

Examining Quality in Two Preschool Settings: Publicly Funded Early Childhood Education and Inclusive Early Childhood Education Classrooms

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Abstract

Background Although classroom quality is an important consideration, few recent research studies have examined the process and structural quality in publicly funded early childhood education (ECE) and inclusive ECE classrooms. This study provides an important contribution to the literature by comparing two conceptualizations of quality in classrooms serving children from low-income households and those with disabilities.

Objectives (1) To characterize and to determine differences with regard to process and structural quality in publicly funded ECE and inclusive ECE classrooms, and (2) to examine whether and to what extent the process quality varied when controlling for structural quality and classroom income/race variables.

Method One hundred and sixty four classrooms (85 ECE, 79 inclusive) that were enrolled in two large-scale intervention studies examining a book-reading program were included in the present study. The Classroom Assessment Scoring System (CLASS; Pianta et al. in

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Classroom assessment scoring system, Paul H. Brookes, Baltimore, 2008) and three detailed questionnaires were used to quantify process and structural quality, respectively. *Results* Results revealed quantitative differences in process quality, specifically in the emotional support dimension of negative climate as well as all dimensions of instructional support, between the two settings. In addition, teachers' education was a significant predictor of process quality, and publicly funded ECE classrooms scored over two points higher on the instructional support domain of the CLASS when controlling for other structural quality measures and income and race.

Conclusions Our findings have implications for best practice guidelines and policies, particularly for classroom environments serving children with disabilities, which are discussed.

Keywords Inclusive early childhood education · Early childhood education · Classroom quality

Introduction

Young children's early educational experiences are formative for building the foundation of future academic learning and success (Barnett 1993; Reynolds 2000; Reynolds et al. 2001; U.S. Department of Education, Health and Human Services 2015). Because young children have diverse home experiences, they arrive to preschool with varied knowledge and skills (Burchinal et al. 2011; Justice et al. 2008; McWayne et al. 2012). For example, those children raised in low-income households and those with disabilities frequently have limited exposure to diverse language and communicative acts (e.g., Crain-Thoreson and Dale 1999; Fryer and Levitt 2004; Hoff 2013; Light and Smith 1993). Thus, providing young children with access to high-quality educational experiences is of the utmost importance in mitigating this early educational gap. In other words, high-quality preschool programs should enhance the early learning experiences for all young children, including those from low-income households and those with disabilities, and develop the knowledge and skills necessary for academic success when they enter formal school environments (Burchinal et al. 2010). Despite this emphasis, research suggests the quality of early childhood education programs has decreased over the past several years as a result of budget cuts due to the recession (Barnett et al. 2012). Thus, the goal of this paper is to provide a contemporary, current assessment of quality across diverse early childhood settings that serve at-risk children.

Policymakers, researchers, and educators agree that high-quality early education is essential for all children. As described in the Individuals with Disabilities Education Act (IDEA), children with disabilities have the right to attend and be included in school alongside their typically developing peers in the least restrictive environment (LRE; U.S. Department of Education, Health and Human Services 2015), a practice known as inclusion. Approximately 10 % of all preschoolers are diagnosed with a disability, and nearly half of the preschool-age children with disabilities attend inclusive early childhood education programs (ECE; U.S. Department of Education, National Center for Education Statistics 2012). Potential barriers, however, exist that limit opportunities for all young children with disabilities to attend high-quality preschools with their typically developing peers. Examples of barriers include inaccurate or negative perceptions, variability in

professional's structural credentials and experience (i.e., training, education, knowledge), and fragmented services across multiple settings (U.S. Department of Education, Health and Human Services 2015).

Despite these statistics, surprisingly few research studies have examined the quality of inclusive ECE classrooms. Given the varied learning needs of children enrolled in these classrooms, some may hypothesize that the classroom quality may be different in inclusive classrooms when compared to publicly funded ECE environments, especially because federal mandates emphasize the importance of high-quality classrooms to mediate the learning of children with disabilities (U.S. Department of Education, Health and Human Services 2015). Thus, it is essential that early childhood educational research answer critical questions related to potential differences in quality between settings to best meet the needs of children from low-income households as well as those with disabilities.

The goals of the present manuscript are to investigate classroom quality and determine if differences exist across two broad educational learning contexts: (a) publicly funded ECE classrooms that primarily serve typically developing children from low-income households, and (b) inclusive classrooms that include both children with disabilities as defined by Part B of IDEA and their typically developing peers. We are also interested in examining potential relations between process (i.e., teacher–child interactions) and structural (i.e., infrastructure) quality components in these two settings. This timely, empirical investigation has the potential to inform program improvement policies related to the learning environments of children with disabilities (e.g., Clawson and Luze 2008; McCormick et al. 1998).

Conceptualizing and Measuring Classroom Quality

Classroom quality is a broad term that incorporates many inter-connected domains (Bryant 2011). Because quality is theorized and measured in many different ways, there is not one universally accepted definition as to what constitutes high-quality learning environments. Two broad, quality considerations include process components via teacher–child interactions as part of the broad learning context (e.g., Burchinal et al. 1996; Pianta et al. 2005b) as well as structural or infrastructure indicators, including teacher variables (e.g., education, specialized training, professional development) and program characteristics (e.g., class size, teacher–child ratios; Barnett et al. 2012), both of which are important aspects of the classroom environment. In the present manuscript, we incorporate both process and structural quality elements in both settings, which are discussed in turn.

