Teacher Structure and Child Care Quality in Preschool Classrooms

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Abstract:

The present study examined the relationships between teacher structure, teacher behaviors, and child care quality. Participants included 72 female teachers from 44 preschool classrooms. Both a global measure of quality and a measure of teacher-child interaction were utilized. Results showed that a co-teacher structure was associated with higher quality child care and more positive teacher behaviors than a hierarchical two-teacher structure or a single-teacher structure. Comparisons between lead and assistant teachers in a hierarchical structure also revealed that teacher behaviors of lead teachers and assistant teachers were very similar, although their education levels were significantly different. Lower ratios and smaller group size were associated with more positive teacher behaviors. Implications for professionals and future research areas are discussed.

Keywords: Education | Early Childhood | Teacher Structure | Preschool | Child Care

Article:

As the number of children enrolled in nonparental child care has increased in the last two decades, so has the emphasis on child care quality in the research literature (Scarr & Eisenberg, 1993). Research results have demonstrated the strong association between high-quality child care and better developmental outcomes for children. Research findings show a positive relationship between high-quality child care and social development (Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg et al., 1999; Vandel, Henderson, & Wilson, 1988; Volling & Feagans, 1995), cognitive development (Burchinal, Roberts, Nabors, & Bryant, 1996; Howes, Smith, & Galinsky, 1995), and language development (NICHD Study of Early Child Care Research Network [NICHD ECCRN], 1999, 2000b; Vernon-Feagans, Emanuel, & Blood, 1997). While child care quality has been measured in various ways, very little is known about teacher structure and how it relates to child care quality. Teacher structure refers to the way teachers are grouped in the classroom (e.g., a co-teacher structure with two lead teachers, a hierarchical two-teacher structure, including a lead teacher and an assistant teacher, and a single-teacher structure with

one lead teacher). Limited work can be found in the early childhood literature that focuses on teacher structure and its relationship to different aspects of child care quality.

Child Care Quality

Child care quality frequently is divided into two categories in the research literature: structural and process quality. Structural quality usually refers to such regulatable variables as adult-child ratio, group size, education level, specialized training, and the experience of the caregivers. Process quality refers to the physical and social environment children experience, including the physical set-up, program structure, activities, and quality of caregiving (Helburn, 1995; Howes, 1992; Phillips & Howes, 1987; Whitebook, Howes, & Phillips, 1989). A wealth of research has examined the association between structural quality and process quality and its relationship to teacher behavior.

Adult-child ratio has been examined in relation to teacher behaviors and teacher-child interactions. Teachers in classrooms with higher teacher-child ratios were rated as more controlling or harsh (Ruopp, Travers, Glantz, & Coelen, 1979; Whitebook et al., 1989). Similarly, teachers were found to be more sensitive and responsive when teacher-child ratios were lower (Howes, 1997; Howes et al., 1995). The NICHD Study of Early Child Care (NICHD ECCRN, 1996, 2000a) found that adult-child ratio was strongly related to sensitive, frequent, and positive caregiving behaviors, especially for infants and toddlers, while other studies (Howes, Phillips, & Whitebook, 1992; Phillipsen, Burchinal, Howes, & Cryer, 1997; Scarr, Eisenberg, & Deater-Deckard, 1994) indicated that adult-child ratio was a strong predictor of global process quality for both infant/toddler and preschool classrooms. To summarize, research findings suggest that lower teacher-child ratios allow teachers to offer more individualized attention to children, thereby resulting in more responsive and stimulating, and less controlling, teacher behaviors.

Group size also has been addressed with respect to teacher behaviors. Generally, as group size decreases, teacher behaviors become more responsive, stimulating, warmer, and less restrictive (Howes, 1983; Ruopp et al., 1979; Smith & Connolly, 1981). The NICHD Study of Early Child Care (NICHD ECCRN, 1996) also demonstrated that smaller group size was associated with positive caregiving behaviors.

Research also indicates that a high level of formal education of the teacher is strongly associated with high-quality teacher-child interactions (Helburn, 1995; Howes et al., 1992; NICHD ECCRN, 1996, 2000a; Phillips, Howes, & Whitebook, 1991; Whitebook et al., 1989). Teachers or caregivers with more education were more sensitive, stimulating, responsive, and supportive. However, teaching experience in child care has very little association with the quality of caregiving and adult behaviors (Dunn, Beach, & Kontos, 1994; Howes, 1983; Howes, Whitebook, & Phillips, 1992; NICHD ECCRN, 1996; Whitebook et al., 1989). In summary, many aspects of structural quality have been reported to be associated with teacher behaviors.

