

Features of Pre-Kindergarten Programs, Classrooms, and Teachers: Do They Predict Observed Classroom Quality and Child–Teacher Interactions?

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This study draws from the National Center for Early Development and Learning's Multi-State Pre-Kindergarten Study to examine the extent to which program, classroom, and teacher attributes of the program ecology predict observed quality and teacher–child interactions in a sample of 238 classrooms representing 6 states' pre-kindergarten programs. Quality was assessed observationally at the global level and for specific teaching practices. Quality was lower in classrooms with more than 60% of the children from homes below the poverty line, when teachers lacked formal training (or a degree) in early childhood education, and held less child-centered beliefs. Program and teacher attributes were statistically significant, albeit quite modest, predictors of observed quality. Location of the program in a school building, child:staff ratio, and length of day had no relation to quality. State-level factors not attributable to the teacher, program, and classroom factors examined accounted for the majority of explained variance in observed quality. Results suggest that the association between distal features of programs and teachers and quality in pre-kindergarten is more similar to elementary school settings than to child care settings and that quality appears most closely related to proximal teacher and child characteristics.

During the past decade, federal and state governments have been active in creating programs designed to raise school readiness skills of children entering kindergarten. Despite the fact that almost three fourths of the states now fund pre-kindergarten programs, little has been done to document the quality of those programs (e.g., Bryant et al., 2002) or to ask the

extent to which program quality is related to program characteristics that are often mandated by law or that are the focus of training and professional development and support. Nearly every piece of state legislation that provides support for the implementation and expansion of pre-kindergarten programs for 4-year-olds, however, emphasizes that such programs should be of high quality to maximize the extent to which such programs contribute to the academic and social readiness of children to benefit from kindergarten, as is their stated intent (e.g., Bryant et al., 2002; Gallagher, Rooney, & Campbell, 1999). This emphasis on ensuring access to high-quality classroom environments in the preschool years has in turn called attention to features of programs, classrooms, or teachers that predict quality and might be subject to some form of regulation (Bryant, Clifford, & Feinberg, 1991; Graue, 1999; Kagan & Neuman, 1998; National Institute of Child Health and Human Development, Early Child Care Research Network [NICHD ECCRN], 1999, 2002b; Pianta, La Paro,

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Payne, Cox, & Bradley, 2002) or otherwise improved as a function of training or intervention.

Substantial literature has examined the program, classroom, and teacher predictors of quality in child care (e.g., Burchinal, Cryer, Clifford, & Howes, 2002; Burchinal, Howes, & Kontos, 2002; Burchinal et al., 2000; NICHD ECCRN, 1999, 2002b), Head Start (e.g., Head Start Quality Research Consortium [HSQRC], 2003), and in early elementary settings (NICHD ECCRN, 2002a, 2003a, 2003b; Pianta et al., 2002); however, very few large-scale studies have examined these same categories of predictors of classroom quality for publicly supported pre-kindergarten programs. This lack of data stymies ongoing debates at the state and local levels of this rapidly-growing service sector regarding whether child outcomes are improved by these programs. Features of interest include whether the programs are full- or part-day, housed in schools or community settings, universal or targeted, or staffed by certified teachers with 4-year degrees or individuals with less formal training (Bryant et al., 2002; National Center for Education Statistics [NCES], 2003). This study draws from the National Center for Early Development and Learning's Multi-State Pre-Kindergarten Study to evaluate the extent to which features of the ecology of pre-kindergarten programs (program, teacher, classroom attributes) in six states predict three forms of observed classroom quality and teacher-child interactions. In the definition of *state-funded pre-kindergarten* used in this study, we included classroom-based pre-kindergarten programs for 3- and 4-year-olds that receive state funding and are linked to the public education system, including programs administered by public schools or community agencies and those housed in schools or community buildings. This study is designed to have relevance for policy and to evaluate a model of the ecology of these early education settings by including some factors (such as teachers' attitudes) that are not the direct focus of policy.

Conceptualizing and Measuring Quality

Although the term *quality* has been used for many years in the literature on child care and early childhood education (see Bredekamp & Copple, 1997; NICHD ECCRN, 1996, 1999), it has been conceptualized and assessed in a variety of ways. At the most general level, quality is a multidimensional construct that is assessed using a variety of metrics and differing units of analysis, but at its core reflects components of the environment that are related to positive child outcomes in the academic and social domains (Love, Meckstroth, & Sprachman, 1997; NICHD ECCRN, 2002a). Thus a

comprehensive approach to assessing quality entails measurement of different constructs and at different levels of analysis. Notwithstanding definitional and conceptual variations, it is widely accepted that the effects of experiences in early education settings, such as pre-kindergarten programs, derive from proximal-level interactions and transactions among teachers, children, and materials (Bronfenbrenner & Morris, 1998; Pianta, 2003), typically referred to as *process quality*.

Conceptually, process quality in classroom settings involves social, emotional, physical, and instructional elements of interactions with young children, elements that are reflected at several levels of the classroom environment: moment-to-moment displays of discrete behaviors as well as global characterizations of the overall setting. To capture these dimensions of process quality at three levels of analysis, we used three distinct measures, each reflecting different forms of learning experience, sensitive social interaction, and academic stimulation. At the most global level, the Early Childhood Environmental Rating Scale-Revised (ECERS-R; Harms, Clifford, & Cryer, 1998) describes the classroom physical environment and materials and the warmth and responsiveness of child-teacher interaction, aspects that predict both concurrent and future child competencies (Lamb, 1998; Peisner-Feinberg et al., 1999, 2001; Shonkoff & Phillips, 2000). Drawing from the extant literature on the ECERS-R (e.g., Burchinal et al., 2000, Burchinal, Cryer et al., 2002; Peisner-Feinberg et al., 1999, 2001), we utilized two factors extracted from the ECERS-R scales: Teaching and Interactions, and Provisions for Learning. The Teaching and Interactions scale is a measure of the warmth and appropriateness of teacher-child interactions, as well as the richness and quality of language interactions in the classroom. The Provisions for Learning scale is a measure of children's access to and use of appropriate learning materials.

The second measure of quality, the Classroom Assessment Scoring System (CLASS) (La Paro, Pianta, Hamre, & Stuhlman, 2002) is conceptualized as an assessment of the pre-kindergarten classroom as a learning environment. Unlike the ECERS-R, it does not assess physical or structural features of the classroom in measuring process quality but measures the nature and form of the emotional and instruction climate of the classroom. The CLASS scores how productive the environment appears in use of time and activities; how sensitive is the teacher's behavior; the quality of instruction and feedback to students; the effectiveness of behavior management; and the extent to which activities and interactions stimulate conceptual development and engagement. In this study these CLASS scales factored into two subscales, Instructional Climate and

Emotional Climate (La Paro, Pianta, & Stuhlman, in press), a result confirmed in a study of kindergarten classrooms (Pianta et al., 2002). Ratings on Emotional and Instructional quality are associated with children's concurrent social and academic competence and with the extent to which the child demonstrates engagement in ongoing classroom activities (La Paro et al., in press).