Process Quality

Process quality refers to the quality of teacher–child interactions, which is particularly important because of direct links with children's outcomes (Mashburn et al. 2008). Put simply, children who are enrolled in classrooms that receive higher process quality scores make greater academic and social gains than their peers who do not have the same educational experience (Pianta et al. 2005a, b). The theoretical basis for the importance of process quality postulates that young children's frequent reciprocal interactions, or proximal processes, in classrooms facilitate social and academic learning (Bronfenbrenner and Morris 2006). In other words, children learn from their interactions with teachers as well as other children in their classroom environment. The various measureable aspects of classroom quality (e.g., emotional support, classroom organization, and instructional

support) align with these proximal aspects of the preschool learning environment (Mashburn et al. 2008).

Often in the literature, the broad concept of process quality is described as three separate yet interrelated domains: (a) emotional support, (b) classroom organization, and (c) instructional support (e.g., Justice et al. 2008; Mashburn et al. 2008; Pianta et al. 2005a, b). Emotional support refers to a teacher's regard for children's emotional development and well-being, including nurturing teacher and peer relationships (Curby et al. 2009a). Classrooms that are nurturing and supportive facilitate a positive environment by providing enthusiasm and encouragement for learning and limiting negative emotional sentiments (e.g., sarcasm, anger). A classroom's organization includes children's non-instructional learning opportunities that facilitate order and establish routines. Organized classrooms have teachers who anticipate and minimize children's problem behaviors and disruptions, facilitate smooth transitions, and encourage children to explore a variety of classroom activities (Curby et al. 2009a). Instructional support includes the type and frequency of feedback and interactions from teachers as well as the inclusion of strategies that promote language and literacy development (Pianta et al. 2005a). Classrooms that provide high levels of instructional support promote cognitive and linguistic development via teacher's frequent communication and expansive feedback, continued learning, and encouragement of children to make connections with the real world.

Based on the extant literature, most ECE classrooms have moderate to high levels of emotional support and classroom organization (Curby et al. 2009b; Hamre et al. 2008; Mashburn et al. 2008), yet the area of instructional support are substantially lower than the other two domains (Justice et al. 2008; LoCasale-Crouch et al. 2007). For instance, in the Justice et al. (2008) study, which examined 135 publicly funded preschool classrooms, the quality of instruction in these classrooms was considered low, which indicated that teachers infrequently engaged in reciprocal dialogue, provided explicit instruction, or incorporated strategies to facilitate development. Although considerable variability was noted, only a handful of teachers incorporated strategies that were identified as facilitating children's language and literacy development (e.g., asking open-ended questions, scaffolding complex language). Thus, teachers may not be fully capitalizing on opportunities to enhance learning in their classrooms. These findings are important because process quality measures are consistently related to student outcomes (Mashburn et al. 2008; Vandell and Wolfe 2000). Thus, researchers argue that this notion should be emphasized by practitioners and policymakers.

Compared with ECE environments, fewer research studies have investigated the process quality of inclusive ECE classrooms. One particular challenge faced by inclusive ECE teachers is how to best modify the classroom environment to best meet the needs of the individual while providing a high-quality environment to all children in the classroom. Of the studies that exist, results suggest that the general quality of inclusive classrooms is higher than ECE (i.e., non-inclusive) environments (Hestenes et al. 2008). However, because global measures of quality tended to be used, only broad interpretation, not fine-grained analyses, are available (Buysse et al. 1999; La Paro et al. 1998). For example, Buysse et al. (1999) and Hestenes et al. (2008) used the Early Childhood Environment Rating Scale (ECERS; Harms et al. 1998), an observational tool examining overall quality, to determine the quality of inclusive preschools.

When researchers have included a more nuanced analytic focus to examine teacher-child interactions, specifically instructional support, results have been contradictory. For example, in a study describing the quality of 20 inclusive classrooms, Hestenes et al. (2008) reported that these classrooms had significantly higher ratings than non-inclusive

classrooms on the Language-Reasoning subtest of the ECERS. More specifically, Smith et al. (2004) reported that teachers in inclusive classrooms rarely incorporated strategies that facilitate language development, and Soukakou's (2012) data indicated that teachers in inclusive classrooms in the United Kingdom did not include frequent, high-level linguistic feedback. Further, teachers in inclusive classrooms may use more directives and emphasize cognitive as opposed to social play (File 1994). In summary, these contradictory results suggest that additional studies—such as the present investigation—are needed to tease apart aspects of process quality in inclusive classrooms. No studies, to the best of our knowledge, have included measures of emotional support and classroom organization when examining potential differences between inclusive and publicly funded early education classroom environments.

Structural Quality

Aspects of structural quality are theoretically distinct from yet related to process components (NICHD Early Child Care Research Network 2004; Pianta et al. 2005a; Whitehurst 2002). In the most recent version of the National Institute of Early Education Research's (NIEER) *State of Preschool Yearbook* (2015), a nationally recognized report aimed at informing policymakers about best practices in ECE settings, researchers rated states' overall quality based on the number of structural aspects that were met via state regulations. These quality standards included details related to teacher (e.g., degree, training) and program (e.g., class size, teacher–child ratio) characteristics. For teacher characteristics in ECE settings, NIEER's (2015) benchmarks stipulate that the lead teacher should have a Bachelor's degree and specialized training in ECE/pre-K practices and attend at least 15 h per year of in-service training. Likewise, program standards emphasize that ECE programs should have fewer than 20 children in a classroom and maintain a teacher–child ratio of one staff member for every 10 children, or better.

Unlike the ECE environment, there is not a national entity, such as NIEER, that summarizes and consolidates details from each state with regard to structural regulations in the educational realm, as a whole, that includes children with disabilities (e.g., inclusive or segregated classrooms). Thus, for inclusive ECE classrooms, many state standards mandate the structural quality domains required in ECE classrooms. As an example, the Operating Standards for Ohio Educational Agencies Serving Children with Disabilities requires that an inclusive ECE classroom in the state of Ohio may not serve more than eight children with disabilities in one classroom (State Board of Education of Ohio 2008). In addition, the teacher–child ratio must be one teacher for six children with disabilities, and a second adult is required when there are more than seven children are enrolled in one classroom.