Lower teacher-child ratios, smaller group size, and more teacher education are factors that are closely related to positive teacher behaviors.

Another stream of child care quality research has examined process quality. The quality of caregiving and specifically adult-child interaction often are distinguished as crucial components of high-quality child care and education (Bowman, Donovan, & Burns, 2001; Dwyer, Chait, & McKee, 2000; Kontos, Howes, Shinn, & Galinsky, 1995; NICHD ECCRN, 2000b; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Shonkoff & Phillips, 2000). Elicker and Fortner-Wood (1995) addressed the importance of the relationship between teachers, or other caregivers, and young children, based on the attachments children would develop. They concluded that children who had developed a strong and positive relationship with their teachers and other caregivers were more competent, less prone to have behavioral problems, and had positive peer relationships later in school. Lamb (1998) also documented that children with supportive, responsive, and verbally stimulating caregivers showed more developmental progress than children who lacked those positive caregiving interactions with their caregivers. In their research review, Kontos and Wilcox-Herzog (1997) also reported that sensitivity, warm and responsive interactions, the quality of talk, education, ratio, group size, and curriculum were factors that influenced the quality of teacher-child interactions.

Teacher Structure

Previous research that has examined the relationships among teacher characteristics, child care quality, and different child developmental outcomes has focused primarily on lead teachers. In reality, however, most children interact with multiple caregivers or teachers in their child care arrangements (Burchinal et al., 2000; Epstein, 1999; Howes, 1997). Rarely has the role of different caregivers or teachers been considered in the child care literature. Furthermore, research that has examined the association between the teacher-child interactions and program quality rarely focuses on the quality of teacher-child interactions in single-teacher classrooms versus two-teacher classrooms. It may be that the interactions between the teachers and children in two-teacher classrooms are different from those in single-teacher classrooms, due to teachers' different responsibilities and the possible support (in terms of classroom management and curriculum planning) from a second teacher. In other words, although the teacher-child ratio may be the same, having another teacher in the classroom may provide pedagogical support and camaraderie that single-teacher classrooms do not offer. Similarly, children may benefit more from multiple teachers who provide complementary interaction behaviors.

Currently, most preschool classrooms have two teachers. Based on research from four states, the percentage of lead teachers and assistant teachers is estimated at 62.5 percent and 37.5 percent for center-based child care (Helburn, 1995), respectively, and 80 percent and 20 percent for family child care (Burton, Sakai, & Whitebook, 1999; Burton et al., 2002). This estimation implies that the majority of family child care homes are operated with one caregiver, while approximately one-fourth of center-based child care programs are single-teacher classrooms.

Traditionally, when two teachers are available for one classroom, these positions are set up as lead teacher and assistant. Dewey made a clear distinction between lead and assistant teacher in his own laboratory school. He found that "the younger and less experienced teachers, who served as assistants" were not able to perform child-centered educational practices, due to their lack of understanding in educational principles and necessary instructional skills and attitudes" (cited in Mayhew & Edwards, 1936, p. 370). Even though Dewey's educational philosophy advocated "school as a democratic community" and he believed in collaboration among all members in schools, the distinction that he made clearly implies a hierarchical relationship between lead teachers and assistant teachers and their overall competency as teachers. Kagan and Neuman (1996) also addressed "the needs and desires of individual staff members" in inservice training due to their different education and experience levels (p. 69). Indeed, most public and private schools and child care centers have different hiring criteria in the areas of education and experience for lead and assistant teachers. Therefore, it is generally expected that lead teachers, because of higher level of formal education and experience, would be more competent in their teaching practice and show more positive teacher behaviors than assistant teachers.

The Reggio Emilia school system, on the other hand, has been a unique and successful co-teacher structure, which promotes collaboration not only among children and adults but also among teachers (Filippini, 1998; Malaguzzi, 1998; Rankin, 1997). Several scholars have discussed the implications of the co-teacher structure and the effective collaboration among adults in the Italian preschool system (Edwards, Gandini, & Nimmo, 1994; Katz, 1994). Edwards, Gandini, and Nimmo (1994) found that not only the structure of the school system, such as a co-teacher structure, but also the distinct perspectives on education differentiate educational practice between the United States and Italy. Teachers in Italy considered education as a "communal activity" among children and teachers, while teachers in the United States viewed education as a way of "promoting the development of each individual" (p. 71). Some movement has been made in the United States toward using a co-teacher structure or team teaching system in classrooms of young children (Cutler, 2000; Kostelink, 1992; McNairy, 1988; Powers, 1996; Thornton, 1990). While authors have described the value of a co-teacher or team-teaching relationship from their experience, personal belief, or educational philosophy, empirical work is limited in early childhood education. However, early childhood special education has placed greater emphasis on team teaching or co-teaching (File & Kontos, 1992, 1993; Lieber et al., 1997). A study of co-teacher relationships in inclusive child care settings suggests that the global quality of classroom environment is positively associated with a harmonious co-teacher relationship, as indicated by their perceived resemblance in their beliefs and approaches in teaching, and their personal or professional characteristics (McCormick, Noonan, Ogata, & Heck, 2001). Therefore, children are expected to benefit when teachers consider themselves as equal partners in providing a conducive learning environment and promoting development of young children.

