for the 1990s*. Washington, DC: National Academy Press.
- Howes, C., & Hamilton, C.E. (1992). Children's relationships with caregivers: Mothers and child care teachers. *Child Development, 63*, 859-866.
- Howes, C., & Hamilton, C.E. (1993). Child care for young children. In B. Spodek (Ed.), *Handbook of research on the education of young children* (pp. 322-336). New York: Macmillan.
- Howes, C., Hamilton, C., & Althusen, V.D. (in press). Using the attachment Q-Set to describe non-familial attachments: Child-caregiver attachments. In E. Waters & B. Vaughn (Eds.), *Attachment*. Hillsboro, NJ: LEA.
- Howes, C., Matheson, C.C., & Hamilton, C.E. (1994). Maternal, teacher, and child care correlates of children's relationships with peers. *Child Development, 65*, 264-273.
- Howes, C., Phillips, D., & Whitebook, M. (1992). Thresholds of quality: Implications for the social development of children in center-based child care. *Child Development, 63*, 449-460.
- Howes, C., & Smith, E.W. (1995). Children and their child care caregivers: Profiles of relationships. *Social Development, 4*, 44-61.
- Howes, C., & Stewart, P. (1987). Child's play with adults, toys, and peers: An examination of family and child care influences. *Developmental Psychology, 23*, 423-430.
- Hyson, M.C., Hirsh-Pasek, K., & Rescorla, L. (1990). The classroom practices inventory: An observational instrument based on NAEYC's guidelines for developmentally appropriate practices for four- and five-year-old children. *Early Childhood Research Quarterly, 5*, 475-494.
- Jackson, J.F. (1993). Multiple caregiving among African Americans and infant attachment: The need for an emic approach. *Human Development, 36*, 87-102.
- Kontos, S., Hsu, H-C, & Dunn, L. (1994). Children's cognitive and social competence in child care centers and family day care homes. *Journal of Applied Developmental Psychology, 15*, 87-110.
- Pepler, D., & Ross, H. (1981). The effects of play on convergent and divergent problem solving. *Child Development, 52*, 344-356.

- Roupp, R., Travers, J., Glantz, F., & Coelen, C. (1979). *Children at the center: Final report of the National Day Care Study*. Cambridge, MA: Abt Associates.
- Rubenstein, J., & Howes, C. (1979). Caregiving and infant behavior in day care and homes. *Developmental Psychology, 15*, 1-24.
- Rubin, K., & Maioni, T. (1976). Free play behavior in middle and lower class preschoolers: Partens and Piaget revisited. *Child Development, 47*, 414-419.
- Schaffer, H.R. (1992). Joint involvement episodes as contexts for development. In H. McGurk (Ed.), *Childhood social development: Contemporary perspectives* (pp. 99-129). Hillsdale, NJ: Erlbaum.
- van IJendoorn, M., Sagi, A., & Lambermon, M. (1992). The multiple caretaker paradox: Data from Holland and Israel. In R.C. Pianta (Ed.), *Beyond the parent: The role of other adults in children's lives*. San Francisco: Jossey-Bass.
- Vaughn, B.E., & Waters, E. (1990). Attachment behavior at home and in the laboratory: Q-Sort observations and strange situation classifications of one-year-olds. *Child Development, 61*, 1965-1973.
- Vygotsky, L.S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.
- Waters, E. (1990). *Attachment Q-Set 90 items*. Unpublished document, State University of New York.
- Whitebook, M., Howes, C., & Phillips, D. (1990). *Who cares? Child care teachers and the quality of care in America. Final Report of the National Child Care Staffing Study*. Oakland, CA: Child Care Employee Project.