Predicting the quality of center-based early care and education programs for preschool children: a cumulative asset model

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Predicting the quality of center-based early care and education programs for preschool children: A cumulative asset model

by

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ABSTRACT

The present study examined the relationship between structural indicators of quality in early childhood programs to observed quality in the classroom. Observational data about the global process quality and the quality of teacher-child interactions was collected in a sample of 113 center-based preschool classrooms in four Midwestern states.

Results indicated that the single strongest predictor of observed process quality was the use of an evidence-based curriculum. Multiple regression analyses identified a similar relationship between a group of structural indicators and process quality. However, indicators of multicollinearity among the predictor variables were found.

To address the issue of multicollinearity, a cumulative index of seven assets was developed. Classrooms with a greater number of assets were found to have higher ratings of quality. These results support the idea that multiple structural features of early care and education programs work together to create a climate of high quality within the early childhood classroom.
CHAPTER 1: GENERAL INTRODUCTION

Introduction

Current estimates from the US Census Bureau (2002) indicate that around 63% of children under the age of five are participating in some type of nonmaternal child care for an average of 32 hours per week. With this large number of young children in out-of-home care for extended periods of time, the quality of the early care and education programs providing these services have been of particular interest to parent consumers, policy makers, and early childhood professionals. This issue surrounding the quality of care provided in the early years is especially important considering that quality of early care and education has been repeatedly linked to children’s cognitive, language, socioemotional outcomes, enhanced school readiness, later school achievement, and other successes later in life (Campbell & Ramey, 1995; NICHD Early Child Care Research Network, 1996, 1998, 1999, 2000, 2001, 2002, 2003; Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg, Burchinal, Clifford, Culkin, Howes, Kagan, & Yazejian, 2001). Of particular concern are the findings that many of these early care and education programs could be classified as mediocre/minimal or even poor quality care (e.g., Bryant, Burchinal, Lau, & Sparling, 1994; Helburn, 1995; Whitebook, Howes, & Phillips, 1989). Previous research has indicated that children experiencing poor quality care are less likely to demonstrate significant developmental gains, which compromises their school readiness, and may place them at further developmental risk or threaten their health and safety (Peisner-Feinberg et al., 2001). The continuing prevalence of low quality early child care emphasizes the need for further investigation into classroom, staff, center, and state level characteristics related to improved quality care and better outcomes for children.
However, debate continues as to what constitutes good quality and how quality can best be measured. Previous longitudinal examinations of the quality of early care and education programs such as the National Day Care Study, the National Child Care Staffing Study, the Cost, Quality and Child Outcomes Study, the NICHD Study of Early Child Care, and the State-wide Early Education Program Study have explored the relationship between various structural indicators of quality and observed process quality, as well as how quality of care relates to children’s developmental outcomes. These structural indicators of quality as they are often classified are those aspects of early care and education programs which are often amenable to regulation and have less measurement error such as group size, staff-child ratio, teacher qualifications including education, training, and years of experience, teacher wages and benefits, and parent fees to name a few. Such structural indicators have been shown to predict observed process quality. Structural dimensions of child care have been shown to be related to various process-related characteristics of early care and education programs. Therefore, it is understood that structural components of early care settings comprise basic inputs that increase the likelihood that child care programs and providers will provide safe, responsive, and developmentally appropriate caregiving that characterizes high quality child care environments (Peisner-Feinberg & Burchinal, 1997; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000).

Objectives

The purpose of this thesis was to investigate the quality of care provided in center-based preschool age programs. Specifically, this research project investigated which structural dimensions of early care and education programs were best able to predict observed process quality and the experiences of children in preschool age classrooms.
Furthermore, this study addressed whether the relationship between structural features and observed process quality in the early childhood classroom varied systematically by state.

A third goal of the present research investigation was to develop an index of structural assets which had been previously shown to higher quality experiences for preschool aged children in center-based programs. The cumulative asset model was created using seven assets dichotomized using either an empirical or theoretical critical cut point. The asset model included (1) staff-child ratio divided at the NAEYC recommended value of one adult for every eight children, (2) lead teacher education, with the critical value set at a minimum of a 2-year-degree, based on previous research findings, (3) number of hours of annual child-related training set at median cut point of 25 hours, (4) whether or not the teacher received health insurance benefits, (5) whether or not an evidence-based curriculum was used in the classroom, (6) whether or not an annual parent-teacher conference was held, and (7) staff morale as measured by the Gallup Q-12 with a critical cut point at the median score of 4.71 on a 5-point scale. The total number of structural assets for each classroom were then cumulated and classrooms were divided into four groups based on their total number of assets with those classrooms with zero to two assets being considered to have an inadequate level of assets, classrooms with three assets had a minimal asset level, classrooms with four assets had a good asset level, and classrooms with five or more assets had an excellent asset level. The relationship between classroom asset level and observed process quality was then examined.

Method

The present study utilized a sample of 113 center-based preschool programs from Iowa, Kansas, Missouri, and Nebraska collected through the combined efforts of the
University of Nebraska Center on Children Families and the Law and the Midwest Child Care Research Consortium. This sample of observed programs comes from a larger sample of 2,022 child care providers who were contacted using stratified random sampling and completed the telephone survey, 87% of whom agreed to be contacted again. Measures completed during data collection included a telephone survey of the preschool classroom teacher and the center director and observational data about process quality collected using the Early Childhood Environmental Rating Scale – Revised, which rates global classroom quality on 43-items using a 7-point scale ranging from a 1 indicating poor or inadequate quality to a 7 indicating excellent quality, and the Caregiver Interaction Scale, which focuses on adult-child interactions and rates the teacher on 26 items using a 4-point scale on sensitivity, detachment, permissiveness, and harshness/punitiveness.

Significance

Previous examinations of child care quality have provided evidence that child care standards are important for children’s well-being and overall developmental outcomes. For instance, lower child-staff ratios, smaller group sizes, and high levels of care provider training and education have been found to be associated with higher scores on assessments of children’s development (Helburn, 1995, NICHD Early Child Care Research Network, 1998, 1999a, 2000, 2001, 2002, 2003; Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg et al., 2001; Ruopp, Travers, Glantz, & Coelen, C., 1997). Therefore, a better understanding of the relationship between structural features of early child care and education programs that are the most predictive of good child care quality is a critical focus of child development professionals, public policy makers, and parent consumers.
Due to the outstanding research evidence supporting the impact of child care quality, recent years have seen increased investments supporting early care and education programs and efforts aimed at effectively training staff to generate improvements in overall quality of care. However, many research initiatives have found that a majority of program settings are rated as providing mediocre or low quality care (e.g., Bryant et al., 1994; Helburn, 1995; Whitebook et al., 1989). Children experiencing poor quality care are less likely to demonstrate significant developmental gains, which compromises their school readiness and may place them at further developmental risk or threaten their health and safety (Peisner-Feinberg et al., 1997). The continuing prevalence of low quality early child care emphasizes the need for further investigation into program, staff, and state level characteristics related to improved quality care and better outcomes for children.

The present study utilizes state-level representative sampling to investigate quality at the level of the program, provider, and classroom to further the understanding of the relationship between structural indicators and process quality. Furthermore, the current research project develops a cumulative model of assets which are set a critical value or “tipping point” and evaluates the ability of this asset model to predict observed process quality in center-based preschool age classrooms. This cumulative asset model addresses concerns with multicollinearity, or high levels of correlation, and limited variability or restricted range which limits the interpretation of bivariate correlations among structural features of early care education programs and global measures of process quality. Further supporting the use of a multivariate cumulative assets model is the notion that there is a “culture of quality”, or the idea that good things go together, which often exists in high quality early care and education programs, whereby staff, administration, and parents have a
common understanding of what inputs and experiences are most beneficial for children’s optimal developmental outcomes.

Thesis Organization

The alternative thesis format is used for this thesis. It includes two manuscripts to be submitted for publication. The following chapter, Chapter 2 “Understanding the quality of center-based early care and education programs for preschool age children”, provides a review of the relevant research literature and a discussion of measuring and evaluating quality in early care and education programs to be submitted to *Early Childhood Research Quarterly*. The manuscript describes the value of examining quality in early childhood programs, reviews previous investigations relating program quality to children’s developmental outcomes, explores various methods of defining and measuring quality, and concludes by emphasizing the need for a theoretical model of quality in early care and education programs which addresses the interrelationship or multicollinearity of those variables most often used to describe, predict, and regulate quality.

To continue, Chapter 3, “Predicting process quality in center-based preschool programs from provider-, program-, and state-level structural characteristics: Use of a cumulative asset model”, is an empirical manuscript prepared for submission to *Early Childhood Research Quarterly* as well. This chapter is an empirical investigation of the relationship between structural indicators of quality and observed process quality, which develops and utilizes a cumulative asset model to describe and predict quality.
Finally, Chapter 4 summarizes the findings of the empirical study in Chapter 3 and reviews implications. Implications for early care and education policy, early childhood practitioners, and future research in the field are discussed.

References


CHAPTER 2: “UNDERSTANDING THE QUALITY OF CENTER-BASED EARLY CARE AND EDUCATION PROGRAMS FOR PRESCHOOL AGE CHILDREN”

A paper to be submitted to *Early Childhood Research Quarterly*

Amanda Stein-Balock and Susan Hegland

Abstract

The current manuscript is a review of the relevant research literature related to the examination of quality in early care and education programs. Previous research has identified a relationship between quality in early childhood programs and children’s concurrent and later developmental outcomes. Debate continues as to the optimal methods of measuring and defining quality in these varied settings. Findings have been mixed in terms of which structural indicators best predict process quality in the classroom. The study provides support for the utilization of a cumulative asset model to most adequately describe quality in early care and education programs.

Introduction

*Why study child care quality?*

The number of young children participating in non-parental child care arrangements continues to grow as the number of dual-income families and working single parents steadily increases. According to the U.S Census Bureau (2002), 63% of children five years or younger were spending an average of 32 hours per week in some type of child care arrangement. In fact, the most commonly used type of non-parental child care arrangement is organized child care facilities including child care centers, preschools, and Head Start Programs (U.S. Census Bureau, 2002). Due to the large number of children in out-of-home
care, the quality of these early care and education settings has become a major focus of parental concern, state legislation, and research in the field of child development. In fact, the quality of early child care experiences has been shown to be one of the most important predictors of later child outcomes not only in the short term (NICHD Early Child Care Research Network, 1996, 1998, 1999a, 2000, 2001, 2002, 2003; Peisner-Feinberg & Burchinal, 1997) but also in the long term as well (Campbell & Ramey, 1995; Peisner-Feinberg, Burchinal, Clifford, Culkin, Howes, Kagan, & Yazejian, 2001). Therefore, the identification of those structural aspects of early childhood programs that are the most predictive of good child care quality is a critical goal of child development professionals, public policy makers, and parent consumers.