Research Questions

The goal of this research is to extend existing literature on child care quality and teacher behavior in five different aspects. First, this study focuses on the differences in teacher behaviors among co-teachers, lead teachers, and assistant teachers. Second, the difference in the amount, quality, and appropriateness of teacher behavior for single-teacher classroom versus two-teacher classroom will be studied. Third, the difference in global quality for classrooms with one teacher versus two teachers will be examined. Fourth, co-teacher structure will be compared to a hierarchical or traditional two-teacher structure in the area of global quality and positive teaching behaviors. Fifth, specific dimensions of teacher behaviors that are most influenced by group size and teacher-child ratio will be identified.

Method

Participants

Participants in this study included 72 female teachers (36 African American, 35 European American, and one Hispanic) who worked in 44 preschool classrooms with 636 children (349 European American, 242 African American, 13 Hispanic, 10 Asian, and 22 other ethnicity). The teachers were from 29 licensed child care centers in three mid-sized cities in North Carolina. Children were between the ages of 2 and 6 (mean age = 44 months; 288 girls). On average, there were 11.7 children in each classroom (with a range from four to 19). There were 40 lead teachers, 24 assistant teachers, and eight co-teachers. Among the 44 classrooms, 28 were two-teacher classrooms, and 16 were single-teacher classrooms. The ratio of children to teachers was 6.6 on average, with a range from 1.88 to 18 children per teacher. Teacher education level by teacher positions and by number of teachers per class is listed in Table 1 and Table 2.

Table 1. Education Level by Teacher Position

	Lead Teachers	Assistant Teachers	Co-Teachers
H. S. diploma	2 (5.0 %)	8 (3.33 %)	0 (0 %)
NC EC Credential/CDA	11 (27.5 %)	5 (20.8 %)	2 (25 %)
Some College coursework	7 (17.5%)	6 (25.0 %)	0 (0 %)
1 yr. Community college diploma	3 (7.5 %)	1 (4.2 %)	1 (12.5 %)
2 yr. AAS degree	3 (7.5 %)	0 (0 %)	0 (0 %)
4 yr. Degree in other field	0 (0 %)	0 (0 %)	1 (12.5 %)
4 yr. Degree in a related field	6 (15.0 %)	1 (4.2 %)	1 (12.5%)
4 yr. Degree in EC/ CD degree	6 (15.0 %)	2 (8.3 %)	3 (37.5%)
Some graduate coursework	2 (5.0 %)	1(4.2 %)	0 (0 %)

Total	40 (100 %)	24 (100 %)	8 (100 %)

Table 2. Education Level of Single-teacher vs. Two-teacher Classrooms

	Single-teacher Classrooms	Two-teacher Classrooms
H. S. diploma	1 (6.3 %)	1 (3.6 %)
NC EC Credential/CDA	8 (50.0 %)	3 (10.7 %)
Some College coursework	3 (18.8 %)	4 (14.3 %)
1 yr. Community college diploma	2 (12.5 %)	2 (7.1 %)
2 yr. AAS degree	1 (6.3 %)	2 (7.1 %)
4 yr. Degree in other field	0 (0 %)	0 (0 %)
4 yr. Degree in a related field	0 (0 %)	7 (25.0 %)
4 yr. Degree in EC/ CD degree	1 (6.3 %)	7 (25.0 %)
Some graduate coursework	0 (0 %)	2 (7.1 %)
Total	16 (100 %)	28 (100 %)

Procedure

Center directors were contacted and asked to participate in the study. Once director consent was given, teachers and assistant teachers in the center were informed of the study by letter. Each classroom with teacher consent was observed at least three times. Two trained observers visited each classroom independently and completed different measures within a one-week period. One observer, who was responsible for the Early Childhood Environment Rating Scale-Revised (ECERS-R) (Harms, Clifford, & Cryer, 1998), usually stayed more than four hours in the morning on the first visit and collected additional information on group size and teacher-child ratios. The other observer, who was unaware of the ECERS-R rating, was responsible for the Teacher Child Interaction Scale (TCIS) (Farran & Collins, 1996) and usually spent 30 minutes for each teacher in the classroom to observe teacher-child interactions during center times on the second and the third visits. A teacher interview was conducted after all the observations had been made in a classroom with the lead teacher. The interviews lasted about 15-20 minutes in each classroom.