Associations Among Process and Structural Quality

To gain an up-to-date picture of the quality of publicly funded and inclusive ECE classrooms, indices that represent both process and structural quality measures should be included in order to fully understand the contribution from each as well as their interplay between them. Process and structural quality may not completely aligned with ECE classrooms such that a classroom may have specific strengths in one area of quality but not the other. For example, while Pianta et al. (2005a, b) reported significant, albeit small, effects of teacher education and specialized training (i.e., structural quality indices) on

classroom (i.e. process) quality in 238 ECE classrooms, other studies have reported non-significant associations among teacher education and process quality (Early et al. 2006, 2007; Justice et al. 2008). Related to in-service activities, while some research studies support that in-service improved various aspects of ECE classroom quality (Dickinson and Caswell 2007; Piasta et al. 2012), others have reported contradictory findings (Justice et al. 2008).

Class size is a specific program characteristic that has been a focus of ECE research, but this factor is not consistently related to classroom quality. Pianta et al. (2005a, b), for example, did not find an association between teacher–child ratio and ECE classroom quality. However, Barnett et al. (2003) concluded that smaller class size was related to the effectiveness of ECE programs, and Mashburn et al. (2008) reported that class size and teacher–child ratio were related to high emotional support in ECE classrooms.

Fewer empirical studies have examined relations between process and structural quality indicators of inclusive ECE classrooms. Once again, the results have been contradictory. For instance, La Paro et al. (1998) described the quality of 30 segregated (all children had disabilities) and 30 inclusive (at least one child had a developmental disability) classrooms and reported no significant relations of process quality with teacher characteristics, including teacher education and specialized training. In contrast, Buysse et al. (1999) examined the quality inclusive and general education classrooms and found teacher education and teacher specialized training to be predictive of classroom quality. Other studies have found potentially positive results for increased in-service training (Cassidy et al. 1995). To the best of our knowledge, there are no empirical examinations of class size and teacher-size ratio in association with process quality in inclusive classrooms. Moreover, the studies investigating the other aspects of structural quality are outdated. In light of recent policies, mandates, and contradictory results in the literature, a current examination of the associations between process and structural quality in inclusive classrooms may be especially imperative for classrooms serving young children with disabilities.

The Current Study

Federal and state initiatives emphasize the need for all children, including those from low-income households and those with disabilities, to have access to high-quality early educational experiences. Yet, few recent research studies have unpacked process and structural quality in publicly funded and inclusive classrooms to determine if differences exist between the two settings. It is plausible that significant associations between process and structural quality may be noted, although this remains unclear in the research literature, thus warranting the present investigation. In other words, the two broad settings may be structurally different based on policy, as previously described, yet in the present study, we examine if these differences co-occur with process quality.

Thus, the research aims of the current study are twofold: (a) to characterize and to examine differences with regard to process and structural quality in publicly funded and inclusive ECE classrooms, and (b) to examine whether and to what extent process quality differs by classroom type (publicly funded or inclusive ECE) when controlling for structural quality and income/race. We hypothesize that the process quality, including the specific domains, in both contexts will be similar to the findings reported in the research literature (i.e., moderate to high emotional and organizational quality and low instructional quality). Given that the state mandates for children with disabilities are more stringent than

for ECE classrooms, we hypothesize that a higher percentage of inclusive classrooms will meet the minimum quality standards as described by NIEER. In addition, given that national emphasis on quality in early childhood education classroom environments and differences in benchmarks for structural quality in the two settings, we hypothesize that process quality will differ by program type, even when controlling for structural quality and income status.

Method

The present manuscript included 164 classrooms enrolled in two large-scale intervention studies examining a book-reading program; one of these studies focused on publicly funded ECE classrooms while the other focused on inclusive ECE classrooms. Thus, all of the publicly funded ECE classrooms followed the same recruitment and inclusion procedures, which was similar to the procedures for the inclusive ECE classrooms. Specific details and additional information on each of the larger studies has been previously reported (see Justice et al. 2009, 2015). District administrators were initially contacted; if they agreed to participate in the respective study, teachers in that district were then invited to an information session that provided more specific details about the studies. All of the teachers in the classrooms taught in either a Midwestern or a Mid-Atlantic state. Eighty-five classrooms were either state-funded targeted-enrollment or federally funded Head Start programs (referred to throughout as publicly funded ECE), and 79 were inclusive ECE classrooms. Prior to participation, Institutional Review Board approval was granted, and informed consent was obtained. The authors do not report any conflicts of interest.

Publicly funded ECE classrooms were recruited if they served a majority of children from low-income families or children at-risk for academic difficulty based on poverty status, which was defined, for the purposes of this study, as an annual income of less than \$20,000. Once classrooms were recruited, caregivers of eight children per classroom provided consent for their child to participate in the study. Direct and indirect measures of children's language and literacy skills were used to collect data on these eight study children. Likewise, inclusive ECE classrooms were recruited and included in the study if the school provided special education services to children with developmental disabilities in inclusive classrooms (i.e., both children with developmental disabilities and typically developing peers). If this information was not available, inclusive classrooms were included if they had typically developing children in their classrooms based on information collected on 10 children whose caregivers provided consent for the child to participate in the study. If these results were inconclusive, information was confirmed by researching the center online. State regulations advocate for 6:6 balanced ratio of students with and without disabilities in inclusive classrooms (i.e., six students with disabilities and six typically developing peers). As described below, approximately half of the students in the inclusive classrooms had a disability.

Participants

Publicly Funded ECE

The majority of teachers were female (95 %) and White/Non-Hispanic (62 %); 21 % were African American, 10 % were Asian, 6 % were Latino, and 1 % were Native American.