Research investigating the effects of child care and other early education programs has increased considerably in recent years. Results from this stream of research indicates that high-quality programs can produce dramatic benefits for children in terms of improvement in cognitive, language, and social development, enhanced school readiness, later school achievement, and other successes later in life (NICHD Early Childhood Research Network, 1996, 1998, 1999a, 2000, 2001, 2002, 2003; Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg, et al., 2001). These associations between children’s outcomes and quality of early child care experiences have been revealed even after statistically controlling for child and family factors (e.g. socioeconomic status, gender, and race/ethnicity) known to be linked to children’s developmental outcomes and child care quality. Therefore, in recent years increased investments have been made in early care and education programs and efforts aimed at effectively training staff to generate improvements in overall quality of care. However, many research initiatives have found that a majority of program settings are rated
as providing mediocre or low quality care (e.g., Bryant, Burchinal, Lau, & Sparling, 1994; Hegland & Oesterreich, 2005; Helburn, 1995; Whitebook, Howes, & Phillips, 1989). Children experiencing poor quality care are less likely to demonstrate significant developmental gains, which compromises their school readiness, and may place them at further developmental risk or threaten their health and safety (Peisner-Feinberg et al., 2001). The continuing prevalence of low quality early child care emphasizes the need for further investigation into classroom, staff, center, and state level characteristics related to improved quality care and better outcomes for children.

Defining child care quality.

Defining what constitutes quality in the field of early care and education has been a topic of considerable debate. The way in which researchers and those who determine policies and regulations related to early care and education define and measure quality is of critical importance, especially considering the relationship between high-quality child care in the early years and children’s later developmental outcomes (Peisner-Feinberg et al., 2001). Various investigators have used a variety of indicators comprised by the term “quality.” One common method of categorizing variables related to child care and classroom quality is the distinction between process and structure. Structural indicators of quality are those dimensions of early care and education programs that are easily measured and often regulated. Structural aspects within early childhood settings that have been previously studied include group size; staff-to-child ratio; the education, training and previous experience of staff; and fiscal aspects of child care such as parent fees and staff wages and benefits (Helburn, 1995; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Phillipsen, Burchinal, Howes, & Cryer, 1997; Scarr, Eisenberg, & Deater-Deckard, 1994;
Whitebook et al., 1989). Additionally, Phillipsen and associates (1997) included structural components of early childhood programs that are not directly controlled by state child care regulations such as rate of staff turnover, number of children enrolled, and profits or surpluses.

Process components of the early childhood setting incorporate those aspects of the environment most readily experienced by children including their interactions with care providers and peers, as well interactions with and availability of materials and activities within the program. Such process-related characteristics of early care and education programs have been shown to be related to various structural dimensions of child care such as teacher qualifications, staff-to-child ratios, teachers’ wages, parents’ fees, and other easily measurable and often-regulated indicators of quality (Burchinal, Cryer, & Clifford, 2002; Phillips et al., 2000; Phillipsen et al., 1997). It is therefore assumed that structural components of early care settings comprise basic inputs that increase the likelihood that child care programs and providers will provide safe, responsive, and developmentally appropriate caregiving that characterizes high quality child care environments (Peisner-Feinberg & Burchinal, 1997; Phillips et al., 2000).

Research using data from the NICHD Study of Early Child Care identified significant relationships between what researchers defined as regulable and non-regulable features of child care and the quality of care being provided in home-based settings by a non-relative (Clarke-Stewart, Vandell, Burchinal, O’Brien, & McCartney, 2002). Regulable features of child care were identified as the amount of caregiver education and training, the total number of children (weighted by age), and whether or not the family child care home had a government license (Clarke-Stewart et al., 2002). Those variables characterized as non-
regulable aspects of child care included the level of caregiver professionalism as identified by the provider’s involvement in professional activities, the number of years of experience in child care, the age of the caregiver, the caregiver’s beliefs about children, level of caregiver depressive symptoms, and the presence of the provider’s own child (ren) (Clarke-Stewart et al., 2002). Results indicated that care providers with higher education levels and those who had received more recent and a greater amount of training were found to provide higher quality environments, based on scores on the child-care Home Observation for the Measurement of the Environment Inventor (HOME, Caldwell & Bradley, 1984), and more positive caregiving as measured by the Observational Record of the Caregiving Environment (ORCE: NICHD Early Childhood Research Network, 1996; Clarke-Stewart et al., 2002). Caregiver’s beliefs about how to handle children mediated the effects of caregivers’ training on child care quality (Clarke-Stewart et al., 2002). In addition, caregivers who were not in compliance with recommended age-weighted group size cut-offs received lower ratings of caregiving behaviors (Clarke-Stewart et al., 2002). Overall, children in higher quality child care homes had care providers who were more attentive, responsive, and emotionally supportive (Clarke-Stewart et al., 2002). However, there was no relationship between quality of care and the total number of children enrolled in the child care home, or the provider’s age, mental health status, experience, professionalism, or presence of the provider’s own child in the care setting (Clarke-Stewart et al., 2002).

Still other researchers have organized those variables most commonly associated with quality in early care and education into cumulative models of either assets or risk factors. For example, data from the Midwest Child Care Research study was used to develop an index that included fourteen features of early child care (Raikes et al., 2006). The provider
characteristics included in this index of assets were: 1) highest level of formal education, 2) obtainment of a Child Development Associate (CDA) credential, 3) total number of hours of child-related training in the previous year, 4) up-to-date CPR and first aid certification, 5) completion of an intense training program, 6) attendance at a child care-related conference, 7) use of curriculum, 8) annual conference with parents about individual child’s development, 9) previous year’s earnings, 10) work in a state-accredited home or center, 11) work in a center or home sponsored by Early Head Start/Head Start, and 12) participation in the Child and Adult Care Food Program. The two characteristics that were unique to center-based caregivers were 13) if they received health benefits and 14) reports of discussion with some type of supervisor about work-related progress. Results from these analyses found that having a greater number of these assets was related to providing higher quality care for both centers and family child care (Raikes et al., 2006). Specifically, child care programs possessing eight or more assets were identified to be providing good quality care as defined by an average score of five or higher on the Early Childhood Environment Rating Scale – Revised Edition (ECERS-R; Harms, Clifford, & Cryer, 1998), Infant/Toddler Environment Rating Scale – Revised Edition (ITERS; Harms, Cryer, & Clifford, 1990), or Family Day Care Rating Scale (FDCRS; Harms & Clifford, 1989). Furthermore those providers with fewer than four assets were almost never observed to be providing adequate quality care (Raikes et al., 2006).

Although a variety of methods of defining or categorizing structural components related to the quality of early child care have been investigated, there has been great overlap as to the types of variables measured in early childhood programs. For instance, almost all research studies investigating the quality of early care and education programs have
incorporated measures of classroom composition (e.g., group size and adult-child ratio), teacher or provider qualifications, fiscal aspects of care, developmentally appropriate activities and materials, and interactions between children and staff. However, these key indicators and processes contributing to quality in child care use a framework for research mainly focusing solely on the classroom itself. Nevertheless, further investigation into potentially powerful influences on the quality of early care and education beyond those directly impacting children is needed. Such influential variables may include a social and political climate supporting and investing in improvement in child care quality as well as the regulatory structure that establishes, monitors, and enforces adequate levels of quality in which a particular program is located.

The current study is guided by Bronfenbrenner and Morris’s (2006) framework on the bioecology of human development. Bronfenbrenner has conceptualized the reciprocal influences of different systemic levels on the developing child and in turn, the influence of the child on his or her environment. The child himself or herself brings to a particular system his or her existing genetic makeup, biological influences, and experiences from other systems. Development is therefore, viewed as a function of characteristics of the developing person interacting with immediate and more remote environmental contexts over time. The child participates in an immediate “microsystem” that directly affects her or his development, in this case, the early care and education setting. For the purposes of this study, the “microsystem” of interest is the center-based early childhood classroom, which is most proximal to the child’s experiences. Within the classroom there exists a variety of influences on the child, including interactions with the environment such as activities and materials, interactions with adults, and interactions with peers all comprising process quality. Other
potentially influential factors existing at the level of the microsystem include staff
class characteristics such as group size, adult-child ratio, teacher qualifications (e.g. formal
education, teaching experience, and training related to child development), as well as
program characteristics such as the use of curriculum, teacher wages, and benefits, center
administration, and director qualifications. The associations between these various
microsystems, such as the child’s home environment and child care setting, is what
Bronfenbrenner calls the “mesosystem”. Again, the “mesosystem” would incorporate the
relationships between parents and staff and staff relations with one another and the program
director creating links between those microsystems in which a child is directly involved. The
classroom is nested within the child care center, which sets boundaries and guidelines for
care that is likely to occur within the classroom. Such mesosystem influences are more distal
in terms of what the child actually experiences while in the early childhood classroom. The
mesosystem is influenced by “exosystem” factors, including programs, policies, regulations
and institutions related to early child care and often controlled at the level of the state, such
as requirements for staff training related to early childhood education or child development
and opportunities for professional development. Although these factors may or may not have
a direct impact on the child, they have a major influence on the availability and quality of
children’s services in different communities. Finally, the “macrosystem” of societal values,
beliefs and attitudes is what guides different societies and communities in developing and
implementing child and family policies related to early care and education programs. These
various systems of influence work together to impact an individual child’s experience in the
early care environment. Therefore, researchers should attempt to investigate child care
quality by incorporating measures of potentially influential variables in each of these systems, with those most proximal to the child being of greatest importance.

*Measuring child care quality.*

Although there is consensus that high quality early care and education settings should include necessary inputs such as a safe, healthy environment, positive relationships between children and their caregivers and peers, and the opportunity for children to actively learn and explore as well as empirical data supporting the assertion that quality relates to both short- and long-term outcomes for children, there is less agreement about how to measure quality (Howes & Sanders, 2006). Structural indicators of quality child care are often simple to assess by interviewing center staff or directors or through direct observation of actual group size and child-staff ratio. Such structural features of early care and education programs are often the most amenable to regulation and the least likely to involve measurement error when being assessed. However, information regarding process quality is more complicated to gather, involving a greater potential for measurement error, and must often be measured through direct observation of the environment.