Conceptualizations of classroom settings also emphasize the activity settings offered to children on a moment-to-moment basis throughout the day, as indicators of opportunities to learn (Bredenkamp & Copple, 1997). We assessed these opportunities within the framework of the Emerging Academics Snapshot (Ritchie, Howes, Kraft-Sayre, & Weiser, 2001). Because of our interest in understanding the elements of classroom quality that could be altered by policy or training, we focused on Snapshot assessments of the nature and variety of activity settings (free choice/centers, whole-group teacher-led activities, or routines) in the course of the pre-kindergarten day. These are considered indicators of teachers' approaches to implementing the early childhood curriculum being used in the program (Bredenkamp & Copple, 1997) and are not confounded with curriculum, which varied considerably across the classrooms, districts, and states in this study.

The Ecology of Process Quality: Features of Programs, Classrooms, and Teachers

Pre-kindergarten programs designed to improve children's readiness for school are situated in a larger, multilevel ecology that encompasses policy and legislation, cultural factors that encompass family and schooling factors, issues related to training and workforce support, accountability frameworks at state and district levels, and curriculum frameworks, to name a few components (see Johnson et al., 2003; Shonkoff & Phillips, 2000). In this study, we admittedly restrict our focus on the ecology of pre-kindergarten programs to a more limited look at structural features of programs and teacher and classroom characteristics that have been the interest of policy and training efforts (Ripple, Gilliam, Chanana, & Zigler, 1999). In so doing, we recognize that the analyses reported in this study will not reflect the various ways in which features of pre-kindergarten programs (such as teacher training or program goals and curriculum) interact with potentially key variations in cultural and family background, aspects of the ecology of early education and care that require attention (Johnson et al., 2003).

Notwithstanding these limitations in our approach to studying program ecology, as noted earlier, nearly

all state legislation aimed at ensuring access and equity to high quality pre-kindergarten programs relies on structural features of programs or teacher characteristics as the primary targets of regulation (NCES, 2003). It is assumed that if certain features of programs (e.g., ratios, teacher credentials, wages) meet certain thresholds (e.g., teachers with a bachelor's degree, ratios below 16:1, improved salaries) then the program will be of sufficient quality to have the desired positive effect on children's readiness for school. However, the child care and elementary school literatures that we draw from in the following discussion make clear that comprehensive models of quality include predictors from several levels and domains within levels (Burchinal et al., 2000; HSQRC, 2003; NICHD ECCRN, 1996, 1999). Different levels of the early education ecology include program features, classroom attributes, and teacher characteristics, with more proximal features, such as teachers' attitudes, nested within distal features such as teacher training or structural aspects of the program. Across these levels of the ecology, it is posited that the association of quality with distal program features, such as full- or part-day, is at least partially mediated or moderated by proximal factors such as teachers' attitudes or emotional states, a hypothesis that has been supported in research on child care (Hamre & Pianta, 2003).

Within levels of the program ecology, certain parameters are of interest because of their relevance for policy (e.g., teacher wages), professional development (e.g., type of training), or conceptualizations of factors affecting teacher-child interactions (e.g., teachers' depression). Within program features, attention is focused on location and full- or part-day. At the classroom level, the focus is on the educational and developmental needs of the children in the room (in this study, reflected by the percentage of children in poverty in the classroom) and the child:teacher ratio. Teacher characteristics include credentialing and years of experience (aspects of structural quality often reflected in states' regulatory standards) as well as psychological factors such as teachers' depressive symptoms and teachers' beliefs about children, both of which have shown to be uniquely predictive of teachers' interactions with children (Hamre & Pianta, 2003; NICHD ECCRN, 1999). Our approach to examining the ecology of these pre-kindergarten programs reflects this multilevel and multidimensional framework.

Full- and Part-Day Programs

Formalized early education programs for children at-risk of school failure often provide services on a half-day basis, largely as a function of costs, assumptions about exposing young children to too much edu-

cational input, and empirical results demonstrating that attendance in half-day programs is related to improved school functioning (Barnett, 1995; Hubbs-Tait et al., 2002; Reynolds, Temple, Robertson, & Mann, 2001). Although there is variation in the quality of half-day intervention programs, including variation in Head Start quality (Abbott-Shim, Sibley, & Neel, 1992), the benefits of attendance in half-day programs in general appear to accrue to some extent regardless of quality variation (Barnett, 1995). Interest in extending the benefits of early childhood education experiences and in providing wrap-around care experiences for children attending half-day programs has led to an increase in full-day early education programs, as is reflected in some states' pre-kindergarten efforts (Bryant et al., 2003; Clifford et al., 2003). Understanding the degree to which length of day and program quality are associated can help in turn advance understanding of the link between program attendance and child outcomes (Bowman, Donovan, & Burns, 2000; Peisner-Feinberg et al., 2001; Shonkoff & Phillips, 2000).

Location In or Out of School

A second structural variation that may be linked to quality is the location of the pre-kindergarten program; some pre-kindergarten programs are physically located within elementary schools, whereas others are not (Clifford et al., 2003). Because of their physical proximity to and presumed greater interaction with elementary school teachers and administrators, pre-kindergarten classrooms located within elementary schools possibly may look more like those in an elementary school (e.g., basic skill acquisition through large-group instruction) compared to those located in community-based settings not as directly exposed to the elementary curriculum and methods. Although not directly related to classroom quality, there is evidence that location does make a difference in terms of the early childhood-like culture of pre-kindergarten programs as reflected in patterns and success in engaging families, with pre-kindergarten programs located in community settings reported by families to be more flexible in scheduling visits and welcoming in approach to interactions with families (Rimm-Kaufman & Pianta, 2003) despite similarities in teacher experience, training, and program goals to engage families.

Classrooms: Child:Teacher Ratio and Poverty

Attributes of the classroom may play key roles in shaping the quality of experiences children receive. It has been amply demonstrated for example, that

child:staff ratio has a significant effect on observations of process quality and experiences of children with teachers (e.g., Burchinal et al., 2000; NICHD ECCRN, 1999, 2002a) such that quality is higher and child outcomes are better when child:teacher ratio is lower. In addition, it appears that ratio is associated with child outcomes in part as a function of its effect on teacher sensitivity and process quality (NICHD ECCRN, 2002b). It is also the case that attributes of the children in the classroom, collectively, can affect process quality and teacher behavior. In elementary schools, lower levels of quality are observed in classrooms with higher concentrations of poverty (NICHD ECCRN, 2003b; Pianta et al., 2002), with teachers observed to be less sensitive and instructional quality lower when a larger percentage of children in poverty is enrolled in the classroom.