Measures

Early Childhood Environment Rating Scale-Revised. The ECERS-R (Harms et al., 1998) is an established measure used to assess the global quality of the early childhood environment. Forty-three items are structured into seven subscales: Space and Furnishings, Personal Care Routines, Language-Reasoning, Activities, Interaction, Program Structure, and Parents and Staff. Each item is rated on a Likert-type scale from 1 (inadequate) to 7 (excellent). An average score and factor scores were used in the analyses. Previous research on the ECERS-R has identified two distinct factors for this scale (Cassidy, Hestenes, Hegde, Hestenes, & Mims, 2004). Factor 1

includes items 3, 5, 15, 19, 20, 22, 24, 25, 26, and was labeled "Activities/Materials" (Cronbach's alpha = .87). Factor 2 includes items 17, 18, 30, 31, 32, 33, 36, and was labeled "Interaction/Language" (Cronbach's alpha = .81) (Cassidy et al., 2003). Interrater reliability was established at 85 percent at the beginning of the study, and checked after every seventh classroom observation. The average reliability was 92 percent with a range from 86 to 98 percent. The reliability was based on the consensus between pairs of observers, and then close agreement (ratings within one point on the scale) was computed against the consensus.

Teacher Child Interaction Scale. The TCIS (Farran & Collins, 1996) is a measure used to analyze teacher behaviors during children's choice activities periods. Teacher behaviors are recorded for amount, quality, and appropriateness on 11 items: Physical Involvement, Verbal Involvement, Responsiveness, Play Interaction, Teaching Behavior, Control Over Children's Activities, Directives or Demands, Relationship Among Activities, Positive Statements, Negative Statements, and Goal Setting. The amount refers to the frequency of each of the 11 behaviors that teachers demonstrate. Quality indicates the degree of warmth, flexibility, and sensitivity during each of the 11 behaviors that teachers exhibit. The appropriateness deals with the extent to which each of the 11 teacher behaviors corresponds to the children's developmental level and interests. The rating is based on a 5-point Likert-type scale, on which a score of 1 indicates lowest amount, lowest quality, or very inappropriate and 5 indicates highest amount, highest quality, or very appropriate. If a score of I is given for the amount of a behavior, then the observer cannot rate the quality or appropriateness of the behavior. In other words, a low occurrence of any behavior does not permit the observer to know enough about a teacher's behavior to assess the quality or appropriateness.

Two items (Control Over Children's Activities and Directives/Demands) had midpoint scores that often seemed to reflect ideal teaching behavior. For example, in many classrooms, a teacher who displays a moderate amount of control over activities is considered more favorably than a teacher who displays no control or high levels of control. Similarly, some children have individual needs that require more directives than other children. Since the interpretation of the amount score was somewhat ambiguous for these two items, they were eliminated. One item, Negative Statements, was dropped because of its negative direction. Reverse coding of this item did not make conceptual sense. Therefore, the amount subscale was created by summing the remaining eight items. The quality and the appropriateness subscales, however, were created by summing all 11 items. Since each teacher was observed twice, a total score was created for both visits for each subscale. Interrater reliability was 90 percent at the beginning of the study and was checked after every seventh classroom observation; an average of 96 percent (range: 95 to 99 percent) was obtained during the study. These reliability scores also were based on the consensus agreement.

Teacher Interviews. Teacher interviews were conducted at the end of the observations with lead teachers. The teacher was asked questions to complete items not observed on the ECERS-R and to obtain demographic information. This information included the educational level, types of

training, years of experience in early childhood education, and the ethnic background of each teacher in the class.

Results

The accuracy of data was checked by examination of frequencies and histograms. Missing data, outliers, linearity, and normality were checked and data transformations were made for variables with nonnormal distribution (Tabachnick & Fidell, 2001). Only one variable, teacher-child ratio, required transformation due to positive skewness and kurtosis. See Table 3 for means, standard deviations, and ranges for all the dependent measures.