Thirty seven percent had a Bachelor's degree, 27 % had an Associate's degree, and 18 % had a Master's degree, and 18 % had some college experience but no degree. The teachers' experience as a lead teacher ranged from 0 to 40 years, with an average of 8.44 years ($SD = 8.85$ years). See Table 2 for additional teacher characteristics.

For the purposes of the larger study, demographic information was collected on a sample of 551 children, who were approximately 4 year, 4 months old ($SD = 5$ months; range = 3 years, 5 months to 5 years, 6 months). Half of the children were male (51 %) and White/Caucasian (42 %); 37 % were African American, 8 % were multi-racial, 7 % were Latino, and approximately 1 % were Asian, Native American, or 'other' races/ethnicities (3 % unreported). The majority of children resided in homes with an annual income of less than \$30,000 (57 %), whereas 21 % resided in homes where the annual income was between \$30,001 and \$60,000, 6 % resided in homes where the annual income ranged from \$60,001 to \$85,000, and 2 % resided in homes where the annual income was greater than \$85,001; information was missing for 14 % of children.

We anticipated that the percentage of children from low-income households and children's race might each contribute to the observed structural or process quality of the setting. To account for these potential confounding constructs, we created classroom-describing variables by using all available student data in each classroom. For example, if a classroom had eight students who participated in the study, four whom lived in low-income households, then the classroom was considered to have 50 % of the students from low-income households. There was considerable variability in terms of the children served in publicly funded ECE settings. On average, publicly funded ECE classrooms served children 55 % of whom were from low-income households, but the range was from zero to 100 % of the classroom meeting this criteria. Upon further investigation, three classrooms had no children included in the study who met our criteria for low-income (less than \$20,000); however, half of the students enrolled in the study in these classrooms lived in households with a reported income of less than \$30,000. Because of this, coupled with demographic details from the school, these classrooms were included in the study. Similarly, classrooms were on average 47 % White/Caucasian, but the range was also from zero to 100 %.

Inclusive ECE

The majority of teachers were female (99 %) and White/Non-Hispanic (95 %); 2 % were Native American, 1.5 % were African-American, and 1.5 % were Asian. Most of the teachers had a Master's degree (75 %) and the remaining 25 % had a Bachelor's degree. The teachers' experience as a lead teacher (in any grade level) ranged from 0 to 34 years, with an average of 11.6 years ($SD = 9.4$ years). See Table 2 for additional teacher characteristics.

Demographic information was collected on a sample of 641 children, who were, on average, 4 years, 4 months old ($SD = 7$ months; range = 3–5 years, 9 months). Over half of the children were male (62.5 %) and White/Caucasian (76.5 %); 10.25 % were Black/African American, 5 % were Hispanic, 2.75 % were Asian, and 5 % were identified as having another race/ethnicity, and less than 1 % were Native American. Annual household income varied considerably with approximately one-fourth of children residing in each of the following categories: Less than \$30,000 (25.5 %), \$30,001–60,000 (26 %), \$60,001–85,000 (22 %), and greater than \$85,001 (26.5 %). Forty-five percent of the children had an Individualized Education Plan (IEP); 96 had a known diagnosis, which included the following: autism spectrum disorder, cerebral palsy, Down syndrome,

developmental delay, attention deficit hyperactivity disorder, sensory integration disorder, and other health impairment. This information was provided by the caregiver on a demographic study questionnaires. On average, inclusive ECE classrooms were comprised primarily of children who were white (75 %; range 22–100 %) and who were not poor (36 % were living in low-income households; range 0–100 %).

Measures

The present study utilized one measure of process quality, the Classroom Assessment Scoring System (CLASS; Pianta et al. 2008), and three detailed questionnaires assessing structural quality through self-reported teacher and program characteristics.

Process Quality

Classroom quality was measured using the CLASS, a systematic observational tool (Pianta et al. 2002, 2008) comprised of three domains (emotional support, classroom organization, and instructional support) and 10 dimensions. The emotional support domain includes the dimensions of positive climate, negative climate, teacher sensitivity, and regard for student perspectives. The classroom organization domain includes the dimensions of behavior management, productivity, and instructional learning formats, and instructional support includes the dimensions of concept development, quality of feedback, and language modeling.

The CLASS is scored by a reliable coder (described below) using a 7-point Likert scale, and includes *low* (score of 1–2), *moderate* (score of 3–5), and *high* (score of 6–7) quality ratings. Examination of the reliability of this measure showed adequate internal consistency (0.77–0.89; Pianta et al. 2008) for each domain. This measure is highly correlated with similar measures of classroom quality, including the Early Childhood Environment Rating Scale—Revised (Pianta et al. 2008).

CLASS training protocols for publicly funded and inclusive ECE classrooms were identical. All coders participated in a 2-day CLASS training provided by a certified trainer, which concluded with coding agreement of at least 90 % agreement with six master-coded videos. For the publicly funded ECE classrooms, field assessors collected videotaped observations that ranged from 30 to 60 min in the fall and spring of the year. CLASS coding was then completed by CLASS-reliable coders. In inclusive ECE classrooms, 90-min videotaped classroom observations conducted in the fall and spring were coded using CLASS. These were divided into six, 15-min intervals, and three intervals were randomly selected for coding as an attempt to have similar length across the two settings. Ratings were averaged to obtain a score for each dimension. Within-one agreement percentage was determined by the double-coding of 20 % of the videos; overall CLASS reliability was 92 %, which indicates a high level of inter-rater reliability (Pianta et al. 2002).

Structural Quality

Teacher and program characteristics were ascertained from three detailed teacher questionnaires, which included a series of demographic questions (e.g., education, specializations, in-service hours). Classroom eligibility and observation questionnaires included questions related to program characteristics (e.g., class size, teacher–child ratio). The

average class size for ECE and inclusive ECE classrooms was about 17 children and 11 children, respectively. Structural quality of the two types of settings is included in Table 2. Additionally, differences were noted between the classrooms on income ($F = 23.98$, $p = < .01$) and race ($F = 37.42$, $p = < .01$) for the children enrolled in these classrooms.