Teacher Credentialing–Training

Reviews of effective teaching practices in early education (Bowman et al., 2000; Howes, James, & Ritchie, 2003; Shonkoff & Phillips, 2000) and empirical reports demonstrating links between child care teachers' practices and child outcomes (Howes, 1997; NICHD ECCRN, 2002a) suggest that, in contrast with teachers who have less formal education or no specific training in early childhood education, providers with BA degrees specifically in early childhood education provide higher quality learning experiences for children in their care. Whether the putative benefits of teacher education are evident in pre-kindergarten settings that tend to be more formal and more highly regulated than child care remains to be seen. In addition to having a formal college degree in early childhood education, it has also been demonstrated that receiving focused training and professional development related to early childhood curricula or practices is related to teachers' more sensitive and stimulating (language) interactions with young children in child care homes (Clarke-Stewart, Vandell, Burchinal, O'Brien, & McCartney, 2002) and centers (Burchinal, Cryer, et al., 2002; NICHD ECCRN, 1999). Clifford et al. (2003) report that states vary considerably in their requirements for pre-kindergarten teachers' training, education, and credentialing, allowing for the possibility of examining associations between these parameters and process quality.

When examining teachers' educational credentials, degrees, or certifications, considerable overlap exists among some of these features, such as is the case when most teachers in pre-kindergarten programs who have a BA also have received specific training in the field of early childhood education (Clifford et al., 2003). Such confounding makes it difficult to disentangle the level from the nature of teacher training, which was the basis

of our decision to combine these factors into a training and credential construct.

Teachers' Psychological Characteristics

In child care settings, providers' psychological characteristics are significantly associated with child care quality in terms of their behavior and interactions with children (Clarke-Stewart et al., 2002; NICHD ECCRN 1999). For example, it has been reported that caregivers' attitudes about children and childrearing predict more positive behavior in home-based care (Clarke-Stewart et al., 2002) and in centers (NICHD ECCRN, 1999). Indeed, it is believed that attitudes about childrearing may account, in part, for why education and training are related to process quality. In addition it has been shown that caregivers' depression is associated with more negative caregiver-child interactions, including harshness and withdrawal (Hamre & Pianta, 2003). These psychological attributes of teachers of young children have received less attention in the literature on elementary school than in child care; however, the child care literature, as well as the parenting literature (e.g., Campbell, Cohn, & Meyers, 1995; NICHD ECCRN, 1999), makes a compelling case for including them in a comprehensive analysis of the predictors of process quality.

In sum, we approach the study of quality in pre-kindergarten programs using a multilevel model of the ecology of such programs, with a focus on factors of relevance to policy and training. We examined program and classroom factors (e.g., location in or out of a school, child:teacher ratio, concentration of poverty in the class), teacher demographic factors (e.g., training and experience), and teacher psychological factors (e.g., depression, attitudes) as predictors of three forms of observed process quality in a sample of pre-kindergarten classrooms in six states. Because of the nature of pre-kindergarten programs as a transition between child care settings and elementary classrooms in terms of formality and regulation, it is not clear the extent to which these structural and distal factors will account for significant explained variance in quality as they do in child care (e.g., Burchinal, Cryer, et al., 2002; Burchinal, Howes, et al., 2002; NICHD ECCRN, 1999, 2002b), will demonstrate the lack of association with quality as has been shown in elementary settings (NICHD ECCRN, 2002; Pianta et al., 2002), or will be influenced by a range of factors related to culture and social structure that were not assessed in this study. The results of such analyses may have considerable implications for debates about how to ensure children's school readiness through access to high quality programming in the expanding pre-kindergarten sector of public education.

Methods

Participating Children, Teachers, and Classrooms

The study took place in six states selected from among states that in 2001 had committed significant resources to pre-kindergarten initiatives. All were serving more than 15% of their 4-year-old children in state-funded pre-kindergarten programs. States were selected to maximize diversity with regard to geography, program location (in a public school building or not), program length (full-day vs. part-day programs, using a cut point of 3.5 hr per day), and educational requirements for teachers. In four states, a stratified random sample of 40 centers-schools was selected from the list of all the centers-schools or programs provided to us by each state's department of education. In two geographically large states, the random sample was drawn from all programs within a large predefined geographic area. Descriptive statistics on the obtained sample are provided in Table 1.

The resulting sample reflected the aforementioned sampling strategy but should not be interpreted as representative of pre-kindergarten programs in aggregate across these six states. Overall, the participating programs were fairly evenly divided in terms of whether they were located in a public school (54%), were part-day programs offering on average less than 3.5 hr of programming a day (49%), and whether the lead teacher had a BA or BS and was certified to teach 4-year-olds (48%). On a weekly basis, the modal full-day program lasted 26 to 35 hr per week with programs ranging from fewer than 15 hr per week (39%), 15 to 25 hr per week (17%), 26 to 35 hr per week (27%), and more than 35 hr per week (16%).

One classroom in each center or school was selected at random for observation. Most classrooms served only 4-year-olds, with a minority serving 3- and 4-year-olds. The observed mean teacher:child ratio was 6.9 children per teacher. Two hundred thirty-eight teachers participated in the study. Almost all (93%) of the teachers in the selected classrooms were women and were predominantly White (61%). Nineteen percent of the teachers were African American and 14% were Latino. The teachers were relatively experienced teaching 4-year-olds, averaging 9.7 years in the classroom with children of this age. See Table 1 for other descriptive statistics on this sample.

Measures and Procedures

Observed Classroom Quality

As noted previously, we observed quality using three assessment systems: two that rated global quality

Table 1. *Descriptive Statistics for Program and Teacher Factors*

	N	M	SD
Child-teacher ratio	224	6.90	2.15
Teacher years of experience w/4-year-olds	233	9.69	7.13
Teacher depressive feelings	236	8.28	6.46
Adult-centered attitudes	233	38.90	9.88
Teacher hourly wages	204	20.93	13.57
Frequency (N)/Percent (M)			
Located in school building	132	54	
Classroom > 60% poor	128	54	
Short day program (< 3.5 hr per day)	112	49	
Teacher education/credential			
BA or certification for 4-year-olds	114	48	
AA/CDA	77	32	
No early childhood training	46	19	
Teacher ethnicity			
African American	45	19	
Latino	32	14	
White	145	61	
Other	15	6	

Note: BA = Bachelors degree; AA = Associates degree. CDA = Child development associate.

(ECERS-R, CLASS) and one that assessed teaching practices reflective of quality (Snapshot). These instruments are described in the following sections. Classroom observations took place in the fall of the pre-kindergarten year. All observers were trained centrally with an expert coder whose codes were considered the “gold standard.”