Table 3. Means, Standard Deviations, and Ranges for All Dependent Measures

	Mean	Standard Deviation	Minimum	Maximum	Possible Range
ECERS-R Average Score	4.4141	1.0397	2.36	6.38	1-7
Factor 1 Score (Activities/Materials)	4.2886	1.2200	1.40	6.80	1-7
Factor 2 Score (Interaction/Language)	4.8019	1.4722	1.57	6.86	1-7
TCIS Amount	47.6591	10.1293	24.00	69.00	16-80
TCIS Quality	70.2045	18.9241	24.00	109.00	22-110
TCIS Appropriateness	69.6364	19.2161	28.00	101.00	22-110

Since education level has been shown to play an important role in teacher position and teacher behavior, each research question was examined with the influence of education included and then excluded (i.e., the variance was partialed out) whenever education was shown to be different across groups of teachers. The amount of teaching experience in the early childhood field was not significantly different across teachers and therefore was excluded from further analyses.

Teacher Position and the TCIS

An independent-samples t-test was conducted to evaluate the hypothesis that lead teachers would show more positive teacher behaviors in amount, quality, and appropriateness than assistant teachers. There was no significant difference in the amount (t (62) = .397, p = .692), quality (t (62) = .668, p = .507), or appropriateness (t (62) = .414, p = .680) subscales between lead teachers and assistant teachers. While there was a significant difference in the education level between lead teachers and assistant teachers, education level did not appear to influence scores on the TCIS subscales for these two groups of teachers.

A second independent-samples t-test was conducted to examine the hypothesis that co-teachers would show more positive teacher behaviors (as judged by amount, quality, and appropriateness)

than lead teachers. There was not a significant difference on the amount subscale (t (46) = -1.551, p = .128), but significant differences were found for the quality subscale (t (46) = -2.18, p = .034) and the appropriateness subscale (t (46) = -2.114, p = .04). Co-teachers (M=84.63) demonstrated teaching behaviors that were of higher quality than that demonstrated by lead teachers (M = 68.85). Co-teachers (M = 84.00) also showed more appropriate teaching behaviors than did lead teachers (M= 68.58). Attest found no significant differences in education level between co-teachers and lead teachers (t (46) = 1.12, p = .27).

Number of Teachers and the TCIS

A one-way analysis of variance (ANOVA) was conducted to analyze the hypothesis that two-teacher classrooms would demonstrate more positive teacher behaviors in amount, quality, and appropriateness than would single-teacher classrooms. The ANOVA was not significant on the amount subscale, but was significant for the quality subscale (F (1, 42) = 4.953, p = .031) and the appropriateness subscale (F (1, 42) = 5.251, p = .027). Mean comparisons revealed that two-teacher classrooms were higher than single-teacher classrooms on both the quality subscale ([M.sub.Two] = 72.14, [M.sub.Single] = 60.5) and the appropriateness subscale ([M.sub.Two] = 72.38, [M.sub.Single] = 60). The eta square index ([[eta].sup.2]) indicated that 10 percent of the variance of teacher behavior in quality and 11 percent of the variance of teacher behavior in appropriateness could be attributed to the number of teachers in the classroom.

Since educational level was found to be a defining feature between single-teacher classrooms and two-teacher classrooms (t (42) = -3.96, p < .001), education level was used as a covariate in these comparisons to identify differences between teacher behaviors and the number of teachers per class beyond the education level. A one-way analysis of covariance (ANCOVA) was conducted to examine the hypothesis that two-teacher classrooms would show more positive teacher behaviors in amount, quality, and appropriateness than single-teacher classrooms. When education level was used as a covariate, no significant result was found in amount (F (1, 41) = 1.977, p = .167), quality (F (1, 41) = 3.268, p = .078) or appropriateness (F (1, 41) = 3.212, p = .080).

Number of Teachers and ECERS-R

A one-way analysis of variance (ANOVA) was conducted to analyze the hypothesis that two-teacher classrooms would be higher in child care global quality than single-teacher classrooms. The ANOVA was significant for the ECERS-R average score (F (1, 42) = 14.84, p < .001), the Activities/ Materials factor score (F (1, 42) = 17.99, p < .001), and the Interaction/Language factor score (F (1, 42) = 6.75, p = .013). Mean comparisons revealed that two-teacher classrooms were higher than single-teacher classrooms for the ECERS-R average score ([M.sub.Two] = 4.81, [M.sub.Single] = 3.72), the Activities/ Materials factor score ([M.sub.Two] = 4.73, [M.sub.Single] = 3.37), and the Interaction/Language factor score ([M.sub.Two] = 5.21, [M.sub.Single] = 4.10). The eta square index ([[eta].sup.2]) indicated that 26 percent of the

variance of the ECERS-R average score, 30 percent of the Activities/Materials factor score, and 14 percent of the Interaction/Language factor score could be attributed to the number of teachers in the classrooms.