Study Design

To address the study's first research aim, descriptive details related to the process and structural quality measures in publicly funded and inclusive ECE classrooms are provided. Then, regression models are included to investigate whether and to what extent process quality differs by classroom type when controlling for structural quality as well as income and race (defined by the percentage of children at the classroom level living in low-income households and the percentage of children who were White/Caucasian). There was very little missing data for the primary study variables (maximum of six missing cases), and the data was found to be missing completely at random (Little's MCAR test = 3839, $df = 31$, $p = 0.17$). However, this was not the case for the class size variable, where significantly more data were missing for the publicly funded ECE classrooms than for the inclusive ECE classrooms. All inferential analyses were conducted both with and without the class-size variables. No substantive changes were found. The third author takes responsibility for the integrity of the data and the accuracy of the data analysis procedures.

Results

Process and Structural Quality Indicators

This study's first aim was to examine and to determine if differences exist in the process and structural quality of publicly funded and inclusive ECE classrooms. For process quality, publicly funded ECE classrooms scored in the moderate range for emotional support ($M = 4.91$, $SD = 0.88$), classroom organization ($M = 4.38$, $SD = 0.86$), instructional support ($M = 3.86$, $SD = 0.97$). Inclusive ECE classrooms also scored in the moderate range for emotional support ($M = 5.20$, $SD = 0.64$) and classroom organization ($M = 4.62$, $SD = 0.64$) but in the low range for instructional support ($M = 2.19$, $SD = 0.54$). Significance tests of the differences between the two setting types were conducted using general linear modeling and are presented in Table 1 with the full descriptive information. Significant differences between the two setting types were found

Table 1 Descriptives for process quality in publicly funded ECE and inclusive ECE classrooms

Process quality	Publicly Funded ECE			Inclusive ECE			<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range		
Emotional support	4.91	0.88	2.00–7.00	5.20	0.64	4.00–7.00	−2.58	0.01
Classroom organization	4.38	0.86	2.00–7.00	4.62	0.64	3.00–6.00	1.47	0.14
Instructional support	3.86	0.97	2.00–7.00	2.19	0.54	1.00–4.00	9.51	<0.01

Quality scores are based on a 7-point Likert scale, which includes *low* (score of 1–2), *moderate* (score of 3–5), and *high* (score of 6–7) ratings (Classroom Assessment Scoring System—CLASS; Pianta et al. 2008)

for emotional support ($p = .01$) and instructional support ($p < .01$). We further examined the process quality of the two setting types by breaking down the three CLASS domains into the 10 different dimensions. For each setting type, the mean for each dimension was calculated along with the corresponding 95 % confidence interval. Results of these analyses are reported in Fig. 1. These results demonstrate that, for emotional support, the two settings differed only on negative climate (favoring the inclusive ECE classrooms). No differences were observed for the classroom organization dimensions, and all domains of instructional support showed significant differences favoring the publicly funded ECE settings.

Structural quality was comprised of five teacher (the highest degree obtained by the lead teacher, whether the teacher had specialized training—Child Development Associate; CDA—in early childhood education, the amount of in-service training the teacher received) and program (maximum class size, teacher–child ratio) characteristics and was examined in two ways. First, the two setting types were statistically compared using general linear modeling, with results presented in Table 2 that demonstrate that each structural quality measure varied significantly depending on the setting type. Second, the five teacher and program characteristics were compared to the NIEER benchmarks. Table 3 includes the recommended NIEER benchmark (second column) and the percentage of publicly funded and inclusive ECE classrooms in the present sample that met these benchmarks (last two columns). For lead teacher education, over one-third of publicly funded ECE teachers had a Bachelor’s degree while all of the inclusive ECE teachers had at least a Bachelor’s degree. For specialized training, one-fourth of publicly funded ECE teachers had a CDA, whereas almost all of inclusive ECE teachers had this specialized training. The opposite was found for in-service training, with results indicating that a majority of publicly funded ECE teachers had completed the recommended 15 or more hours of professional development, whereas about one-fourth of the inclusive ECE teachers completed the recommended this amount. For program characteristics, almost all

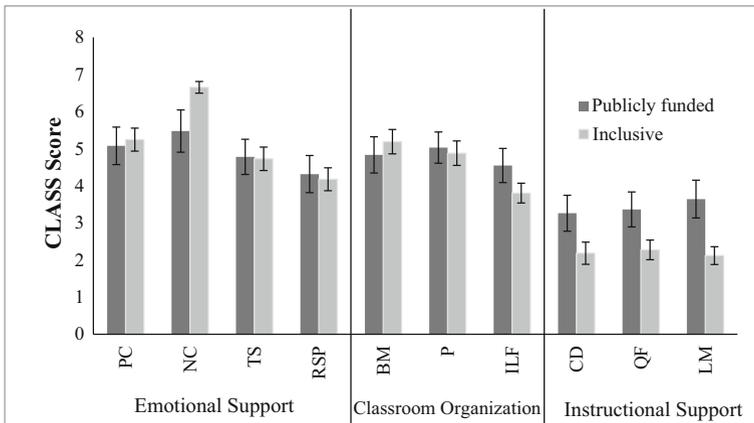


Fig. 1 Scores for publicly funded and inclusive ECE classrooms on the 10 CLASS dimensions. *PC* Positive climate, *NC* negative climate*, *TS* teacher sensitivity, *RSP* regard for student perspectives, *BM* behavior management, *P* productivity, *ILF* instructional learning formats, *CD* concept development*, *QF* quality of feedback*, *LM* language modeling*. *Indicates a significant difference between the two classroom environments