Two different approaches to measuring process quality can be distinguished. The first methodology assesses overall or global quality by measuring a range of components associated with high quality care in early childhood environments. The most widely used measure of global quality within preschool child care classrooms is the Early Childhood Environmental Rating Scale-Revised (ECERS-R) (Harms, Clifford, & Cryer, 1998). The ECERS-R (Harms, Clifford, & Cryer, 1998) is a 43-item instrument used to evaluate early care and education programs at the classroom level on their inclusion of developmentally appropriate interactions, activities, materials, curriculum, supervision, and scheduling for
children, as well as health and safety, center administration, staff development, and parent involvement. Many large-scale research studies on the quality of early care and education, including the Cost, Quality, and Child Outcomes in Child Care Centers Study (CQCO; Helburn, 1995), the National Center for Early Development and Learning’s (NCEDL) Multi-State Study of Pre-Kindergarten and study of State-Wide Early Educations Programs (SWEEP; Early et al., 2005), and an evaluation of Head Start classrooms (Bryant et al., 1994) have used the ECERS-R or its predecessor, the ECERS, to assess quality. Similarly, the Assessment Profile for Early Childhood Programs (Abbot-Shim & Sibley, 1987) measures global quality by assessing the physical and social environment of the early childhood classroom but utilizes a true-false format, rather than ratings on a 7-point scale like the ECERS-R. The use of such a dichotomous scoring format by the Assessment Profile may potentially over- or under-estimate the presence of quality indicators within early care and education settings, as compared to a Likert-type scale, used by the ECERS-R, which provides a range of quality within each item to be measured.

Although the ECERS-R incorporates seven subscales, researchers have not found these subscales to have sufficient levels of internal consistency to be used individually (Harms, Clifford, & Cryer, 1998). Factor analyses have identified two main constructs being measured by this instrument, including items related to “teaching and interactions”, or tone, and others incorporating “provisions for learning”, or developmentally appropriated activities and materials (Cassidy, Hestenes, Hegde, Hestenes, & Mims, 2005; Sakai, Whitebook, Wishard, & Howes, 2003). Still other examinations of the psychometric properties of the ECERS-R have found one global factor of quality to explain the greatest amount of variance in scores (Perlman, Zellman, & Le, 2004). Work by Perlman and associates (2004) compared
overall ECERS-R scores with subgroups of randomly selected items, a subgroup of items identified as easy-to-administer, as well as a subgroup of items designated to be especially important indicators of child care quality by a group of child care practitioners. Results indicated that scores from these various subgroups correlated highly with total ECERS-R scores, suggesting that a smaller subgroup of items can provide similar information as would be obtained from administering the entire measure (Perlman et al., 2004). However, the authors caution against using an easy-to-administer subset of ECERS-R items primarily in a high-stakes context, whereby a center’s score on the ECERS is connected to sanctions or rewards in terms of the amount of public funding it receives (Perlman et al., 2004).

Considering that items which are easiest to measure (e.g. number of books in the classroom) would inherently be easier to change, providers would therefore, attempt to improve their scores by focusing on easily improved aspects of the child care setting, thereby ignoring other important features of child care quality, reducing the predictive ability of the subset of ECERS-R items, and failing to improve quality in a meaningful way.

Besides the widespread use of the ECERS-R as a research measure assessing the global quality of early childhood classrooms, teachers and administrators have also used it as a self-assessment tool to identify strengths and areas of improvement in their own classrooms. Scores on the ECERS-R have been used to evaluate programs as poor, mediocre, or good. These levels have been used as one of the criteria for determining status and/or funding in state-level quality rating systems (e.g., North Carolina’s Star Rating System; Colorado’s Educare System) for early care and education programs (Perlman et al., 2004). Specifically, North Carolina’s Smart Start program utilizes a system of tiered reimbursement based on the number of stars an early child care program has received as an indicator of the
quality of care provided. Likewise, selected counties in Colorado have elected to reimburse child care providers for care of subsidy-eligible children in accordance with their Educare rating. A trend exists across the United States towards the development of quality rating systems of early care and education settings that should motivate providers to improve the quality of care they provide and to more accurately inform parent consumers of child care.

A second method of assessing process quality in early childhood programs focuses on more specific types of quality indicators. For instance, in comparison to the ECERS-R, which compiles information about overall process quality in classrooms, The Caregiver Interaction Scale (CIS; Arnett, 1989) measures individual teachers’ interaction styles with children in the program. The Arnett CIS is a 26-item observational measure containing four subscales including positive interaction, punitiveness, permissiveness, and detachment (Arnett, 1989). Performance on the Arnett CIS has been found to be correlated ($r = .48$) with scores on the High/Scope Program Quality Assessment (PQA): Preschool Version, a measure designed to evaluate early childhood program quality and identify staff training needs (High/Scope Educational Research Foundation, 1998).

Another specific measure of process quality developed and utilized by the NICHD Early Child Care Research Network in their longitudinal Study of Early Child Care is the Observation Record of the Caregiving Environment (ORCE; NICHD Early Child Care Research Network, 2002). The focus of this observational instrument is on the occurrence of specific kinds of behavior directed by identified care providers toward a target child. Therefore, scores on the ORCE provide information about quality of care at the level of the individual child. The ORCE contains three scales, one capturing behavioral ratings, one providing qualitative ratings, and a measure of structural variables. In addition, ORCE
observations incorporate a method of time sampling consisting of 44-minute cycles, alternating between 30 second observe and record frames. The ORCE observations focus on the particular study child’s behaviors, activities, and interactions with the caregiver or other adults or peers in the classroom including such behaviors as asking questions, restricting the child's activity, responding to the child's talk, positive physical contact, cognitive and social stimulation, fostering exploration, the quality of opportunities for, and encouragement of the child’s exploration of objects and the environment. In regard to structural features of care, the number of children of different ages and the number of caregivers is tallied at the beginning and end of each observation cycle. According to the NICHD Early Child Care Research Network (1999b), the ORCE was informed from previous measures of early care and education quality such as the ECERS and the Arnett CIS, but was created to “assess minute-to-minute evidence of caregiving and quality in a relatively objective, quantitative and qualitative way.”

Factors influencing child care quality

Group size and teacher-child ratio. One regulable feature of early care and education programs that is consistently examined in studies of child care quality relates to the number of children present in a classroom. Previous research exploring the association between group size and the ratio of children to staff to observed quality in preschool classrooms has found mixed results. Differences in findings related to the impact of classroom composition on the quality of early care and education settings may exist due to restricted ranges in group size or ratio. For example, results from the National Day Care Study (Ruopp, Travers, Glantz, & Coelen, 1979) identified class size to be the strongest and most consistent structural indicator related to preschoolers’ experiences in center-based care. Across the three
study sites, group sizes ranged from eight to 36 children per classroom (Ruopp et al., 1979). Although staff-child ratio was found to predict classroom quality for preschool children in this study of center-based child care with a sample of 57 centers, it was identified to be a less important structural feature than group size when ratio was within the policy relevant range of 1:5 to 1:10 (Ruopp et al., 1979). However, teacher-child ratio was found to have the strongest relationship with center costs (Ruopp et al., 1979). Specifically, Ruopp and colleagues (1979) found that an increase in group size was correlated with an increase in the likelihood that children would be receiving developmentally inappropriate care as measured by the Adult-Focus Instrument.

However, further research from the Cost, Quality, and Child Outcomes study utilizing a large sample of preschool centers in four different states found that higher, or more stringent, adult: child ratios along with staff wages, but not group size, were predictive of higher process quality as measured by the ECERS, Caregiver Interaction Scale (CIS), and Teacher Involvement Scale (Phillipsen et al., 1997). Similarly, higher teacher-child ratios were significantly related to higher levels of observed quality in a sample of 106 preschool classrooms in three different states (Phillipsen et al., 2000). However, class size was not predictive of preschoolers’ classroom experiences (Phillips et al., 2000). In further evidence of the importance of ratios in child care settings, longitudinal data from the NICHD Study of Early Child Care, utilizing data from nine different states, found that in center-based preschool classrooms with better ratios and more highly educated teachers, children received more positive caregiving (NICHD Early Child Care Research Network, 1999a).

Although many studies examining the relations among class size, teacher-child ratio, and process quality have found significant associations, results vary as to which regulable
feature is the most important correlate of early child care quality. Differences in research findings related to the influence of class size and ratios on child care quality may be related to the range, which, in turn, varies based on state regulations of child care. Therefore, critical to examining the impact of group size and ratio on quality of early child care programs is the knowledge of regulations of such structural features, as well as regulatory compliance of child care sites sampled. Consequently, studies including sites from varying regulatory contexts are necessary to investigate the mediating effect of these variables on child care quality as well as children’s developmental outcomes.

**Teacher qualifications.** Research in the field of early care and education indicates the importance of the relationship between teacher qualifications and the quality of preschool classrooms. However, the way in which studies have defined teacher qualifications has varied. Previous studies have evaluated the association of teachers’ level of education, amount of training related to early child development and education, and amount of teaching experience to observed quality in the classroom environment.

One of the earlier studies examining this relationship, the National Day Care Study, (Ruopp et al., 1979), found that teacher education and training in the area of children’s development and learning, but not amount of formal education alone or years of child care experience, was associated with higher quality preschool environments, as measured by the Adult-Focus Instrument and Child-Focus Instrument. In contrast, results from the National Child Care Staffing Study (Whitebook et al., 1989), indicated that those preschool teachers demonstrating the most appropriate and sensitive caregiving behaviors, as measured by the Caregiver Interaction Scale (CIS; Arnett, 1989), were those that had received a greater amount of formal education, particularly a college degree or higher. However, level of formal
education and amount of specialized early childhood education were correlated indicating that the most highly educated teachers also tended to have higher levels of early education training. Years of experience in child care were found to be a poor predictor teacher behavior with children (Whitebook et al., 1989). Later studies have supported this finding that a high level of formal education in the area of early childhood of the teacher is strongly correlated with high quality teacher-child interactions and better levels of overall process quality in the classroom (Helburn, 1995; NICHD Early Childcare Research Network, 1996; Phillipsen et al, 1997).

Data from 370 preschool classrooms from the Cost, Quality, and Child Outcomes Study (Phillipsen et al., 1997) found that process quality measured using the Early Childhood Environment Rating Scale (ECERS) and the Arnett Caregiver Interaction Scale (CIS) was higher in classrooms with a lead teacher who had at least a baccalaureate degree. In a sample of 509 preschool classrooms in four states, Phillipsen and colleagues (1997) also identified a modest correlation between classroom quality and amount of teaching experience with the mean number of years spent teaching ranging between 5.7 to 12 years between the four states sampled. However, other studies have contradicted this finding that teaching experience is associated with the quality of caregiving and adult behaviors (NICHD Early Childcare Research Network 1996; Whitebook et al., 1989).

One study of Head Start classroom quality did not find a statistically significant association between teacher qualifications such as education and experience and classroom quality as measured by the ECERS (Bryant et al., 1994). One possible explanation for the lack of a statistically significant association between teacher qualifications and quality measured in the classroom could be the limited variation in the education levels of teachers.
For teachers participating in this study, years of experience ranged from 2 to 19.8 years and 67% had received a bachelor’s degree or greater, with only 3% having only a high school education (Bryant et al.). In addition, caution must be used when interpreting these data due to the small sample size of only 32 classrooms, the limited variation in ECERS scores, and the narrow range in educational level of the teachers, all of which restrict the statistical power to detect relationships between these variables.