ECERS-R. Global classroom quality was assessed using the ECERS-R (Harms & Clifford, 1983; Harms et al., 1998). The ECERS-R observation was completed by a data collector different from the individual who conducted the Snapshot and CLASS observations. The ECERS-R is specifically designed for use in classrooms serving children 2 to 5 years of age. ECERS-R scores, using a 7-point scale of quality, ranged from 1 (*inadequate*), 3 (*minimal*), 5 (*good*), and 7 (*excellent*). In addition to the overall composite score, factor analysis of the ECERS-R, conducted in several other investigations (e.g., Burchinal et al., 2000, Burchinal, Cryer, et al. 2002; Peisner-Feinberg et al., 1999, 2001) and confirmed in this study, yielded two factors. The first factor, labeled *Teaching and Interactions*, is a composite of several indicators including staff-child interactions, discipline, supervision, encouraging children to communicate, and using language to develop reasoning skills. The second factor, labeled *Provisions for Learning*, is a composite of indicators such as furnishings, room arrangement, gross motor equipment, art, blocks, dramatic play, and nature or science.

Just prior to data collection, each data collector's reliability on the ECERS-R was tested during a live visit to a practice classroom with one of two project staff who were experts in this measure. Data collectors' mean weighted kappa with the expert trainer was .65

on their final test. On average, 83% of data collector responses were within one scale-point of the trainer's codes. These levels of agreement are consistent with the use of the ECERS-R in other studies (e.g., Burchinal et al., 2000, Burchinal, Cryer, et al. 2002; Peisner-Feinberg et al., 1999, 2001).

CLASS (Pianta, La Paro, & Hamre, 2005). The CLASS provides an assessment of the classroom in terms of quality of emotional climate, classroom management, and instructional supports for learning. The observer rated the pre-kindergarten classroom and the teacher on nine dimensions roughly every 30 min, throughout the two observation mornings in the fall (on the same days as the Snapshot). Each classroom's score is the average of its scores across the two mornings.

Each dimension is rated on a 7-point scale ranging from 1 or 2 (*classroom is low on that dimension*); 3, 4, or 5 (*classroom is in the midrange*); and 6 or 7 (*classroom is high on that dimension*). Positive Climate reflects the enthusiasm, enjoyment, and respect displayed during interactions between the teacher and children and among children. Negative Climate is the degree to which the classroom has a negative emotional and social tone (displays of anger, aggression, or harshness). Teacher Sensitivity is the extent to which teachers provide comfort, reassurance, and encouragement. Over-control reflects the extent to which classroom activities are rigidly structured or regimented. Effective Behavior Management encompasses the teacher's ability to use effective methods to prevent and redirect children's misbehaviors. Productivity reflects how well the teacher manages instructional time and routines so that children learn and make progress. Concept De-

velopment considers the strategies teachers employ to promote children's higher order thinking skills and creativity through problem solving, integration, and instructional discussions. Instructional Learning Formats includes the available activities, method of presentation, use of groupings, and range of materials that teachers use to maximize children's engagement. Finally, Quality of Feedback focuses on the quality of verbal evaluation provided to children about their work, comments, and ideas. Factor analysis of the CLASS yielded two factors, Emotional Climate and Instructional Climate, consistent with the use of these scales in a study of 223 kindergarten classrooms (Pianta et al., 2002). Factor 1, *Emotional Climate*, is a composite of Positive Climate, Negative Climate (reversed), Teacher Sensitivity, Over-control (reversed), and Behavior Management. Factor 2, termed *Instructional Climate*, is a composite of Productivity, Concept Development, Instructional Learning Format, and Quality of Feedback.

Prior to fall data collection, data collector reliability was tested on the CLASS using videotapes of preschool classrooms. Data collectors' mean weighted kappa was .67 on their final test. On average, 89% of data collector responses were exactly the same or within 1 scale-point of the expert's responses. This level of agreement was equal to or higher, on average, than that obtained in studies using these scales in kindergarten (Pianta et al., 2002) and first grade (NICHD ECCRN, 2002a) in which the scales were also related significantly to children's social and academic functioning.

Emerging Academics Snapshot. We used selected items from the Emerging Academics Snapshot (Ritchie et al., 2001) to describe children's experiences within their program. The Snapshot consists of 27 items that are coded as present or absent within a 20-sec period. The items are divided into sections including children's activity setting, children's interaction with adults, and children's engagement with activities. The activity setting categories describe the activities that the teacher prepared for the children, and these categories (mutually exclusive) were a focus of

this study. Routine Activity Setting was coded when the child was engaged in toileting, standing in line, cleanup time, wait time between activities, or waiting for materials to be passed out. The Whole Group Time activity code was used when the child was engaged with the rest of the children in the classroom in a teacher-initiated activity (stories, songs, calendar instruction, discussions, book reading, or demonstrations). The Centers/Free Choice code was applied when children were able to select what and where they would like to play or learn (art projects, blocks, pretend area, puzzles, reading, puppets, computers, science areas, etc). If none of the activity setting was appropriate the interval was coded as Other.

Each Snapshot observation consists of a 20-sec observation period followed by a 40-sec coding period. Data collectors observed each of the study children in succession. Observations of the set of four children were repeated five times. After each 20-min block, data collectors stopped for an average of 5 min to observe the classroom and code other measures (including the CLASS). After completing the other measures, they resumed Snapshot coding. On average, each child was observed and coded 51.1 times ($SD = 18.7$, range = 8 to 120) in the fall over a 2-day period. On each observation day, data collectors stayed from the beginning of the class until the end of the class in part-day rooms, or from the beginning of class until naptime in full-day rooms.

All of the observers from all states were trained centrally using videos and live visits to classrooms. Interobserver reliability on activity setting codes was measured using live coding of classrooms with the measure's authors. The average kappa value, calculated by taking the mean of data collectors' means across activity setting codes, was .95. Table 2 presents descriptive information on the observational indicators of classroom quality.

Teacher, Classroom, and Program Attributes

Teachers were asked to complete questionnaires about themselves, including information on demo-

Table 2. Descriptive Statistics for Observational Indicators

	N	M	SD
Global observations	227		
CLASS Emotional Climate		5.22	0.76
CLASS Instructional Climate		2.47	1.10
ECERS-R Teaching and Interactions		4.43	1.29
ECERS-R Provisions for Learning		3.79	0.96
Snapshot setting (proportion of time)	231		
Free choice/center activity		.35	.15
Routine activity		.20	.08
Whole group activity		.24	.12

Note: CLASS = Classroom Assessment Scoring System; ECERS-R = Early Childhood Environmental Rating Scale-Revised.

graphic characteristics (e.g., race, age, education, training), beliefs about children, and depressive symptoms.