Table 2 Descriptives for structural quality in publicly funded ECE and inclusive ECE classrooms

Structural quality	Publicly funded ECE		Inclusive ECE		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Education level	5.90	1.72	7.75	0.86	−8.63	<.01
Teacher specialized training	0.25	0.43	0.96	0.19	81.12*	<.01
Teacher in-service	7.86	4.42	4.15	3.01	6.25	<.01
Class size	16.84	4.13	11.15	3.73	7.99	<.01

The following continuous variables were used for teachers' educational level such that 1 = 8th grade education or less, 2 = some high school, no diploma, 3 = high school diploma, 4 = high school diploma and technical training, 5 = some college but no degree, 6 = Associate's degree, 7 = Bachelor's degree, 8 = at least 1 year of course work beyond a Bachelor's degree, 9 = Master's degree, 10 = educational specialist, and 11 = doctoral degree; a one-unit increase corresponded to more education. Specialized training was coded as a binary variable to indicate if the teacher had a CDA or not. In-service included the number of hours of training, and class size included the average number of students per classroom

* Results from a Chi square test

Table 3 Descriptives for structural quality in publicly funded and inclusive ECE classrooms

Structural quality	Benchmark	Publicly funded ECE (%)	Inclusive ECE (%)
Lead teacher degree	Bachelor's	38	100
Teacher specialized training	Specializing in pre-K	25	96
Teacher in-service	At least 15 h/year	68	28
Maximum class size	20 or lower	94	99
Teacher-child ratio	1:10 or better	89	100

Workshops were assumed to be 2 h of in-service/specialized training; teachers with six or more workshops were considered to be meeting the "specialized training" benchmark. ECE classrooms were considered to have a second teacher when the number of hours they would have an assistant teacher matched the number of hours they indicated was the length of the school day

of the classrooms in both settings met the recommended class size of less than 20 students as well as the teacher–child ratio of 1:10 or better.

Process and Structural Quality Associations

To address the second research aim, we first ran correlations to examine which, if any, aspects of structural quality and income status and race were related to process quality in each setting. For publicly funded ECE, all of the process quality indicators (emotional support, classroom organization, instructional support) were related to the structural quality measure of lead teacher degree ($r = 0.33, p < .01$; $r = 0.39, p < .01$; $r = 0.60, p < .01$, respectively). In other words, publicly funded ECE teachers with higher education had higher scores on the three process quality domains. No other associations between the indicators of process quality and NIEER standards (structural quality) were significant for publicly funded ECE. For inclusive ECE classrooms, the quality indicators of instructional support and teacher education were moderately significant ($r = 0.22, p = .03$). Therefore, teachers in inclusive ECE classrooms with higher education included more complex

language and literacy instruction in their classrooms. Although most of the details are specific to teachers, two descriptions of the children served were also included: The percentage of children served in the classroom who lived in low-income households, and the percentage of children who were White/Caucasian. For publicly funded ECE settings, the percentage of children from low-income households was negatively related to emotional support ($r = -0.26, p < .05$), but no other relations were seen. However, both the percentage of children from low-income households and the percentage of children who were White/Caucasian were significantly related to all of the process quality indicators in inclusive ECE classrooms. See Table 4 for full correlational results.

Finally, we conducted three regression analyses (one for each process-quality construct) to examine whether process quality differed by classroom type (publicly funded or inclusive ECE) while controlling for structural quality and the classroom income/race variables (percentages of children from low-income backgrounds and White/Caucasian; these two variables served as covariates). All of the predictors were entered simultaneously in each model, and results are presented in Table 5. As shown in Table 5, teacher education was related to each of the process quality domains (emotional support, classroom organization, and instructional support) such that teachers with more education were also rated higher on the three domains of the process quality measure ($\beta = 0.12, p = .04$; $\beta = 0.15, p = .04$; $\beta = 0.30, p < .01$, respectively). The percentage of children from low-income households also predicted classroom organization and instructional support ($\beta = -0.98, p = .01$; $\beta = -0.80, p = .02$, respectively), such that classrooms with higher percentages of children from low-income households had lower classroom organization and instructional support quality ratings. Finally, setting (publicly funded or inclusive ECE) was related only to the process quality domain of instructional support, such that publicly funded ECE classrooms scored more than two points higher ($\beta = 2.19, p = .01$)

Table 4 Correlations between process and structural quality indicators in publicly funded and inclusive ECE classrooms

	Publicly funded ECE			Inclusive ECE		
	Emotional support	Classroom organization	Instructional support	Emotional support	Classroom organization	Instructional support
Lead teacher degree	0.33**	0.39**	0.60**	0.10	0.07	0.22*
Teacher specialized training	0.04	0.12	0.06	0.03	0.12	0.14
Teacher in-service	0.18	0.03	0.12	-0.10	-0.05	-0.15
Class size	-0.04	-0.06	0.03	0.17	0.09	0.07
Teacher-child ratio	-0.25	-0.24	-0.24	0.20	0.22	0.07
Children % low-income	-0.26*	-0.21	-0.20	-0.27*	-0.36**	-0.31*
Children % White/Caucasian	-0.08	0.11	0.11	0.43**	0.42**	0.26*

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

Table 5 Regression results for associations between process and structural quality with covariates in publicly funded and inclusive ECE classrooms