Since the education level of teachers was higher in two-teacher classrooms than in single-teacher classrooms, this question also was analyzed with education level as a covariate. The one-way analysis of covariance (ANCOVA) results were significant in the ECERS-R average score (F (1,41) = 6.98, p = .012) and the Activities/Materials factor score (F (1,41) = 9.10, p = .004), but no significant result was found for the Interaction/Language factor score (F (1,41) = 2.61, p =. 114). Two-teacher classrooms had higher adjusted means than single teacher classrooms for the ECERS-R average score ([M.sub.Two] = 4.73, [M.sub.Single] = 3.86) and the Activities/ Materials factor score ([M.sub.Two] = 4.65, [M.sub.Single] = 3.52).

Co-Teacher and Hierarchical Teacher Structure

A one-way analysis of variance (ANOVA) was conducted to examine the hypothesis that a co-teacher structure would show more positive teacher behaviors and higher global quality scores than a hierarchical teacher structure. The test was not significant for teacher behaviors or the Interaction/Language factor score, but was significant for the ECERS-R average score (F (1, 26) = 5.01, p = .034) and the Activities/ Materials factor score (F (1, 26) = 6.42, p = .018). The co-teacher structure showed a higher ECERS-R average score ([M.sub.co] = 5.54, [M.sub.hier] = 4.69) and a higher Activities/Materials factor score ([M.sub.co] = 5.78, [M.sub.hier] = 4.56) than the hierarchical teacher structure. The eta square index ([[eta].sub.2]) indicated that 16 percent of the variance of the ECERS-R average score and 20 percent of Activities/ Materials factor score were attributable to the teacher structure. A t-test identified no significant difference between co-teachers and lead teachers on education level (t (26) = - .829, p = .414).

Teacher Behaviors, Global Quality, Teacher-Child Ratio, and Group Size

Correlation coefficients were computed among the three teacher behavior variables, the three global quality variables, the teacher-child ratio, and group size. The results of the correlation analyses are presented in Table 4. Teacher-child ratio was significantly and negatively correlated with teacher behaviors, ECERS-R average score, the Activities/Materials factor score, and the Interaction/Language factor score. The group size was moderately and negatively correlated with teacher behaviors, but not with the ECERS-R scores. In general, the results suggest that lower ratios and smaller group sizes are related to positive teacher behaviors. Lower teacher-child ratios were associated with overall higher quality child care, as well as higher quality classroom activities/materials and higher quality interactions.

Table 4. Means, Standard Deviations, and Ranges for All Dependent Measures

	TCIS Amount	TCIS Quality	TCIS Appropriateness	ECERS-R Average	ECERS-R Activities/Materials	ECERS-R Interaction/Language

				Score	Factor	Factor
Ratio	-.506 *	-.546 *	-.529 *	-.467 *	-.480 *	-.370 *
Group Size	-.387 *	-.402 *	-.373 *	-.339	-.280	-.278

* p<.01

Discussion

Teacher Structure

The results of this study on preschool teachers from 44 preschool classrooms in North Carolina indicate that teacher structure and the number of teachers in a classroom are linked to child care quality and the teacher behavior. A co-teacher structure was associated with the highest child care quality, especially in the area of activities and materials. It is also interesting to note that co-teachers exhibited more positive behaviors in quality and in appropriateness than lead teachers, although there was no difference in their education level. These findings imply that the co-teacher structure may provide a more collaborative and conducive learning environment in the classroom, thus resulting in higher quality and more appropriate teacher behaviors as well as higher child care quality. This finding corresponds with an increasing body of research literature on the importance of teacher relationships and co-teaching structure in early childhood education (Cutler, 2000; Kostelink, 1992; McNairy, 1988; Powers, 1996; Thornton, 1990). Thornton (1990) described how her relationship with the other teacher in her pre-kindergarten classroom had evolved from a hierarchical relationship, in which unequal power over education decisions and responsibilities existed, into a successful team teaching relationship in which shared decision-making and mutual respect was cherished. She believes that a successful team teaching relationship, based on trust and continuing efforts to communicate, is beneficial for both children's learning and the parent-teacher relationship. McNairy (1988), however, reported that the co-teacher structure itself did not guarantee a successful partnership between teachers. Based on an ethnographic study, she indicated that interpersonal frustration, perception of classroom ownership, perceived differences about individual status, and lack of communication influenced a teacher's teaching behavior in a co-teaching structure. Therefore, evidence from this study and others indicates that a co-teacher structure can be associated with positive teaching behaviors; additional research is needed, however, to determine the type of co-teacher relationship that might be the most beneficial.