*Teacher wages and benefits.* Several multisite studies of child care quality suggest that teacher wages are one of the strongest predictors of process quality in the preschool classroom, as measured by both the ECERS and the Assessment Profile for Early Childhood Programs (Phillips et al., 2000; Phillipsen et al., 1997; Scarr et al., 1994). For instance, teacher wages, defined as the higher wage paid to any full-time teacher, were more strongly associated with quality of care than any other regulatory or structural dimension of quality that was measured (Phillips et al., 2000; Scarr et al., 1994). Results from the Cost, Quality, and Child Outcomes data also confirm the finding that higher staff wages, measured as the salary of an observed classroom’s lead teacher, are related to higher process quality for preschoolers, as measured by the ECERS (Phillipsen et al., 1997). Furthermore, a longitudinal evaluation of the National Association for the Education of Young Children (NAEYC) child care center accreditation process indicated that staff salaries and the related retention of qualified, experienced teachers predicted the quality of care provided, as measured by the ECERS and the Arnett CIS, beyond the variance attributable to NAEYC accreditation status (Whitebook, Sakai, & Howes, 1997).

Previous researchers have demonstrated an association between teacher wages and their background characteristics; with staff with higher levels of education, training, and
experience receiving higher pay (Whitebook et al., 1989). In addition, research has indicated that teachers receiving higher salaries are less likely to leave their job, leading to lower rates of staff turnover (Whitebook et al., 1989). The associations among teacher wages, educational background, and rates of turnover support the idea that high-quality child care centers that offer better salaries are more likely to bring in more qualified, experienced teachers who will remain in their position for longer periods of time. In fact, most child care studies that have included teacher wages as a predictor variable in the analyses have found a statistically significant correlation with classroom quality, indicating the importance of state budgets supporting funding for early care and education initiatives.

*Regulations of child care.* The regulatory context in which an early childhood program is located has been found to have a meaningful impact on the quality of care that is provided. For instance, research indicates that child care programs located within states with more stringent regulations regarding child care are of higher quality than programs in states with fewer or more lenient regulations (Helburn, 1995; Phillips et al., 2000, Phillipsen et al., 1997). Also important to the impact of the state child care regulatory climate in relation to quality of care offered is the compliance of each early childhood program to such regulations. To illustrate, results from the Cost, Quality, and Child Outcomes study, which included early childhood programs from four different states, found that process quality was higher in states with more stringent child care regulations (Phillipsen et al., 1997). Specifically, better process quality in center-based preschool classrooms, as measured by the ECERS, Arnett CIS, and Teacher Interaction Scale, was identified in those states with teachers with more education, a moderate amount of experience, and higher wages (Phillipsen et al., 1997). Similarly, in a sample of 227 child care centers in five metropolitan
areas, those centers in states with more rigorous child care regulations tended to have higher staff: child ratios, staff with a greater amount of training related to early care and education, and lower staff turnover rates (Phillips et al., 1992). In addition, centers that complied with child care standards related to group size, ratio, and teacher training had lower rates of turnover, more developmentally appropriate activities, more responsive and less harsh teachers, and teachers with more specialized training (Phillips et al., 1992).

One paper utilizing data from the NICHD Study of Early Child Care including nine different states, reported specifically on the impact of child care centers meeting recommended standards regarding class size, ratio, teacher training, and teacher level of education on later child outcomes (NICHD Early Child Care Research Network, 1999a). Analyses indicated, that although most classrooms did not meet all four of these standards (ranging from 10% to 34% of classrooms), those children in classes that met a greater number of the suggested standards demonstrated higher levels of school readiness, superior language comprehension skills, and fewer behavioral problems at 36 months of age (NICHD Early Child Care Research Network, 1999a). Although a direct measure of classroom quality was not included in this investigation, the better child outcomes for those children in classrooms meeting more recommended standards are suggestive of the importance of compliance with child care regulations to achieve higher quality early care and education environments.

However, another study, with a sample from three different states, explored the effects of state child care regulations on child care quality and found a perplexing pattern of differences by site (Phillips et al., 2000). Although structural indicators of quality (including group size, ratio, teacher education and training, highest teacher wage, and parent fees)
corresponded as expected with the ranking of states on regulatory stringency, observed classroom quality as measured by both the ECERS-R and the Assessment Profile for Early Childhood Programs did not follow the same pattern (Phillips et al., 2000). This discrepancy from previous research findings related to the role of regulatory quality could be explained by poorer enforcement of child care regulations, the level of state funding for child care subsidies and support, early care initiatives focused on staff training or compensation, or other factors affecting child care quality that may vary across states. In addition, the compliance with ratios was the only measure of regulatory compliance in this study. Further investigation into the impact of the various facets of child care regulations and the complex relationship with child care program quality is necessary. Further clarification of the regulatory dimension of quality is only possible using research studies that sample early childhood programs from multiple states.

*The relationship of quality to child outcomes.*

Research evaluating the impact of high quality early intervention programs indicates the lasting benefits of these initiatives on children’s developmental outcomes in a variety of domains, especially for children who are considered at risk for school failure. High-quality demonstration programs such as the Perry Preschool Project, the Abecedarian Preschool Program, and the Chicago-Child Parent Centers have documented the lasting effects of well-designed, sufficiently funded early childhood programs employing qualified, trained staff. Examination of these model programs provides clarification as to which components of early childhood settings are necessary for high quality to exist and lead to the most optimal outcomes for children.
The High/Scope Perry Preschool Study, for example, randomly assigned 58 low-income, African American children who had been identified to be at-risk for school failure to participate in a high-quality preschool education program. Long-term outcomes for the program participants were compared to those of a randomly assigned group of children who did not attend preschool. The Perry Preschool Program employed teachers with at least a bachelor’s degree as well as certification in education. The classes met for 2 ½ hours per day each week for 2 years. Each teacher served between 5 and 6 children and conducted weekly home visits with families. Results indicated lasting improvements in regards to greater school readiness, reduction in the need for special education, decreased rates of grade retention, improved rates of high school graduation, overall higher levels of educational attainment, reduction in delinquency and crime, and higher levels of job attainment and income.

Other investigations of quality of early care and education programs have evaluated the existing state of early child care and its relationship to later assessments of children’s development. Such studies provide a more “realistic” picture of the experiences of preschool age children from a broad cross-section of children and types of care, providing invaluable information about the variations in the early care and education experiences and developmental patterns of children. For instance, previous research published by the NICHD Early Child Care Research Network (1999a) indicated that children in preschool classrooms in which caregivers had graduate from college demonstrated displayed better preacademic skills and language comprehension. The same was true for children whose teacher had received specialized child-related training at the college level. However, random assignment of participants was not used in this study.
Similarly one multi-site longitudinal study, also using data from the NICHD Study of Early Child Care, investigated the relationship between regulable and non-regulable features of child care and child outcomes using a large sample of family child care homes (Clarke-Stewart et al., 2002). Results from this study revealed that children in child care homes that were of higher quality as measured by the child-care HOME (Caldwell & Bradley, 1984), and the ORCE, scored better on measures of language and cognitive development (Clarke-Stewart et al.). In addition, children in higher quality child care environments received more positive behavioral ratings on the Child Behavior Checklist by both mothers and caregivers (Clarke-Stewart et al.).

Conclusions

In conclusion, this article reviews a large body of research literature examining the relationship between structural indicators of quality and observed process quality in early care and education programs and their impact on short-term and long-term child development. Researchers in the field of early childhood education have debated various methods of defining quality. For instance, many examinations of child care quality have defined quality broadly in terms of structural and process dimensions of care, whereas other investigations have evaluated predictors of quality in terms of their proximity of impact on children participating in the program. Still others designate structural features related to quality at their varying levels of influence including classroom or provider, program, and state.

Beyond theoretically defining child care quality, a variety of measures exist that can be used to assess process quality through observation of the child care setting. Depending on the measure, quality can be evaluated at a global level of impact using such measures as the
commonly used environmental rating scales and the Assessment Profile. Additionally, pertinent information about more specific aspects of quality can be obtained through tools that measure quality at a more narrowly defined level, such as that of the teacher-child interaction, which has been previously evaluated using measures such as the Arnett CIS and the ORCE. Various multisite studies of early childhood programs have demonstrated the relationship of regulable features of care with observed process quality. For example, researchers have found such workforce and program characteristics as group size, teacher-child ratio, care provider qualifications (e.g., formal education, training related to child development, and experience), teacher wages and benefits, parent fees, and regulatory context to be important predictors of quality of early care. Inconsistent findings relating structural components of care to observed quality can often be attributed to limited sample sizes, restricted range or variability, differences in operational definitions, or not accounting for the impact of regulatory context and compliance with such regulations.

This informative body of research helps to guide the decisions of policy makers, child care administrators, care providers, and parent consumers. Therefore research informing professionals in the field of early childhood about which components of programs are most likely to enhance child care quality significantly is essential. It is still not clear what combination of provider and program inputs constitute the best quality enhancement investments at the state level. To guide state-level funding of initiatives focused on improving the quality of early care, research efforts should generate information about the relationship of structural dimensions of care to process quality as well as guide the development of more accurate, cost effective methods of measuring child care quality. Future studies should continue to utilize multistate representative sampling of child care programs.
and providers across various types of care, especially considering the degree of variation in regulatory contexts by state. Such studies will also have the benefit of identifying changes in trends in child care quality amidst various state quality enhancement initiatives. It is essential to identify provider and program level structural characteristics, especially those that are amenable to regulation and monitoring, which work best in conjunction with one another to create high quality early child care programs. In addition, there is value in creating a cumulative index of assets found to have a consistently strong predictive relationship with observed quality to help identify which multiple components work together to create the climate for high quality care.
References


CHAPTER 3: “PREDICTING PROCESS QUALITY IN CENTER-BASED PRESCHOOL PROGRAMS FROM PROVIDER-, PROGRAM-, AND STATE-LEVEL STRUCTURAL CHARACTERISTICS: USE OF A CUMULATIVE ASSET MODEL”

A paper to be submitted to Early Childhood Research Quarterly

Amanda Stein-Balock and Susan Hegland

Abstract

The current research study investigated the relationship between structural components of center-based preschool programs at the provider, program, and state level to observed process quality within the classroom. The sample included 113 center-based preschool age programs from four Midwestern states selected using stratified random sampling based on location, type of care, and subsidy receipt. Lead teachers and program administrators completed a telephone interview and observations of classroom quality were conducted using the ECERS-R and the Arnett CIS. Correlational analyses indicated that the strongest single structural predictor of process quality was the use of an evidence-based curriculum. State was not found to statistically significantly predict quality. Additionally, a cumulative index of seven program assets was developed. Classrooms with a greater number of structural assets were found to have the highest process quality. Results are discussed in light of the implications for theory building, practice, policy, and future research.