	Emotional support			Classroom organization			Instructional support					
	<i>B</i>	SE	<i>t</i>	<i>p</i>	<i>B</i>	SE	<i>t</i>	<i>p</i>	<i>B</i>	SE	<i>t</i>	<i>p</i>
Intercept	4.43	0.71	6.26	<0.01	3.59	0.92	3.88	0.01	0.39	0.83	0.47	0.64
Publicly Funded ECE	0.13	0.53	0.25	0.81	0.87	0.69	1.27	0.21	2.19	0.62	3.54	0.01
Lead teacher degree	0.12	0.06	2.08	0.04	0.15	0.07	2.09	0.04	0.30	0.07	4.52	<0.01
Teacher specialized training	-0.33	0.22	-1.51	0.13	0.12	0.28	0.41	0.68	-0.23	0.25	-0.89	0.37
Teacher in-service	0.02	0.02	1.04	0.30	-0.03	0.02	-1.07	0.29	0.01	0.02	0.47	0.64
Maximum class size	0.02	0.02	1.00	0.32	0.02	0.03	0.68	0.50	0.03	0.03	1.08	0.28
Teacher-child ratio	-0.04	0.04	-1.08	0.28	-0.02	0.05	-0.44	0.66	-0.06	0.04	-1.43	0.15
Children % low-income	-0.40	0.29	-1.38	0.17	-0.98	0.38	-2.56	0.01	-0.80	0.34	-2.35	0.02
Children % White/Caucasian	0.16	0.31	0.51	0.61	-0.06	0.40	-0.15	0.88	-0.20	0.36	-0.55	0.59

on the instructional support domain than inclusive ECE classrooms when controlling for the other aspects of structural quality and income and race.

Discussion

In light of the recent national emphasis on young children's early learning opportunities in all preschool settings, the quality of these classroom environments is a rich area for research, and an up-to-date investigation is warranted. When compared to publicly funded ECE classrooms, few investigations have empirically examined the quality of inclusive ECE classrooms, despite its importance to learning for young children with disabilities. Thus, in the present study, classroom quality was conceptualized and measured via two avenues: (a) process quality, specifically teacher–child interactions, using the CLASS, and (b) structural quality, specifically the infrastructure based on teacher and program characteristics. The research aims were twofold: (1) to characterize and to determine differences with regard to process and structural quality in publicly funded ECE and inclusive ECE classrooms and (2) to examine whether and to what extent the process quality varied between these two types of settings when controlling for structural quality and income status. The three main findings, which are discussed in turn, are: (a) similar trends in the descriptive findings for process and structural quality in publicly funded ECE and inclusive ECE, (b) significant differences in specific areas of process quality in publicly funded ECE and inclusive ECE, and (c) the predictors of process quality.

Examining Process and Structural Quality

When examining the descriptive results for process quality, our results for both publicly funded and inclusive ECE are consistent with the previously described ECE literature in the domains of emotional support, classroom organization, and instructional quality. To reiterate, the emotional support and classroom organization of ECE classrooms have been described as moderate in nature (score of 3–5 on a 7-point scale; Curby et al. 2009a, b; Hamre et al. 2008; Mashburn et al. 2008) while instructional support tends to be lower (Justice et al. 2008). Of particular importance, no inclusive ECE classrooms received a rating in the high range (a score between 5 and 7) in any aspect of the instructional support domain. With regard to emotional support, parents and teachers have consistently reported that the emotional development of young children with disabilities is a particularly important aspect of development for these children (Jamison et al. 2012), especially when compared to academic learning domains, including language and literacy (Light and Smith 1993). Consistent with these beliefs, inclusive ECE teachers may intentionally provide additional, consistent support via the inclusion of strategies that facilitate learning in the area of emotional development (Bredenkamp and Copple 1997; Curby et al. 2009a, b; Kern and Clemens 2007).

With regard to the descriptive results for structural quality, most of the publicly funded ECE classrooms met NIEER's standards for teacher in-service (68 %), class size (94 %), and teacher–child ratio (89 %) while nearly all of the inclusive ECE classrooms met the standards (96–100 %) with the exception of teacher in-service (28 %). For the present study, we decided to follow NIEER's recommendations, which are based on state-funded ECE environments, because of the nationally recognized presence, accumulation of data from all 50 states and the District of Columbia, and integration of research with best

practices to appropriately inform policymakers, researchers, educators, and the general public (Barnett et al. 2012). Given the more stringent funding and best practice requirements in inclusive ECE environments (e.g., State Board of Education of Ohio 2008), we are not surprised that most of these classrooms met NIEER's standards. Consistent with NIEER's recommendations, our findings support that publicly funded ECE classrooms, in particular, may continue to benefit from additional support as these learning environments strive to meet best practice guidelines, especially as the number of children attending publicly funded ECE classrooms continues to rise.

Examining the Dimensions of Process Quality

Although most of the extant research on process quality has included broad measures, we examined the differences between the settings for each dimension of the process quality as measured using the CLASS to gain a more nuanced view of process quality in both publicly funded and inclusive ECE. Significant differences emerged for the specific dimensions of negative climate, concept development, quality of feedback, and language modeling. For negative climate, inclusive ECE classrooms tended to facilitate a more emotionally stable classroom environment than publicly funded ECE. Although we did not examine any possible correlations to this finding, it may be related to teacher education. Inclusive teachers may be better able to limit the instances of sarcasm, negativity, and threats in their classrooms. In addition, every dimension of the instructional support domain (concept development, quality of feedback, language modeling) was found to be significantly lower in quality in inclusive ECE classrooms than publicly funded ECE classrooms. This finding will be discussed more thoroughly below.

Predictors of Process Quality

For each domain of process quality (emotional support, classroom organization, instructional support), the highest degree obtained by the lead teacher was a significant predictor, with results indicating that higher teacher education was related to higher process quality ratings. Put simply, teachers' education is an important consideration for process quality, particularly for publicly funded classroom environments. Although teacher education is a significant predictor of process quality, it is important to note that the association was small, such that a one unit increase in education (e.g., Associate's degree to a Bachelor's degree) resulted in a fractional increase in process quality (0.12–0.30). These results are consistent with the previously described research, which supports that teacher education was significantly, albeit small, related to classroom quality. However, previous research on the relation between teacher education and quality is mixed (La Paro et al. 1998).