Hierarchical or traditional two-teacher structure appears to be the next most favorable teacher structure. Teachers in a hierarchical structure showed more positive teacher behaviors in quality and appropriateness than those in single-teacher classrooms. This finding is consistent with earlier research showing teachers in single-teacher classrooms had lower appropriate caregiving scores than those in two-teacher classrooms (Whitebook et al., 1989). However, when teacher education level was statistically controlled, the differences were not present. These findings seem

to indicate that teacher education level played a critical role in explaining the difference between those two groups of teachers. Classrooms with a hierarchical two-teacher structure also had higher child care quality scores than classrooms with a single-teacher structure, regardless of the teacher education level. This was true for the ECERS-R average score and the Activities/ Materials factor score. It is not surprising that a two-teacher structure allows teachers to set up a greater variety of activities and to make more use of the materials than a single-teacher structure. It is also likely that two-teacher classrooms are larger and have more materials that may be better maintained than single-teacher classrooms.

It is noteworthy, however, that teacher position was not related to positive teacher behaviors in the hierarchical teacher structure. There was no difference between lead teachers and assistant teachers in amount, quality, and appropriateness of teaching behaviors, even though their education level was significantly different. Although the two teachers held different roles, they seemed to be exhibiting similar behaviors. This finding is somewhat consistent with previous research on teacher responsibilities and teacher positions (Kontos & Stremmel, 1988; Whitebook, Howes, Darrah, & Friedman, 1982). Kontos and Stremmel (1988) concluded that the type of responsibility and the time spent on task was very similar between lead teachers and assistant teachers. The only outstanding exception they found was that lead teachers spent much more time on behavior management than did assistant teachers, directors, or aides. Whitebook et al. (1982) also pointed out that the job title of the teachers did not reveal differences in the types of duties between teachers, aides, or teacher/directors, whereas it was reflected in their compensation, benefits, and education level. The multiple roles of teachers in child care seem to become blurred across different positions as compared to other professions. Kontos and Stremmel (1988) referred to this as "the uniqueness of child care work," whereby even people in higher ranking positions were expected to do routine work (p. 88).

Research on teachers and assistant teachers in elementary schools, on the other hand, revealed that assistant teachers were regarded either as complementary personnel who bring a different knowledge base or set of skills (Harris, 2002) or reduce the perceived stress of the teachers (Blatchford, Martin, Moriarty, Bassett, & Goldstein, 2002). Blatchford et al. (2002) evaluated the association among class size, adult-child ratio, the number of teaching assistants, and children's educational outcomes on literacy and math in their three-year longitudinal study following 11,386 children from their first to third years of school in England. They concluded that the assistant teachers made no difference on children's educational progress across the years, even though the survey of teachers about the effect of their teaching assistant revealed that having extra adults in their classroom helped teaching effectiveness and classroom management. Assistant teachers in elementary schools seem to provide different roles than assistant teachers in child care settings.

Assistant teachers in child care appear to engage in comparable tasks to lead teachers and perhaps, across time, both lead and assistant teachers display more similar behaviors. These behaviors, however, are not maintained at a level as high as the behaviors of co-teachers.

Additional research is needed to determine how teacher behaviors change across time when they are paired with assistants versus co-teachers, as well as what impact one member of a teaching team has on the other member.

Single-teacher structure in this study was found to be the lowest in child care quality, and teachers in a single-teacher structure showed the least positive teacher behaviors. The lower teacher education level and having the sole responsibility for teaching and managing different duties may explain why a single-teacher structure may lead to lower quality scores and less positive teaching behaviors. It is also possible that these teachers were in smaller classrooms with fewer materials, and this may have limited their ability to set up the highest quality classrooms. Further research is needed to clarify this speculation.