Introduction

A majority of children in the United States experience non-parental child care prior to entry into kindergarten (Lamb, 1998). In fact, current estimates indicate that 63% of children five years or younger are spending an average of 32 hours per week in some type of
nonmaternal child care arrangement (U.S. Census Bureau, 2002). Consequently, the quality of early child care and education is of major concern to parents, policy makers, and early childhood professionals especially considering recent research findings that have linked better child care quality to more positive child development outcomes (NICHD Early Childhood Research Network, 1996, 1998, 1999a, 2000, 2001, 2002, 2003; Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg, Burchinal, Clifford, Culkin, Howes, Kagan, & Yazejian, 2001). Therefore, the identification and regulation of those components of early childhood programs that are the most predictive of child care quality is a critical goal for researchers, practitioners, and policy makers alike.

Although all 50 states in the U.S. regulate child care centers in some way, there is considerable variation in regulatory standards. For example, in a multisite study of child care in nine different states, mandated child-staff ratios ranged from 2:1 to almost 15:1 for three-year-olds, with only 56% of observed classrooms meeting the recommended standard of seven children per adult (NICHD Early Child Care Research Network, 1999a). Recommended standards used for the NICHD Study of Early Child Care (1999a) were published by the American Public Health Association and the American Academy of Pediatrics (1992). For the same sample of three-year-old children, group size ranged from three to 32 children per classroom (NICHD Early Child Care Research Network, 1999a). Again only 63% of the 250 preschool classrooms sampled met the recommended standard of a maximum of 14 children per classroom (NICHD Early Child Care Research Network, 1999a). Standards for caregiver education ranged from less than a high school education to an advanced degree, with 80% of child care providers completing some college courses as recommended (NICHD Early Child Care Research Network, 1999a). Similarly, caregivers’
formal training related to child development or early childhood education ranged from no formal training to a college degree, with 75% of staff taking some college courses or formal, post-high school training in child development as recommended (NICHD Early Child Care Research Network, 1999a).

Previous examinations of child care quality have provided evidence that child care standards are important for children’s well-being and overall developmental outcome. For instance, lower child-staff ratios, smaller group sizes, and high levels of care provider training and education have been found to be associated with higher scores on assessments of children’s development (Helburn, 1995, NICHD Early Child Care Research Network, 1998, 1999a, 2000, 2001, 2002, 2003; Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg et al., 2001; Ruopp et al., 1997). Therefore, a better understanding of the relationship between regulable features of early child care and education programs that are the most predictive of good child care quality is a critical focus of child development professionals, public policy makers, and parent consumers.

Due to the outstanding research evidence supporting the impact of child care quality, recent years have seen increased investments supporting early care and education programs and efforts aimed at effectively training staff to generate improvements in overall quality of care. However, many research initiatives have found that a majority of program settings are rated as providing mediocre or low quality care (e.g., Bryant, Burchinal, Lau, & Sparling, 1994; Helburn, 1995; Whitebook, Howes, & Phillips, 1989). Children experiencing poor quality care are less likely to demonstrate significant developmental gains, which compromises their school readiness and may place them at further developmental risk or threaten their health and safety (Peisner-Feinberg et al., 1997). The continuing prevalence of
low quality early child care emphasizes the need for further investigation into program, staff, and state level characteristics related to improved quality care and better outcomes for children.

Defining what constitutes quality in the field of early care and education is of vital importance, especially considering the relationship between high-quality child care in the early years and children’s later developmental outcomes (Peisner-Feinberg et al., 2001). In early child care research, a distinction has been drawn between structural components of child care and the “process” aspects of the early childhood classroom environment. Process dimensions of a child care setting include components such as materials and activities available to children and interactions with teachers and peers. The structural features of early care and education programs include those aspects that are more easily measured and more amenable to regulation. Structural factors that are often measured in studies of early child care quality include child-staff ratio, total number of children in a classroom, teacher qualifications, and financial aspects such as cost of care and teacher wages and benefits. Structural dimensions of child care have been shown to be related to various process-related characteristics of early care and education programs. Therefore, it is understood that structural components of early care settings comprise basic inputs that increase the likelihood that child care programs and providers will provide safe, responsive, and developmentally appropriate caregiving that characterizes high quality child care environments (Peisner-Feinberg & Burchinal, 1997; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000).

Further investigations into the existing state of child care quality and its impact on children’s developmental outcomes have defined quality with slight variations. For example, work by Clarke-Stewart and colleagues examined the impact of what they defined as...
regulable and non-regulable features of child care homes on overall quality as measured by the child-care Home Observation for the Measurement of the Environment Inventory (HOME, Caldwell & Bradley, 1984), and the ORCE (Clarke-Stewart, Vandell, Burchinal, O’Brien, & McCartney, 2002). Results indicated that care providers with higher education levels and those who had received more recent and a greater amount of training were found to provide higher quality environments. Overall, children in higher quality child care homes had care providers who were more attentive, responsive, and emotionally supportive (Clarke-Stewart et al., 2002).

The present study measured quality of center-based preschool classroom using both the ECERS-R and the Arnett CIS. The ECERS-R was selected for its comprehensiveness and durability in obtaining pertinent information about process quality at the classroom level. The Arnett CIS was chosen to provide more detailed information about the quality of teacher-child interactions. The Cost, Quality, and Child Outcomes Study collected data on process quality using these same measures, as well as the UCLA Early Childhood Observation Form (ECOF; Stipek, Daniels, Galuzzo, & Milburn, 1992) for measuring child-centeredness and the Adult Involvement Scale (AIS; Howes & Stewart, 1987) to capture information about teacher responsiveness (Peisner-Feinberg et al., 2001). Results from this study indicated that scores on the four observation measures of child care practices tended to be highly correlated, with correlations from .74 to .91 (Peisner-Feinberg et al., 2001). However, correlations between the AIS teacher responsiveness and the other measures were not as strong, ranging from .26 to .31 (Peisner-Feinberg et al., 2001). Therefore, the authors elected to conduct a principle components analysis to create a single composite index of classroom quality, which accounted for 68% of the total variance (Peisner-Feinberg et al., 2001).
Similar statistical analyses are conducted in the present study to examine correlations between measures of process quality in the early childhood classroom.

In addition to investigating the relationship of individual structural predictors of child care with observed classroom quality in center-based programs, the present study developed a theoretical index of nine program assets which have been identified in previous empirical literature to have significant associations with the “culture of quality” experienced by children in these early care education programs. The proposed assets for the model can be found in Table 3.1. The goal of creating such an index is to designate the combination of program assets and their respective critical values that best predict observed quality in the early childhood classroom setting. This cumulative approach has the potential to provide valuable information to inform state quality enhancement efforts which often attempt to improve multiple dimensions of early care and education programs. In addition, a cumulative index of program assets addresses some of the issues related to the multicollinearity of predictor variables, with an understanding that often good things go together to create a culture of quality. In other words, a child care program possessing some preferable structural characteristics is more likely to exhibit other desirable features impacting the quality of care provided.
Table 3.1

Table 3.1
Proposed Assets for the Cumulative Asset Model of Quality

<table>
<thead>
<tr>
<th>Asset</th>
<th>Description of Assets</th>
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<tr>
<td>Asset 1</td>
<td>Group Size</td>
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<tr>
<td>Asset 2</td>
<td>Teacher-Child Ratio</td>
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<tr>
<td>Asset 3</td>
<td>Lead Teacher Education in Years</td>
</tr>
<tr>
<td>Asset 4</td>
<td>Number of Annual Training Hours Completed by Lead Teacher</td>
</tr>
<tr>
<td>Asset 5</td>
<td>Health Insurance Benefits Received by Lead Teacher</td>
</tr>
<tr>
<td>Asset 6</td>
<td>Use of an Evidence-Based Curriculum</td>
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<tr>
<td>Asset 7</td>
<td>Annual Parent-Teacher Conference</td>
</tr>
<tr>
<td>Asset 8</td>
<td>Staff Morale as Measured by the Gallup Q-12</td>
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<tr>
<td>Asset 9</td>
<td>Accreditation by NAEYC</td>
</tr>
</tbody>
</table>

The first structural dimension included in this index of assets relates to classroom composition. Previous researchers have found that both total group size and teacher-child ratio predict the quality of care children experience (NICHD Early Child Care Research Network, 1999a; Phillips et al., 2000; Phillipsen, Burchinal, Howes, & Cryer, 1997; Ruopp et al., 1979; Whitebook et al., 1989). Variations in research findings relating classroom composition to observed quality may be due to limited variance in the range of these structural dimensions (e.g. observed classrooms are located in states that regulate class size or ratio) or differences in the critical value or cut off point identified in a particular study. For instance, Ruopp and colleagues (1979) identified staff-child ratio to be a less important feature related to classroom quality than group size, but focused on classrooms with ratios in
the policy relevant range of 1:5 to 1:10. Therefore, based on previous research findings and staffing patterns recommended by the National Association for the Education of Young Children (NAEYC) in their most recently updated Early Childhood Program Standards and Accreditation Performance Criteria (2006) for classrooms of children ages three to five years, a group size of 20 or fewer children and a teacher-child ratio of 1:20 or less will designate the first two assets.

The next two assets in the theoretical cumulative index of quality are related to teacher qualifications. Researchers in the field of early care and education have found significant relationships between teacher’s level of formal education, amount of training related to child development and early education, and in some studies years of experience in the field (Helburn, 1995; NICHD Early Childcare Research Network, 1996; Phillipsen et al, 1997; Whitebook et al., 1989). Findings have varied as to whether level of formal education or amount of child care related training is the best predictor of quality related to qualifications of teaching staff. For the purposes of the present study, a program will be identified to possess an asset related to teacher education if the lead teacher possesses an associate’s degree or higher in any field. NAEYC accreditation standards require all teachers in a child care center to possess at least an associate’s degree of the equivalent and at least 75% of teachers to have earned a minimum of a baccalaureate degree. Furthermore, observed classrooms in which the lead teacher had completed 25 hours or more of training related to child care in the previous year when identified to have this particular asset. Previous work by Raikes and associates (2006) has utilized the critical value of 24 hours of training.

The fifth asset included in the theoretical index model relates to the fiscal components of child care programs. For example, in a multisite study of early child care, Phillips and
colleagues (2000) found that teacher wages and parent fees were the strongest predictors of high quality classroom processes. To avoid confusion in comparing financial aspects of full day versus part day programs or programs that run the full year versus centers that do not provide services during the summer months, receipt of health insurance by full time staff will serve as a proxy for teacher wages. Other studies incorporating a model of cumulative assets have also utilized receipt of health insurance by program staff as one criterion in their cumulative asset model because of its relationship to global child care quality (Hegland & Oesterreich, 2005; Raikes et al., 2006). In fact, NAEYC recommends that full time staff receive benefits including health insurance as well as employee leave, educational benefits, and retirement.