Teacher Attitudes and Beliefs

Teachers' beliefs were measured with the Modernity Scale (Schaefer & Edgerton, 1985), a 15-item Likert-type questionnaire ranging from 1 (*do not agree*) to 15 (*strongly agree*) that discriminates between traditional or relatively adult-centered perspectives on interactions with children and more modern or progressive child-centered perspectives. Scores are derived by taking the mean of all items, with child-centered beliefs reversed-scored. Teachers holding a more adult-centered view agreed with statements such as "Children must be carefully trained early in life or their natural impulses make them unmanageable" and "Children should always obey the teacher." Teachers with more child-centered beliefs agreed with statements such as "Children should be allowed to disagree with their parents if they feel their own ideas are better." Cronbach's alpha for this scale was reported as .84 by the scale's authors and was .78 in this sample.

Teachers' Depressive Feelings

The level of depression experienced by the teacher was assessed using the Center for Epidemiological Studies Depression Scale (Radloff, 1977), a 20-item questionnaire that identifies depressive symptomatology in the general population. Scores are created by taking the mean of all items, with positive items reversed-scored so that the scale score reflects emotional distress. The coefficient alpha for this scale is .86 in this sample. Test-retest reliability is reported as .57 (Radloff, 1977).

Questionnaires to program directors and teachers provided information on whether the program was located in a school building, the daily hours the program operated, which was categorized as *short day* (less than 3.5 hr per day) or not, and classroom child:teacher ratio (number of children–number of staff). Teachers also provided information on the number of years of education they had attained, their years of teaching experience with 4-year-olds, their ethnicity, and training and credentials in early childhood (certificates, endorsements, coursework, etc.). In addition, during the course of selecting the sample of children, we sent a very brief demographic questionnaire home to all the children's families in the selected classrooms. One question assessed the family's income level, which we then categorized as above or below the poverty line. Then for each classroom we calculated the percentage of children below the poverty line in the class and used a 60% threshold to de-

termine if the child was assigned to a high-poverty classroom.

We made several preliminary analyses of teacher education and training to derive the most parsimonious indicator(s) of these attributes. Originally, we were interested in examining the associations between quality and these two indicators separately, as if educational level and early childhood training were distinct or independent. In this data set that was far from the case, so entering these two indicators as independent predictors in regression models was not appropriate. For example, of the 141 teachers in this sample with a BA, 114 (81%) also held a certificate in early childhood education (ECE). Thus a 4-year degree and early childhood certification were highly confounded. Similarly, of the 77 teachers with less than a 4-year degree but with formal training or education such as an associate's degree (AA) or child development associate (CDA), all had specific coursework and training in early childhood education. Because of these links between level of education and training, we simply cannot examine the association between a Bachelors degree (or other levels of education) and quality separate from having certification and training in early childhood education.

For the aforementioned reasons, we combined educational level and training into a three-level categorical variable to better reflect the phenomenon we were describing. This three-level variable reflected the following combinations of level of education and training: (a) no early childhood training (which could include teachers with a high school degree or those few with a 4-year degree in a major other than early childhood education), (b) less than 4-year degree with an early childhood focus (such as an AA in early childhood or a CDA certificate), and (c) a 4-year college degree with specific early childhood training (e.g., a Bachelors in early childhood education). In the regression analyses to follow, the "no early childhood training" category functioned as the reference cell (i.e., comparison group) for the teacher education/training variable.

Analysis Plan

Associations among predictors and outcome variables were examined using correlations or group comparisons, when appropriate, to provide basic descriptive information on the associations among variables. Multivariate analyses were designed to address two questions related to the ecology of these pre-kindergarten settings. First, they asked to what extent characteristics of the program, characteristics of the teacher, and wages predicted observed quality, and whether teacher psychological characteristics or wages accounted for observed associations between quality and either program or teacher characteristics. Thus, we structured

analyses to examine the unique associations of predictors but also whether associations apparently attributable to distal factors were in fact mediated by proximal factors. Second, they asked whether the same pattern of associations between structural characteristics and quality were observed for classrooms observed in and out of public schools and for programs that primarily served poor children or not.

These questions were examined using two analytic approaches. In the first, hierarchical regression was used to examine associations between predictors and outcomes, entering predictors in order of most distal to most proximal in relation to observed quality. Thus, blocks of predictors were entered into the model in the following order: (a) state, (b) program–classroom (in-school, ratio, short day, classroom poverty), (c) teacher demographics (education–training, years experience with 4-year-olds), (d) teacher psychological attributes (traditional attitudes, depressive symptoms), and (e) wages. In this hierarchical model, contributions to prediction were evaluated for each block as it entered the model and for individual predictors within a block, controlling for predictors entered previously. At each step, tests examined whether the block of variables interacted with whether the program was located in a public school and whether the classroom primarily consisted of low-income children. In the second analytic approach, all the predictors were entered simultaneously as a set; thus the association of each predictor with the outcome(s) was examined controlling for all other predictors in the model, allowing for statements about the unique associations attributable to each predictor. These two analytic approaches allowed for understanding how more distal features of programs or

classrooms (e.g., ratio or classroom poverty) may be associated with quality through associations with more proximal variables (e.g., teacher training or attitudes), such as might be the case when a predictor, such as classroom poverty, that is significant at entry does not remain significant in the final model once other factors, such as teacher training or attitudes, are entered and controlled.

Results

Table 3 reports correlations among program and teacher factors used as predictors of classroom quality in subsequent analyses. Child:staff ratio was negatively related to teacher experience, with less experienced teachers in rooms with more children. Teachers expressing depressive symptoms tended to hold traditional attitudes about childrearing.

In terms of group comparisons, programs in a school building were more likely to be short day than programs outside of school buildings (63% vs. 32%), and teachers in school programs were higher paid (\$28/hr vs. \$15/hr). Also, teachers in short-day programs were paid less than those in full-day programs (\$17/hr vs. \$24/hr), and teachers who taught a class composed mostly of poor children were paid less than their counterparts with fewer poor children in their classrooms (\$18/hr vs. \$24/hr). With regard to teacher education/training, teachers with a BA degree and early childhood certification earned higher wages (\$27/hr) than teachers with a CDA/AA (\$15/hr) or no training in early childhood (\$17/hr).

Table 4 reports correlations among the observational indicators of classroom quality. Moderate to

Table 3. *Associations Among Program and Teacher Factors*

Correlations	Experience	Depression	Attitudes	Hourly Wages
Ratio	-.15*	.08	.16*	-.01
Experience		-.09	-.10	.18*
Depression			.21**	.14
Adult-centered attitudes				-.11

* $p < .05$. ** $p < .001$

Table 4. *Associations Among Observed Quality Indicators*

	CLASS		ECERS-R		Activity Settings/Snapshot		
	Instructional	Interactions	Provisions	Whole-Group	Centers	Routine	
CLASS Emotional	.41***	.58***	.34***	-.11	.25***	-.21**	
CLASS Instructional		.41***	.18**	.02	.12	-.26***	
ECERS-R			.61***	-.20***	.30***	-.14*	
Teaching/interactions							
ECERS-R Provisions				-.47***	.55***	-.19**	
Whole group					-.59***	-.40**	
Centers/free choice						-.11	

Note: CLASS = Classroom Assessment Scoring System; ECERS-R = Early Childhood Environmental Rating Scale–Revised.