We were surprised that there were no associations among our measures of the program characteristics of class size or teacher–child ratio and process quality components, given that there are some studies indicating that quality and class size are related (Barnett et al. 2003; Copple and Bredekamp 2009; Lee et al. 2006). We hypothesized that the lack of association between class size and process quality may be due to the low variability of these factors across both settings. All of the class sizes were relatively small; 94 % of publicly funded ECE classrooms and 99 % of inclusive ECE classrooms had less than 20 students. Eighty-nine percent of the publicly funded ECE classrooms had a teacher–child ratio of 1:10, and 100 % of the inclusive ECE classrooms had a teacher–child ratio of no more than 1:10. Our findings converge with Pianta et al. (2005a, b) data resulting in a lack of significant association between teacher–child ratio and classroom quality. These authors

also postulated that the consistent and small teacher–child ratios might have resulted in the non-significant finding.

Given that the ECE classrooms were all publicly funded classrooms, serving children from low-income households, we included proxies for income and race (program characteristics) as predictors of process quality; typically, these characteristics are used as a control variable. For classroom organization and instructional support, the percentage of children from low-income households was a significant predictor, such that a higher percentage of children from low-income households was related to lower quality. The extant literature supports difficulty in finding high-quality ECE placements for children from low-income backgrounds; thus, one explanation for this finding may be that classrooms serving high percentages of children from low-income households do not have the resources (personnel or materials) to provide high-quality learning environments (Burchinal et al. 2010). Further, teachers may be dedicating additional time to the management of student behaviors stemming from their home environments and the stressors of being raised in a low-income environment.

Setting was only a significant predictor of instructional support, which is not surprising given that each dimension of instructional support was significantly lower in inclusive ECE classrooms. The results indicated that publicly funded ECE classrooms were more than two points higher in instructional quality (on a seven-point scale) when controlling for structural quality and income status and race. One explanation for this finding may be that inclusive ECE teachers effectively meet the needs of the children enrolled in their classroom via strategies that do not receive high-quality rating scores. For example, high-quality classrooms in this domain promote high-level cognitive and linguistic development through frequent communication and expansive feedback, emphasize continued learning, and encourage children to make connections with the real world. Yet, inclusion of these strategies may not be the most appropriate strategies for all children in the inclusive ECE classrooms, or teachers may not believe that these strategies are appropriate for their students. In other words, it is possible that, given the cognitive and linguistic levels of development (over half of the children in the present study had IEPs, many with language goals), teachers may not feel that the provision of high-quality input is appropriate for these children. As a result, inclusive ECE teachers may modify their level of complexity to meet their children's level of development, resulting in lower process quality ratings. In reality, inclusive ECE classrooms may effectively bolster young children's knowledge and skills yet these environments may receive lower quality ratings when compared to classrooms without children with disabilities.

However, it is important to note that exposure to high-level thinking and complex language has been shown to be beneficial for children with disabilities (Green et al. 2014; Strain and Bovey 2011). Notably, inclusive ECE classrooms, by definition, include typically developing children as well as those with disabilities. The research literature on the effects of peer-to-peer interactions supports that students with and without disabilities benefit from participation in inclusive classrooms (Justice et al. 2014; Mashburn et al. 2009). Therefore, the notion of high-quality inclusive classrooms is particularly important such that the typically developing children benefit, which in turn, may impact their peers with disabilities through interactions. Regardless, inclusive teachers should aim to provide all children with high-quality experiences that will extend their current abilities.

Limitations and Directions for Future Research

Despite the significance of the findings, three limitations must be acknowledged. First, process quality, as measured by the CLASS, assesses the teacher–child interactions at the classroom level. Although the CLASS has acceptable psychometric properties (Pianta et al. 2008), reliability and validity have not been reported for inclusive ECE classrooms. Thus, additional research needs to be conducted to ensure adequate psychometrics when used in other learning contexts, including inclusive ECE classrooms. Likewise, our procedures for collecting process quality data (via the CLASS) varied slightly from the recommended procedures described in the CLASS manual/training; this modification may have had an impact on our study procedures. Second, analysis of the learning experiences of individual children was beyond the scope of this study. Future research should empirically investigate links between publicly funded and inclusive ECE classroom quality and child outcomes. Lastly, for the purposes of the present study, we used NIEER’s guidelines, which are based on state-funded ECE environments, as a basis for structural quality (i.e., teacher and program characteristics) because of NIEER’s nationally recognized presence, accumulation of data from all 50 states and the District of Columbia, and integration of research with best practices to appropriately inform policymakers, researchers, educators, and the general public (Barnett et al. 2015). We highlight that these recommendations are for state-funded preschool programs and do not necessarily include those learning environments receiving funding via other sources (e.g., private preschools). While NIEER’s recommendations include ten benchmarks, for the present study, we intentionally restricted focus to the five benchmarks that have implications to policy. We did not analyze benchmarks that are often considered when assessing a program (e.g., screenings/referrals, meals).

In conclusion, the present study highlights quantitative differences in and associations with process and structural quality between publicly funded ECE and inclusive ECE learning environments. Our study is unique in that, despite structural quality differences between the two settings, we were able to investigate co-occurring differences in process quality in these settings. Our findings have implications for best practice guidelines and policies, particularly for inclusive ECE environments. For example, because inclusive ECE classrooms received considerably lower instructional support ratings than publicly funded ECE environments, additional mechanisms should further unpack the reasons for this difference. As the number of young children attending preschool settings, including those with disabilities, continues to rise, there is a need for continued empirical research to ensure that all children, regardless of disability status, receive access to the highest quality so that they develop the essential knowledge and skills required for academic success.

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