The next asset relates to the educational climate of the center-based preschool classroom. NAEYC accreditation criteria require the use of a curriculum framework that addresses several aspects of child development to provide “a coherent focus for planning children's experiences.” One study utilizing a sample of 102 preschool classrooms serving children with Individualized Education Plans (IEPs) in Iowa, found the use of a comprehensive, evidence-based curriculum model such as High/Scope or the Creative Curriculum, to be positively and significantly correlated with scores on the ECERS-R, ECERS-E, and Arnett CIS (Hegland & Oesterreich, 2005). Therefore, the sixth asset in the proposed theoretical index recognizes the use of evidence-based curriculum models. The relationship between center staff and parents of children enrolled in the program is an important mesosystem level variable found to be related to the quality of child care provided. To represent the value of communication between parents and child care providers, an asset relating to whether or not a formal annual conference was held with each parent about their
child’s development was also included in the index. Not surprisingly, NAEYC accreditation criteria recommend the use of family conferences or home visiting to “promote dialogue with families” especially communicating concerns and goals for their children.

Finally, the last two assets involve program-level characteristics found to predict observed child care quality. In regards to staff development and leadership within the center-based preschool program, a mean score from the Gallup Q-12 ascertaining aspects of staff morale and development such as whether someone, most often the center director, had discussed the staff member’s progress in the last six months was used to represent this relationship between staff and program administrator, especially regarding progress monitoring of quality of work. The Gallup Q-12 is brief measure completed by program staff assessing opinions related to staff morale and supervision provided by administrators. The ninth asset, representing a more dichotomous global rating rather than a structural component of care, involves whether or not a program is accredited by a state or nationally recognized child care accrediting body, such as the National Association for the Education of Young Children (NAEYC), indicating a program focus on quality. Due to the extensive self-assessment and improvement process requiring thorough documentation evidencing that accreditation requirements have been met, it is expected that programs obtaining accreditation will be of higher quality than preschool centers that do not.

The current study will extend the research literature in the field of early care and education by providing additional information about how both classroom-level and center-level structural components of child care centers are related to observed process quality through a comprehensive examination of center-based child care for preschool age children in four states. More specifically, structural features of early child care will be examined
hierarchically to determine their relative impact in contributing to process quality. Results of these analyses have extremely important policy implications. Examining the relationship of structural features of child care centers to quality of care being received is critical because these are aspects of child care that are most amenable to regulation and the most likely to be regulated by state governments.

Research Questions

In light of the growing interest in quality of early care and education environments as well as recent trends in the development, proposal, and implementation of state-wide quality rating systems for evaluating early childhood program the current study will address the following questions:

(1) Which regulable or structural components of center-based preschool programs best predict the overall quality of early care and education settings as measured by the ECERS-R and the Caregiver Interaction Scale?

(2) Do structural and process features of center-based care for preschool age children vary systematically by state?

(3) Can an index of structural and regulatory indicators of quality that have previously shown especially strong links to preschool-age children’s experiences in child care, predict observed process quality?

Method

Participants

Child care programs were sampled in four different states including Iowa, Kansas, Missouri, and Nebraska. Each state supplied a list of licensed providers and those who received government subsidies to develop the initial pool of 39,473 child care providers. A
sample pool of 10,000 participants was then selected using stratified, random sampling from these lists of regulated and subsidy-receiving programs. The sample was stratified based on the state in which the program was located, type of care, and subsidy receipt. The types of child care programs included in this sample were both center-based infant/toddler and preschool classrooms, licensed family child care, registered family child care, license-exempt family child care, and a portion of Early Head Start and Head Start child care partners. In Missouri only, a sample of license-exempt center-based child care providers was drawn. The final sample size included 2,022 child care providers that completed phone interviews. Of those respondents interviewed by telephone, 87% agreed to be contacted again and a subset of 365 programs participated in follow-up observations. For the purposes of the current study only the sample of center-based classrooms and Head Start programs were utilized ($N = 113$).

**Center-based preschool-age classrooms.** The present sample included 23 classrooms from centers in Iowa, 27 in Kansas, 44 in Missouri, and 19 in Nebraska. Of these centers, eight (7%) were involved in a partnership with either Early Head Start or Head Start. Seventy-four percent of these early care and education programs in this sample served children using child care subsidies and approximately half of the classrooms included children with verified disabilities or developmental delays. A very small number (4%) of the centers included in the sample were accredited by the National Association for the Education of Young Children (NAEYC). Further descriptive information regarding the early care and education centers and the preschool classrooms in those centers can be found in Table 3.2.
Table 3.2

Characteristics of Center-Based Preschool-Age Early Care and Education Programs

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>N</th>
<th>%</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Variables</td>
<td>113</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iowa</td>
<td>23</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kansas</td>
<td>27</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missouri</td>
<td>44</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nebraska</td>
<td>19</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classrooms Serving Children with Disabilities</td>
<td>57</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation in Child Care Food Program</td>
<td>64</td>
<td>57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programs with Children Receiving Subsidies</td>
<td>83</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAEYC Accreditation</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Size</td>
<td>107</td>
<td></td>
<td>11.48</td>
<td>5.13</td>
<td>2 - 29</td>
</tr>
<tr>
<td>Staff-Child Ratio</td>
<td>107</td>
<td></td>
<td>6.04</td>
<td>2.41</td>
<td>1.5 - 12</td>
</tr>
<tr>
<td>Number of Staff Present</td>
<td>107</td>
<td></td>
<td>2.15</td>
<td>1.20</td>
<td>1 - 7</td>
</tr>
<tr>
<td>Number of children with disabilities</td>
<td>105</td>
<td></td>
<td>.49</td>
<td>.86</td>
<td>0 - 5</td>
</tr>
</tbody>
</table>

Lead preschool teachers. All of the teachers included in this sample were female and a majority were married (67%) and white (85%). The median annual income earned by these teachers was between $12,500 and $14,999. Twenty-one percent of the teachers in the study had an associate’s degree, while only 31% had completed a bachelor’s degree or more in terms of their education. Total years of education was calculated by recoding categorical education variables with less than a high school education becoming 10 years, a high school education or equivalent becoming 12 years, some training beyond high school and a one-year child development program becoming 13 years, a two-year associate’s degree becoming 14 years, a bachelor’s degree becoming 14 years, and graduate school courses or a degree becoming 15 years. Preschool teachers in the present sample had an average of about 14 years of education. Seventy-four percent of teachers sampled said that their major area of
education or training was related to child development. Only 27% of the teachers sampled indicated that they had a teaching certificate from their state. All providers reported receiving some child-related training in the year 2000, with a median of 25 hours of training completed. The forms of training received by preschool teachers varied with the most common type of training being training offered in the provider’s community (81%). Many teachers also reported receiving training provided in their center by their director (67%), training through videotape and self study materials (63%), training that resulted in college credit, CEU credit, or certification from a state or national child care organization (62%), and through attendance at regional, state, or national meetings or conferences (61%). Fewer teachers reported receiving training from “in person” support staff (25%), on the internet (22%), or via teleconferencing or ICN distance learning (16%). In addition, teachers reported receiving training in programs that resulted in certification such as West Ed, (4%) High Scope (15%), Creative Curriculum (42%) and variations of Montessori certification (7%). Furthermore, teachers also indicated certification in training programs that were specific to their state including ChildNet (4%) in Iowa, Project Construct in Missouri (8%), and Heads Up! Reading (3%) and First Connections (2%) in Nebraska. However, 15% of teachers sampled indicated that if given the opportunity they would choose work other than child care. Table 3.3 provides detailed descriptive information about lead preschool teachers in the current sample.
Table 3.3

Characteristics of Teachers in Center-Based Preschool Classrooms

<table>
<thead>
<tr>
<th>Teacher Demographic Variables</th>
<th>N</th>
<th>%</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>109</td>
<td></td>
<td>36.31</td>
<td>11.34</td>
<td>19 - 64</td>
</tr>
<tr>
<td>Ethnicity/Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>96</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Hispanic or Latino</td>
<td>6</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black or African-American</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual child care income</td>
<td>106</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10,000 to less than $15,000</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$15,000 or more</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance benefits from employer</td>
<td>46</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year of experience caring for children</td>
<td>110</td>
<td></td>
<td>6.25</td>
<td>2.31</td>
<td>1 - 10</td>
</tr>
<tr>
<td>Teacher Education/Training Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total years of education</td>
<td>110</td>
<td></td>
<td>14.11</td>
<td>1.59</td>
<td>12 – 17</td>
</tr>
<tr>
<td>High school/GED completed</td>
<td>15</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some training/education beyond high school</td>
<td>26</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One year child development program</td>
<td>10</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-year college degree</td>
<td>24</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four-year college degree</td>
<td>27</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate school courses or degree</td>
<td>8</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training/education related to child development</td>
<td>82</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching Certifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching certificate from your state</td>
<td>30</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDA (Child Development Associate)</td>
<td>24</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPR within the past two years</td>
<td>98</td>
<td>87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First aid within the past two years</td>
<td>97</td>
<td>86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours of Child Care Related Training in 2000</td>
<td>106</td>
<td></td>
<td>49.50</td>
<td>67.06</td>
<td>3 – 500</td>
</tr>
<tr>
<td>Child Care Associations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAEYC</td>
<td>25</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Morale (Gallup Q-12)</td>
<td>110</td>
<td></td>
<td>4.55</td>
<td>.56</td>
<td>1.25 - 5</td>
</tr>
</tbody>
</table>
Measures

Telephone interview. The phone survey was developed based on structural indicators linked to quality in early care and education programs and the workforce from existing child care literature as well as information related to the needs of state child care administrators. The telephone survey consisted of 28 general questions, eight demographic questions, and one open-ended question. Items were selected for inclusion in the survey if 1) they had been found to predict observed quality or child outcomes in previous studies, 2) if they were found to be related to features of the child care workforce in previous investigations, or 3) if they represented specific state quality improvement initiatives or policies. In general, questions were written to be consistent with previous research examining child care quality in order for comparisons between findings to be made.

Although an effort was made to develop an interview that generalized across state and child care providers, the survey administered to participants varied in three ways. First, some items were specific only to a particular type of provider (e.g. family home child care providers versus center-based providers). Secondly, some state-specific questions were included because states wanted to measure aspects of a certain type of child care program that was only offered in that state. Finally, some survey questions were altered slightly to be most meaningful to the type of provider queried.