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

Table 5. *Associations of Program and Teacher Factors with Observed Quality*

	CLASS		ECERS-R		Activity Settings		
	Emotional	Instructional	Interactions	Provisions	Whole Group	Centers	Routine
Ratio	.03	.06	.01	.09	.04	-.06	.04
Experience	.06	-.03	-.08	.06	-.02	.09	-.09
Depression	-.15*	-.11	-.11	.04	-.07	.11	.00
Attitude	-.14*	-.10	-.16*	-.07	.07	-.16*	.06
Wages	.06	.11	-.02	-.20**	.32***	-.18*	-.07

Note: CLASS = Classroom Assessment Scoring System; ECERS-R = Early Childhood Environmental Rating Scale-Revised.

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

large associations were detected among the global quality indicators (CLASS and ECERS-R). Associations between the global indicators and the time-sampled activity settings from the Snapshot varied from minimal to large. In classrooms rated high on the global indicators, children spent more time in centers and less time in routines.

Table 5 presents correlations between continuous predictors (program, classroom, and teacher factors) and the observed quality indicators. Several significant associations were observed; however, all were fairly small. Classrooms with teachers reporting higher levels of depressive symptoms were rated lower on CLASS Emotional Quality. Teachers expressing more traditional beliefs had classrooms rated lower on Emotional Quality and ECERS-R Teaching and Interactions, and their classrooms less often offered children centers as an activity setting. Classrooms with teachers receiving higher wages were rated as lower on the ECERS-R Provisions for Learning factor and were more likely to have children engaged in whole group activities and less likely to offer centers.

The results for the regression models are reported in Table 6 for the global quality indicators (CLASS and ECERS-R) and in Table 7 for the time-sampled activity settings. The first (left-side) column reports the effect for the predictor in a multivariate test adjusting for the covariance among the indicators of quality (e.g., the correlations among CLASS and ECERS-R scores). Tables 6 and 7 are organized to display results for both the hierarchical and simultaneous entry models. For each dependent measure of classroom quality, there are two columns of results. The column on the left presents coefficients corresponding to associations between predictors and that outcome when the predictor is entered into the model. At the block level, entries correspond to the increment in R^2 attributable to that block as it enters the model; these entries are underlined. Under each block-level statistic the standardized betas are reported for each individual predictor. For teacher education/training, the cell entry reflects the standardized betas for the BA/ECE and CDA/AA cate-

gories when each is compared with the category of no early childhood training.

Again, for the *at entry* columns of data, readers should note that the reported figures estimate associations adjusting for all prior predictors. The column of data on the right for each dependent measure lists the standardized betas for each predictor when all are entered in the model as a set; thus these figures are adjusted for all other predictors in the model (e.g., the final model). Neither location of the program nor poverty showed significant interactions in the final analyses, so results from those analyses are not presented in the tables or discussed in the following.

Prediction of Global Process Quality

For predicting global quality ratings (see Table 6), state differences accounted for the largest increments of explained variance (between 8% and 22%) for the global process quality indicators except for the CLASS Emotional Quality score. The multivariate test indicated that the selected program characteristics were related to the quality measures at a multivariate level. More specifically, significant contributions of the program block were observed with the ECERS-R factor scores when entered after state. Classrooms with at least 60% of the children from low-income families were rated as significantly lower in quality in terms of Teaching and Interactions and Provisions for Learning from the ECERS-R. This finding remained significant after adjusting for all other predictors, although the block itself was not significant for the ECERS-R Interactions score.

The teachers' education-training and experience block was significantly related to the global quality measures when added after state and the program block. In particular, teacher characteristics significantly predicted the CLASS Emotional Climate, ECERS-R Interactions, and ECERS-R Provisions scores. Teachers with a 4-year college degree and a teaching certificate in early childhood were rated as creating a more positive emotional climate and providing more activities on the ECERS-R than were teachers with no formal training in early childhood.

Table 6. Prediction of Global Quality From Program and Teacher Factors

	CLASS						ECERS-R			
	Multivariate Effect ^a		Emotional		Instructional		Interactions		Provisions	
	At Entry	Final	At Entry ^b	Final ^c	At Entry ^b	Final ^c	At Entry ^b	Final ^c	At Entry ^b	Final ^c
State	6.74***	5.64***	.03	.03	.15***	.13***	.08**	.07**	.22***	.17***
Program	2.24**	1.44	.04	.02	.02	.01	.03*	.03	.06**	.05**
In school	1.46	.79	.05	.01	.00	-.05	.05	.02	-.09	-.10
Child-staff ratio	.61	.29	-.05	-.03	-.01	.00	-.10	-.08	-.03	-.02
Short day	2.62*	2.16	.07	.10	.04	.04	-.04	-.02	.17*	-.14*
Poor class	4.00**	2.68**	-.15*	-.12	-.17*	-.11	-.20*	-.17*	-.22***	-.21***
Teacher characteristics	2.20*	1.24	.03*	.03	.01	.00	.05*	.03	.06***	.02
Teacher ed/training										
BA/ECE			.21*	.22*	.14	.13	.11	.11	.16*	.15*
CDA/AA			.14	.15	.03	.07	-.02	-.02	.12	.10
Experience w/ 4-year-olds	3.57***	1.08	.17	.08	.05	.00	.27**	.12	.31***	.12*
Teacher psychological	2.10*	2.07	.03*	.04*	.02	.02	.02*	.03*	.02*	.02*
Depression	1.72	1.70	-.13	-.12	-.05	-.04	-.04	-.03	.03	.05
Adult-centered attitudes	2.32	2.24	-.11	-.12	-.16*	-.16	-.14*	-.16*	-.11	-.13*
Wages	1.46	1.46	-.12	-.12	.02	.02	-.13	-.13	-.17*	-.17*
Final R ²				.13**		.21***		.17***		.34***

Note: N = 243. CLASS = Classroom Assessment Scoring System; ECERS-R = Early Childhood Environmental Rating Scale-Revised; BA = Bachelors degree; ECE = Early childhood education; CDA = Child development associate; AA = Associates degree.

^aMultivariate test of effect across all dependent measures; *F* statistic. ^bR² change at entry to the model. ^cStandardized beta from final model with all predictors entered.