Measurement: ECERS-R & TCIS

The use of both the ECERS-R and the TCIS in this study allowed for comparisons to be made across the two measures. The TCIS, compared to the ECERS-R, seemed to allow more detailed analysis of teacher-child interactions. The items for the Interaction/ Language factor in ECERS-R (which include "Using language to develop reasoning skills," "Informal use of language," "General supervision of children," "Discipline," "Staff-child interactions," "Interactions among children," and "Group time") provide information on overall interactions among all members in the classroom, while the TCIS focuses on individual teacher behaviors with children. The TCIS goes beyond measuring the amount of teacher behavior, and addresses both the quality of teaching behavior, in terms of flexibility, intensity, and spontaneity, and the appropriateness of behaviors, taking into account the teacher's ability to demonstrate developmentally appropriate behaviors. The finding that there was little difference in the amount of teacher behaviors by teacher position was somewhat consistent with the earlier research showing that quality, rather than quantity, should be considered (see Kontos & Wilcox-Herzog, 1997). The TCIS made it possible for the researchers to assess the differences in the quality and appropriateness of different teachers' behaviors, while the ECERS-R allowed for an overall picture of interaction quality via the Interaction/Language factor.

Teacher-Child Ratio and Group Size

The predicted relationship between lower teacher-child ratio and positive teacher behaviors, and between lower teacher-child ratio and higher child care quality, were both confirmed. Smaller group size also was related to positive teacher behaviors, but not with the ECERS-R scores. It appears that group size may make a bigger difference when considering teacher behaviors rather than overall classroom quality.

Limitations

Although this study offers insight into the importance of teacher relationships, especially for the co-teacher system, several limitations in the research should be noted. First, the small sample

size limits the generalizability of the results. Larger sample sizes, especially with more co-teachers, would help confirm the reliability of the results. Second, the generalizability of the findings should be tested in different contexts (e.g., preschool teachers in rural areas), and with different populations (e.g., male teachers in preschools). Third, the information on the decision-making process of how teachers get paired in preschool classes and how they perceive the roles and responsibilities of other teachers was not available in this study. This information would be valuable in understanding the rationale behind different types of teacher structure and the perceived benefits of each. Finally, tracking changes in teachers' beliefs and behaviors over time would strengthen the scope of the findings.

Conclusion

This study provides new information on the influence of different teacher structures and different numbers of teachers on teacher behaviors and child care quality in early childhood classrooms. These findings extend previous research on teacher behaviors by demonstrating that the teacher structure and the number of teachers in the early childhood classroom can make a difference, and they should be considered as additional factors that could support a better teaching and learning environment.

The results also suggest that the blurred roles that lead teachers and assistant teachers share in the early childhood classroom may somewhat inhibit higher quality interactions with children. Almost 20 years ago, Phillips and Whitebook (1986) proposed that job categories in child care should consider both education and experience of teachers. While both education and experience are important criteria used when hiring and paying staff, the distinction between job roles and responsibilities still appears to be blurred. Teachers in co-teacher structures share the decision-making power and may be more empowered to develop a collaborative relationship that enhances teacher-child interactions and overall classroom quality. Further research is needed on the roles and responsibilities of different jobs in child care settings, and on the effect of the lack of clarity in those areas. Inservice and preservice programs for teachers in early childhood education also may need to provide more information on how to mentor student teachers or assistant teachers in team teaching situations. Systematic support for more meetings and mentor programs to promote teacher communication at the center level also would enhance teacher relationships, which will lead to better learning environments for both teachers and children.

It was also evident from this study that teacher education level does not fully explain the differences in teacher behaviors. Researchers should continue to explore the factors that could account for the differences in teacher behaviors. As Spodek (1996) speculated, the education level in itself may not be sufficient to explain teacher behaviors, the degree of commitment to the field, and the level of professional development. Fleet and Patterson (2001) challenged the prevailing model of early childhood professional development as "linear" and "simplistic." According to them, the dominant models of teacher development have been based on either a "concerns-based model," which illustrated four stages of teacher development from survival to

maturity (Katz, 1972), or a "five-stage professional development model," which described practitioners' capacity to assume diverse roles in relation to Bronfenbrenner's ecological approach in human development, from novice to influential (Vander Ven, 1988). The National Association for the Education of Young Children's (NAEYC, 1994) position on early childhood professional development also was considered as linear in that "qualifications" were used to classify professionals from degree-oriented training to achievement of doctoral-level qualifications. From their collaborative research among early childhood professionals and researchers in Sydney, Australia, Fleet and Patterson (2001) proposed the need for broadening our views on teacher development from a "hierarchical" point of view into an "empowered learners" point of view, where all individual professionals can grow together in an engaging and supportive working environment. Further research that captures the complexity of teacher behaviors and development may enable the field to more effectively mentor and train early childhood professionals.

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