Included in this telephone survey were 12 items comprising the Gallup Q-12. These items were adapted in order to assess the organizational climate, or staff morale level, in the child care center. This component of the survey included questions related to the workplace environment such as having necessary materials and equipment, receiving praise or recognition for a job well-done, having opportunities at work to learn and grow, and having
someone to discuss progress with, to name a few. The Gallup Q-12 items are rated on a 1 to 5-point scale, with a 1 indicating “strongly disagree” and a 5 representing “strongly agree.” Each respondent’s mean item score on the Gallup Q-12 was used in analyses and descriptive statistics for the present sample are located in Table 3.3. High Gallup Q-12 scores indicate that employees have most of their needs met at work and are therefore fully engaged in improving workplace productivity. Information regarding the reliability and validity of the Gallup Q-12 was unavailable. Professional interviewers from the Gallup Organization conducted the telephone survey. On average, the telephone interview took 12.5 minutes to complete. Respondents were contacted between April and August 2001.

*Early Childhood Environment Rating Scale – Revised (ECERS-R).* To measure process quality in center-based and Head Start classrooms, observations were completed by trained observers using the Early Childhood Rating Scale-Revised Edition (ECERS-R; Harms, Clifford, & Cryer, 1998) and the Caregiver Interaction Scale (CIS; Arnett, 1989). For purposes of data collection, researchers typically spent three hours or more in a classroom completing an observation. The ECERS-R is one of the most widely used measures of quality in center-based early care and education settings. This observation tool is designed to be used to observe classrooms or whole groups of children ages 2 ½ through 5 years and includes 43 items across seven subscales. The ECERS-R is scored on a 7-point scale (1 = inadequate care, 3 = minimally adequate, 5 = good, 7 = excellent). An even-number score on the ECERS-R is given when a program meets half or more (but not all) of the indicator requirements at the next highest level. A mean item score may be obtained for each of the seven subscales including: Space and Furnishings (e.g., indoor space, child-related display, gross motor equipment), Personal Care Routines (e.g., meals/snacks, toileting/diapering),
Language-Reasoning (e.g., books/pictures, encouraging children to communicate), Activities (art, dramatic play, math/number), Interaction (e.g., supervision of children, staff-child interactions, interactions among children), Program Structure (free play, group time), and Parents and Staff (e.g., provisions for parents, staff interaction), as well as an overall total score. Detailed descriptions are provided for each item.

Following extensive field tests of the ECERS-R, analyses of interrater reliability indicated that percent agreement within one at the item-level was 71% ($r = .92$) (Harms et al., 1998). Measures of internal consistency were also high with subscale internal consistencies ranging from .71 to .88 with a total scale internal consistency of .92 (Harms et al., 1998). In terms of validity, in a sample of 141 English preschool centers the ECERS-R has been shown to have a strong positive correlation with the ECERS-E, a supplemental scale developed to assess four specific curricular aspects of preschool age care ($r = .78$), indicating that both instruments measure a general construct of ‘quality’ (Sylva et al., 1999). Predictive validity has also been established with scores on the ECERS-R showing a significant relationship with children’s developmental outcomes (Peisner-Feinberg & Burchinal, 1997; Peisner-Feinberg et al., 2001).

For the present sample, the total ECERS-R scale had an internal consistency of .96. Subscale internal consistencies for the current sample ranged from .68 to .88. These measures of internal consistency are comparable to those reported by the scale’s authors with subscale reliabilities ranging from .71 to .88 and a total scale reliability of .92 (Harms et al., 1998).

Caregiver Interaction Scale (CIS). Like the ECERS-R, the Caregiver Interaction Scale (CIS; Arnett, 1989) was also completed during each classroom observation. The Arnett CIS is a 26-item observational rating scale that focuses on adult-child interaction in early
care and education settings. A study by Loeb, Fuller, Kagan, and Carrol (2004) found that in a sample of 294 early child care programs serving low-income families, scores on the Arnett CIS were found to have a statistically significant positive relationship with children’s reading readiness and higher Arnett scores also predicted fewer social problems lending evidence to the construct validity of this measure. The Arnett CIS has four subscales measuring positive interaction/sensitivity, detachment, permissiveness, and punitiveness/harshness in provider-child interactions and is often used in conjunction with more general measures of child care quality, like the ECERS-R, to expand the assessment of interactions between the provider and children. The Arnett CIS items yield four separate subscale scores: sensitivity, harshness, detachment, and permissiveness. Items on the Arnett CIS can also be coded in a positive direction and summed to create one overall score. In the present sample the Arnett CIS was found to have a total scale internal consistency of .94 with reliability coefficients for the subscales ranging from .77 to .94.

Procedures

The University of Nebraska Center on Children Families and the Law and the Midwest Child Care Research Consortium contracted with The Gallup Organization of Princeton, New Jersey, and four state universities to conduct this study of child care workforce characteristics and quality of early care and education in four states. Each state supplied a list of licensed providers and those who received government subsidies to develop the initial pool of 39,473 child care providers. The list of providers was sent to a telephone number look-up service to maximize the number of providers who could be contacted by telephone, and state universities and Resource and Referral agencies also contributed missing telephone numbers. A sample pool of 10,000 participants was then selected using stratified,
random sampling from these lists of regulated and subsidy-receiving programs. The sample
was stratified based on the state in which the program was located, type of care, and subsidy
receipt. The types of child care programs included in this sample were both center-based
infant/toddler and preschool classrooms, licensed family child care, registered family child
care, license-exempt family child care, and a portion of Early Head Start and Head Start child
care partners. In Missouri only, a sample of license-exempt center-based child care providers
was drawn. The child care programs and providers were mailed letters informing them that
they would be contacted by Gallup to complete a brief telephone survey. In addition, articles
about the study were printed in state early childhood initiative newsletters published by state
child care and education divisions, professional organizations, and resource and referral
agencies to encourage participation. A subset of 2,496 child care providers was contacted at
random to complete phone interviews between April and August of 2001. When contacted by
the Gallup Organization, the individual who answered the phone was informed about the
purpose of the study and asked to identify a teacher at random or respond to the survey if that
particular individual was the only provider. Questions asked to determine the eligibility of
the early care and education program included if the program offered full-day child care, if
the respondent was a full-time teacher or provider, and whether the respondent was an infant-
toddler or preschool-age teacher. The respondent was given the option of completing the
survey at that time or scheduling for a later time.

Once a provider had been reached via the telephone to participate in the study, a
seven-call callback design was followed to ensure the integrity of the random design. The
final survey sample size was 2,022. About half of the documented non-participants were not
eligible for the study because the phone was disconnected, the number was for fax machine,
or no one at the call number passed the screener to meet the eligibility criteria for the study. The response rate of those respondents who were eligible for the study was 81%. Of the 476 eligible providers who did not participate, over 90% had working telephone barriers to participation including 158 providers who had an answering machine or answering service and 278 providers who either did not answer the telephone, had a telephone line that was busy, or was not available at the time of the scheduled callback throughout the seven-call callback design. The remaining nonrespondents either refused or provided other reasons for not participating. Ninety-nine percent of nonparticipants were either registered or license-exempt family child care providers. Only five center-based programs did not participate due to failing the screener.

Following the completion of the phone survey, providers were asked if they would be willing to be contacted again for a more in-depth observation. Eighty-seven percent of the providers said that they would be willing to be contacted again, ranging from a low of 70% of license-exempt family child care providers to a high of 95% of center-based teachers. Researchers from the four Midwestern state universities contacted willing providers to schedule follow-up observations. A subsample of 365 providers was observed in their natural child care environment in both centers and homes. For observations occurring in centers, center directors were interviewed at the time of the observation. The present study focuses on center-based preschool age early care and education classrooms, utilizing a subsample of those programs that were observed \( n = 113 \). For purposes of the current study, approval was obtained from the Iowa State University Institutional Review Board to conduct secondary analyses on this data set.
Prior to observational data collection, lead data collectors from each state received training from the authors of the environmental rating scale or from someone else who had received training from the scale’s authors. In addition, two data collectors from each state attained cross-state reliability on all observation instruments in accordance with recommendations from the environmental rating scale developers. These trained observers served as “anchors” for reliability within their respective state and completed regular follow-up checks on reliability every six months with all other data collectors. Prior to beginning data collection, each observer was required to reach agreement within one point per item for at least 85% of the items on each scale. Interrater reliability checks were completed with each data collector every six months.

Results

Descriptive analyses were conducted to examine the distribution of the demographic, predictor, and outcome variables representing structural and process quality of care offered in center-based and Head Start preschool age classrooms located in four Midwestern states. Next, correlational analyses were used to examine the relationship between selected structural characteristics of the teachers, classroom, center, and process quality of care as measured by the ECERS-R and Arnett CIS. Using this statistical analytic approach allowed for the estimation of the relative association between structural or regulable dimensions of child care and process quality of early care at the level of the microsystem. Multiple regression analyses were then performed to determine the amount of variance in the scores on both measures of observed process quality that could be explained by a group of structural indicators of quality. Next, a multivariate analysis of variance (MANOVA) was conducted to test for differences in structural indicators of quality by state. Chi-square analyses were
performed to examine the impact of state on those structural indicators that were
dichotomous. Following the analyses for differences in quality by state, an index of program
quality-related assets was developed and programs were divided into four asset level groups
based on the number of assets present in each classroom. An analysis of variance was
conducted to determine if differences existed in process quality outcome as measured by the
ECERS-R and Arnett CIS based on asset level.

Center-based Preschool Classroom Process Quality Descriptive Statistics

First, ECERS-R, Arnett CIS, and Gallup Q-12 (obtained from the telephone
interview) total and subscale scores were calculated for each classroom. Total and subscale
scores for all three measures were converted to mean item scores and were used for further
analyses. Descriptive statistics for the total and subscale scores are presented in Table 3.4.
The mean item score on the ECERS-R for the entire sample was 4.44 (SD = 1.10). The mean
item score on the Arnett CIS for all classrooms in the sample was 3.37 (SD = .52). The mean
item score for the Gallup Q-12 was 4.55. A potential ceiling effect exists in this sample on
the Arnett CIS and the Gallup Q-12 as is evidenced by mean total scores that are skewed
toward the positive end of each of these scales. Due to the high correlations between the
subscales scores of the ECERS-R and the total score (range = .78 - .92) only the ECERS-R
total score was used for further analyses. Furthermore, the subscale scores of the Arnett CIS
also correlated highly with the overall score (range = .77 - .94) and therefore the total score
only was used for further analyses.
Table 3.4