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

Table 7. Prediction of Time-Sampled Practices for Activity Settings

	Multi-Variate Effect ^a		Free Choice/Centers		Whole Group		Routine	
	At Entry	Final	At Entry ^b	Final ^c	At Entry ^b	Final ^c	At Entry ^b	Final ^c
State	6.42***	5.02***	.08**	.10***	.15***	.08***	.17***	.17**
Program	2.18*	1.67	.05*	.04*	.05*	.03	.02	.02
In school	2.93*	2.34	-.20**	-.18*	.18	.14	.06	.10
Child-staff ratio	.56	.62	-.07	-.06	.08	.07	-.03	-.04
Short day	2.13	1.49	.04	.06	.12	.09	-.08	-.07
Poor class	2.13	1.77	-.16*	-.15*	.03	.03	.11	.09
Teacher characteristics	.71	.76	.01	.02	.00	.00	.01	.01
Teacher/ed training								
BA/ECE			.08	.07	-.02	-.02	-.05	-.05
CDA/AA			.01	.00	-.06	-.05	.08	.07
Experience w/4-yr-olds	1.06	1.23	.09	.13*	-.01	-.05	.10	-.09
Teacher psychological	2.12*	2.01*	.04*	.01	.02	.02	.01	.00
Depression	1.90	1.74	.14*	.13*	-.07	-.06	.00	.00
Adult-centered attitudes	2.90*	2.80/	-.17*	-.16*	.13*	.13	.05	.05
Wages	2.24	2.24	-.17	-.17	.18*	.18*	-.01	-.01
Final R ²				.19***		.24***		.21***

Note: N = 243. BA = Bachelors degree; ECE = Early childhood education; CDA = Child development associate; AA = Associates degree.

^aMultivariate test of effect across all dependent measures; *F* statistic. ^bR² change at entry to the model. ^cStandardized beta from final model with all predictors entered.

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

Teachers with more years of experience teaching 4-year-olds were rated as more responsive and stimulating in interactions with the child and as providing more activities on the ECERS-R. Most of these observed associations remained significant in the final

model, although the association between teacher experience and the ECERS-R appears to be mediated through the teacher's psychological characteristics.

The teacher's psychological characteristics also contributed significantly to predicting quality when

added hierarchically. This block was significantly associated with the CLASS Emotional, ECERS–R Interactions, and ECERS–R Provision scores. Teachers reporting adult-centered perspectives about interactions with children were rated significantly lower on the CLASS Instructional and ECERS–R Interactions scores, whereas teachers with more depressive symptoms were rated nonsignificantly lower on the CLASS Emotional Climate score. The associations between teacher attitudes and ECERS–R scores remained significant after adjusting for all other variables in the final model.

Finally, teacher wages did not significantly contribute when considered as the final block. As a final check on prediction from wages, we also entered it first in the model (after state) and similar results were obtained. Of note is that the variance explained by the entire set of predictors ranged from 13% (CLASS Emotional Quality) to 34% (ECERS–R Provisions for Learning).

Prediction of Activity Settings

Prediction of the time-sampled activity setting codes from the Snapshot is presented in Table 7 using the same two models with results tabled in the same manner as reported for the global quality indicators. Again, state differences accounted for between 8% and 17% of variance between classrooms, and state was a significant predictor at entry and in the final model for all outcomes. The multivariate test indicated that the set of program–classroom characteristics was related to the quality measures. More specifically, the program–classroom block accounted for significant increments in explained variance for time in free choice–center settings and whole group settings. Classrooms located in a school building offered less time in free choice–center settings and more time in whole group settings. Classrooms with at least 60% of the children from poor families offered less time in free choice–center type activities. Importantly, the effects for location in a school and classroom poverty on less time in free choice–center settings remained significant even in the final model.

The teacher demographic block did not account for significant increments in explained variance for any of the activity setting indicators. The only significant finding related to the predictors in this block was that teachers with more experience teaching 4-year-olds provided more time in free-choice–center settings; however, this isolated effect should be interpreted with caution because the multivariate block test was nonsignificant.

The significant multivariate effect for teacher’s psychological characteristics indicates this block contributed significantly to predicting quality when added hierarchically, particularly for time in free-choice–center activities. More specifically, more time in free

choice–center settings was associated with higher levels of teachers’ self-reported depression and teachers holding more child-centered attitudes. Notably, these associations were obtained with all other predictors controlled. Teacher wages predicted less time in free choice–centers and more time in whole group settings. It should be emphasized that all the associations reported are small. The percentage of variance attributable to the set of predictors ranged from 19% to 24%.

Because programs are nested within states in this sample, as a final check on these results we also examined state-level effects using Hierarchical Linear Modeling. The results obtained when nesting programs within states are no different than those reported earlier.

Discussion

This investigation presents findings related to the extent to which program, classroom, and teacher attributes predict observations of process quality in a large, multistate sample of publicly funded pre-kindergarten programs. The findings help advance understanding of this specific sector of early education services and pertain to debates regarding whether program quality is sensitive to regulations regarding structural program features (such as teacher training or classroom size) and professional development initiatives that focus on teacher training and support (e.g., NCES, 2003; Ripple et al., 1999). Overall, the findings indicate that individually and collectively program and teacher attributes are statistically significant, albeit quite modest, predictors of observed quality in pre-kindergarten classrooms. In fact the obtained associations between features of programs and teachers and observed process quality in these pre-kindergarten classrooms are more similar to those reported for early elementary school settings than for child care settings, for which such associations are consistently greater in magnitude (e.g., Burchinal et al., 2000; Burchinal, Cryer, et al., 2002; Burchinal, Howes, et al., 2002; NICHD ECCRN, 1999, 2002b; Pianta et al., 2002).

The most robust feature of the program ecology was differences among states in factors not reflected in the measures of program, classrooms, or teachers included in the study. It is important to note that follow-up analyses using multilevel modeling did not detect a systematic effect of state on the associations reported for the other predictors. With regard to state effects, several points are germane. First, the associations between state and observed process quality were nearly identical whether state was entered first or last in the model or analyzed in multilevel models; the very small associations with quality that were reported (e.g. for ratio, teacher experience) did not in-

crease when state was entered last. In the context of the models examined, state, as a variable, represents variation in factors other than the other predictors that were included. Reports from other investigations of state-level factors related to the quality of programming for young children suggest that, rather than the nature or level of state regulation present for certain factors (such as ratio or teacher credentials), it is the extent to which state regulations are enforced and professional development support is actively provided to programs to meet regulations that is a mechanism by which state affects process quality (Phillips, Howes, & Whitebook, 1992).

To the extent that any single predictor or set of predictors accounted for increments in explained variance, the findings can be summarized as follows. First, global quality (as assessed by the ECERS-R and CLASS) was lower, by and large, when the classroom was composed of a majority of children below the poverty line, teachers did not have BA-level training in early childhood, and teachers expressed more traditional beliefs about children in which child-adult interactions are understood from an adult-centered perspective. To a lesser extent, global quality, assessed by the ECERS-R, was somewhat higher when teachers had more years experience teaching 4-year-olds and somewhat lower then they earned higher wages. Second, in terms of activity settings offered to children, it appears the more school-like programs and classrooms, such as those located in schools and staffed by teachers earning higher wages, offered less time in center-type activities and more whole group instruction. Finally, if one were to consider the variance explained by the predictors as a set, without including state as a predictor, the total increment in explained variance in global quality attributable to program and teacher characteristics ranged from 8% (CLASS Instructional) to 17% (ECERS-R Provisions), a finding consistent with recent reports on kindergarten and first grade settings in terms of modesty of magnitude (NICHD ECCRN, 2002a; Pianta et al., 2002). It is important to note that no differences in this pattern of associations were observed as a function of the location of the program or the poverty level of children in the classroom. Further, correlations among some predictors limit the extent to which any single predictor was a contributor in predicting quality in the multivariate analyses.

The fairly consistent associations between quality and the percentage of children in poverty in the classroom raise several possible explanations for further examination, two of which are considered here. First, although these programs were often designed and implemented to address the educational and socioemotional needs of children coming from low-income backgrounds, the fact that the saturation of poverty in the classroom is related to lower quality

suggests that the available resources in these classrooms (e.g., personnel, training, etc.) for counteracting the effects of poverty may not be sufficient. That is, it is apparent that when in a classroom with more poor children, any given child (who in these programs is likely to be low income) is exposed to a lower quality experience than a similar child in a class with fewer children from low-income backgrounds. To some extent this reflects the challenge of the collective influence of poverty on the competencies of children attending these programs and the possibility that, as currently organized and delivered, the resources present in these classrooms may not be sufficient to meet this challenge. This finding of a collective effect for the attributes (particularly poverty) of peers in a classroom has been reported for elementary students (Hanushek, 1999) and is consistent with this explanation.

An alternative explanation for the poverty-quality association may be that what was coded as *lower quality* in the classrooms with more poor children was actually quality that is appropriate to these children's needs, the problem being definitional and conceptual. For example, it could be that children from less-advantaged background may benefit more from a different form of early educational experience than peers from more advantaged homes and so the relatively lower quality on the ECERS-R and CLASS measures for children in high-poverty classrooms may be an artifact of an inappropriate definition. This explanation is inconsistent with studies demonstrating the validity of these and other global indicators of quality for predicting social and achievement outcomes among poor and nonpoor children alike (Burchinal et al., 2000; Love et al., 1997; NICHD ECCRN, 2003b; Peisner-Feinberg et al., 2001). However this explanation is further refuted by evidence that the association between high quality (assessed in the ways used in this study) and child outcomes is even higher for poor children than it is for nonpoor children (Burchinal et al., 2000; Hubbs-Tait et al., 2002).

Teacher attributes played a somewhat less prominent role in accounting for quality, but it was clear that such attributes did relate to quality, whether they involved experience, education and credentialing, or attitudes. In short, it appears teachers matter for quality, but through a variety of possible paths. With regard to credentialing and educational level, analyses of teacher credentialing, using the three-category system developed for this study, did suggest that quality was significantly higher for some (not all) indicators when teachers had some level of specialized training in early childhood, although the effects were small. Unlike for studies of child care, in which the actual degree held by the teacher is related to quality, with BA-level providers showing higher quality (e.g., Phillips et al., 1992), in this study whether the teacher

with a BA had specialized training in early childhood education seemed to be more related to observed quality than the degree per se because, in contrast to other studies, there were a fairly substantial number of teachers with BA degrees who had no early childhood training. Although the effect sizes were small, these results suggest that specialized training may be needed in addition to a BA to produce a more effective teacher. This suggested explanation of the value of specialized training in early childhood is consistent with the findings that more experience teaching 4-year-olds and more child-centered (nontraditional) beliefs about children were also related to higher quality. It could be that the variables of education and training, experience teaching young children, and child-centered attitudes about children reflect an understanding of children's developmental needs and teachers' comfort and skill in interacting with young children individually and managing them in groups. Again, it should be emphasized that the associations between teacher factors and quality are quite small.

Also note that several predictors yielded little in the way of significant findings. For example, location in a school building, child:staff ratio, and length of day had little or no relation to the global process quality indicators. In-school location was related to a pattern of activity settings that appeared more formal and school-like, perhaps reflecting the overall influence of an elementary school culture and infusion of elementary curriculum and methods in these classrooms for 4-year-olds. It is not surprising that ratio was unrelated to quality because, unlike in less-regulated child care settings (Lamb, 1998), ratio in these settings was fairly uniform and, on average, low (approximately 7:1). Length of day (short-day programs) was related to lower scores on the ECERS-R Provisions for Learning (but not any other global process quality indicators) and could reflect the difficulty in providing educational programming for young children in a shortened day.

With regard to policy debates concerning program regulation and teacher training needs, these results suggest four cautions. First, we recognize the somewhat restrictive lens through which we viewed these programs. We did not assess or attempt to model the ways in which ethnic, economic, or cultural variations in program settings (local communities, neighborhoods) influenced classroom quality or other program attributes, nor did we examine program features such as those included in this study, in a sample of early education settings servicing young nonrisk children. In this way, our findings do not reflect all sources of variation that have been hypothesized to influence quality (Johnson et al., 2003). Second, with regard to the extent that regulation might achieve observable and meaningful differences in classroom quality, the results of this investigation, although not

in any way causal, suggest that the increment in quality associated with change in regulation of some parameters (e.g., teacher education) may be quite small, whereas for others (e.g., location, program length) one would not expect any change in quality based on changes in regulation that reflect the variation in these parameters that was assessed in this study. Third, it should again be noted that the detected associations were quite modest and would likely be of little functional significance in the field. This caution, in the context of a study that evaluated prediction from program, classroom, and teacher attributes that appear frequently in the research literature, in state regulations, and in discussions of professional development, suggests the conceptual and measurement limitations faced by studies of the ecology of early education settings. Finally, these results suggest that the quality available to children in this sample of pre-kindergarten programs appears more influenced by attributes of teachers and children than by more distal factors in the program ecology. To the degree that policy influences resources offered to children in pre-kindergarten classroom settings (Gallagher et al., 1999), considering the mix of children in the class in terms of economic backgrounds and the capacity of the teachers in terms of training, experience, and attitudes could provide a focus for discussion. Such a discussion would be centered less on policies regulating a teacher's amount of education or degree type and more on professional development opportunities focused on the classroom as an instructional setting, children's actual educational experiences in that setting, and teachers' expressed knowledge and skills.

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