Descriptive Statistics for ECERS-R and Arnett CIS Total and Subscale Scores

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECERS-R Total Score</td>
<td>113</td>
<td>4.44</td>
<td>1.10</td>
<td>2.00</td>
<td>6.44</td>
</tr>
<tr>
<td>ECERS-R Space and Furnishings Subscale</td>
<td>113</td>
<td>4.65</td>
<td>1.12</td>
<td>2.00</td>
<td>6.63</td>
</tr>
<tr>
<td>ECERS-R Personal Care Routines Subscale</td>
<td>113</td>
<td>4.70</td>
<td>1.35</td>
<td>1.17</td>
<td>7.00</td>
</tr>
<tr>
<td>ECERS-R Language and Reasoning Subscale</td>
<td>112</td>
<td>4.49</td>
<td>1.51</td>
<td>1.25</td>
<td>7.00</td>
</tr>
<tr>
<td>ECERS-R Activities Subscale</td>
<td>113</td>
<td>3.59</td>
<td>1.26</td>
<td>1.17</td>
<td>6.30</td>
</tr>
<tr>
<td>ECERS-R Interaction Subscale</td>
<td>113</td>
<td>5.09</td>
<td>1.59</td>
<td>1.00</td>
<td>7.00</td>
</tr>
<tr>
<td>ECERS-R Program Structure Subscale</td>
<td>112</td>
<td>4.64</td>
<td>1.64</td>
<td>1.00</td>
<td>7.00</td>
</tr>
<tr>
<td>ECERS-R Parents and Staff Subscale</td>
<td>112</td>
<td>4.66</td>
<td>1.23</td>
<td>1.50</td>
<td>6.83</td>
</tr>
<tr>
<td>ECERS-R Teaching and Interactions</td>
<td>113</td>
<td>4.95</td>
<td>1.40</td>
<td>1.45</td>
<td>7.00</td>
</tr>
<tr>
<td>ECERS-R Provisions for Learning</td>
<td>113</td>
<td>4.20</td>
<td>1.27</td>
<td>1.67</td>
<td>6.42</td>
</tr>
<tr>
<td>Caregiver Interaction Scale (CIS) Total Score</td>
<td>113</td>
<td>3.37</td>
<td>.52</td>
<td>1.69</td>
<td>4.00</td>
</tr>
<tr>
<td>CIS Sensitivity Subscale</td>
<td>113</td>
<td>3.07</td>
<td>.71</td>
<td>1.10</td>
<td>4.00</td>
</tr>
<tr>
<td>CIS Harshness Subscale</td>
<td>113</td>
<td>1.40</td>
<td>.45</td>
<td>1.00</td>
<td>3.56</td>
</tr>
<tr>
<td>CIS Detachment Subscale</td>
<td>113</td>
<td>1.36</td>
<td>.55</td>
<td>1.00</td>
<td>3.25</td>
</tr>
<tr>
<td>CIS Permissiveness Subscale</td>
<td>113</td>
<td>1.68</td>
<td>.63</td>
<td>1.00</td>
<td>3.50</td>
</tr>
</tbody>
</table>

Relationship of Structural Indicators of Quality to Observed Process Quality

To answer the first research question about the relationship between regulable or structural components of quality in center-based preschool classrooms to observed process quality as measured by the ECERS-R and the Arnett CIS, correlations analyses were
conducted. Correlations among predictor and outcome variables are presented in the Appendix. Total scores on the ECERS-R were found to be positively correlated with whether the lead teacher receives health insurance benefits or not ($r = .26, p < .01$) the use of an evidence-based curriculum ($r = .30, p < .001$), annual parent-teacher conferences being held ($r = .24, p < .01$), and NAEYC accreditation ($r = .21, p < .05$). The teaching and interactions subscale score of the ECERS-R was also found to be statistically significantly positively correlated with the use of an evidence-based curriculum ($r = .21, p < .05$) and holding an annual parent-teacher conference ($r = .26, p < .01$). The provisions for learning subscale of the ECERS-R was similarly found to be statistically significantly positively correlated with use of an evidence-based curriculum ($r = .27, p < .001$) and annual parent-teacher conferences ($r = .20, p < .05$). Scores on the Arnett CIS were not found to be statistically significantly correlated with any of the predictor variables. However, scores on the Arnett CIS were highly positively correlated with scores on the ECERS-R outcomes measures (range = .56 to .85, $p < .001$).

To further assess the ability of certain structural indicators of quality to predict observed process quality in this sample of center-based preschool classrooms simultaneous multiple regression analyses were conducted. For the purposes of these analyses, the predictor variables included group size, staff-child ratio, lead teacher education level, hours of annual child-related training completed by the lead teacher, receipt of health insurance benefits by the lead teacher, use of an evidence-based curriculum, completion of annual parent-teacher conferences, and staff morale as measured by the Gallup Q-12. Two separate regression analyses were conducted with the ECERS-R total score and Arnett CIS total score as the outcome variables. The regression results indicated that this group of predictor
variables statistically significantly predicted the ECERS-R total score, $R^2 = .18$, $F(8, 92) = 2.51, p = .02$. Multiple regression analyses revealed that the same group of predictor variables did not statistically significantly predict Arnett CIS total scores, $R^2 = .12$, $F(8, 92) = 1.49, p = .18$.

However, collinearity diagnostics indicated potential problems with multicollinearity between the predictor variables included in the multiple regression analyses. First, although the F-ratio value statistically significant, when examining the specific individual t-ratios only the use of an evidence-based curriculum was statistically significant, $t(100) = 2.32, p = .023$. Additionally, the predictor variables were typically more highly correlated with one another than with the outcome variable, the ECERS-R total score. Correlations between the predictor variables with the ECERS-R total score ranged from .019 to .256, while correlations among predictor variable ranged from .002 to .32. Such findings of multicollinearity indicate a strong correlation among the predictor variables; therefore, there is potential benefit in utilizing a cumulative asset model to describe the relationship of structural indicators to observed process quality.

**Differences in Quality of Early Care and Education Programs by State**

To answer the second research question, a multivariate analysis of variance (MANOVA) was conducted with state as the predictor variable and continuous structural indicators of quality as the outcome measures, to determine if differences existed based on state in the presence of structural indicators of quality. Structural features included in the analysis were group size, staff-child ratio, lead teacher education level, hours of annual child-related training completed by the lead teacher, and staff morale as measured by the Gallup Q-12. A MANOVA was conducted to reduce the chance of increasing Type I error when the
outcomes are highly correlated, such as in the case of these structural indicators of quality in early care and education programs. Furthermore, a multivariate analysis is appropriate because the intercorrelations indicating an overall unifying factor between the outcome variables, in this case the structural indicators of quality are partially redundant; a MANOVA will allow differences related to the predictor variable, state, to be detected. In contrast, if the structural indicators that seem to form a system of variables underlying the theoretical construct of quality child care were to be examined individually, significant group differences may not be revealed.

In the present MANOVA, results indicated a statistically significant relationship between state and the continuous structural indicators of quality \[Wilk's \Lambda = .66, F(3, 97) = 2.75, p = .001, \eta^2 = .13\]. However, Levene’s Test for Equity of Error Variances was computed and was found to be statistically significant for both the group size, \(F(3, 97) = 3.65, p = .02\), and for number of hours of training received in the past year by the lead teacher, \(F(3, 97) = 7.75, p < .001\). These results indicate that the assumption of homogeneity of variance required for MANOVA was violated. This finding further supports the utilization of a cumulative model of assets, which are computed using a critical value or cut point that would reduce the impact of variances that are not equally distributed across groups.

For dichotomous indicators of quality, including whether or not the lead teacher received health insurance benefits, whether or not an annual parent-teacher conference was conducted for each child, and whether or not an evidence-based curriculum was utilized in the classroom, chi-square analyses were conducted to ascertain if differences existed by state. Results indicated that the preschool classrooms in the four states differed statistically significantly in their use of an evidence-based curriculum, \(\chi^2 = 9.28, df = 3, p = .03\). Missouri
had the highest number of classrooms using an evidence-based curriculum with 16 (36%). Nebraska and Kansas had 6 (22%) and 7 (37%) classrooms respectively, while Iowa only had one (4%) classroom using an established preschool-age curriculum model. However, receipt of health insurance benefits by the lead teacher ($\chi^2 = 7.29, df = 3, p = .06$) and completion of an annual parent-teacher conference ($\chi^2 = 1.78, df = 3, p = .62$) were not found to differ statistically significantly by state.

*Cumulative Index of Assets Related to Quality in Center-based Preschool Classrooms*

The third research question examines the predictive ability of a cumulative index model of structural indicators of quality that have been previously linked to observed process quality in early care and education programs. To answer the third research question regarding the relationship between a cumulative index of assets and observed quality in center-based preschool classrooms, continuous predictor variables were first developed into assets. Seven structural indicators of quality that had been identified in previous research literature as predictors of observed quality in early care and education programs were selected to form a group of assets. For each individual asset a critical value or cut point was established based on either theoretical support as indicated by the use of such values in the NAEYC accreditation standards or empirically selected based on identification of the median value in the present sample. Scores on each of these assets were dichotomized with a one reflecting the presence of a particular asset and a zero indicating the absence of that asset. The cumulative number of assets were calculated and correlated with mean total scores and mean subscale scores on the both of the process measures of quality. Correlations of assets with observed measures of process quality are presented in Table 3.5. Some correlations have
smaller sample sizes than the total sample size of 113 due to missing observational data regarding the number of teachers and children present or missing survey data.

Table 3.5

**Correlations of Dichotomized Structural Assets with Outcome Variables**

<table>
<thead>
<tr>
<th>Assets</th>
<th>ECERS-R Total</th>
<th>ECERS-R Teaching and Interactions Subscale</th>
<th>ECERS-R Provisions for Learning Subscale</th>
<th>Arnett Caregiver Interaction Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Staff-Child Ratio (N = 107)</td>
<td>.13</td>
<td>.12</td>
<td>.10</td>
<td>.04</td>
</tr>
<tr>
<td>2: Lead Teacher Education (N = 110)</td>
<td>.14</td>
<td>.15</td>
<td>.14</td>
<td>.15</td>
</tr>
<tr>
<td>3: Lead Teacher Annual Training Hours (N = 110)</td>
<td>.15</td>
<td>.17</td>
<td>.10</td>
<td>.22</td>
</tr>
<tr>
<td>4: Lead Teacher Receipt of Health Insurance Benefits (N = 110)</td>
<td>.26**</td>
<td>.17</td>
<td>.19*</td>
<td>.12</td>
</tr>
<tr>
<td>5: Use of Evidence-Based Curriculum (N = 113)</td>
<td>.30***</td>
<td>.21*</td>
<td>.27***</td>
<td>.12</td>
</tr>
<tr>
<td>6: Annual Parent-Teacher Conference (N = 110)</td>
<td>.11</td>
<td>.13</td>
<td>.07</td>
<td>.10</td>
</tr>
<tr>
<td>7: Staff Morale (N = 110)</td>
<td>.13</td>
<td>.10</td>
<td>.13</td>
<td>.13</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001.
The first asset was staff-child ratio, which was divided using NAEYC recommendations that there be at least one adult for every eight children in the preschool age group. The level of lead teacher education was the second asset, the critical value was established to be at least a two-year-degree, which corresponded to previous literature in the field and was also the median value for the sample. The third asset was related to the number of hours of child-related training that were completed by the lead teacher in year 2000. A cut point of 25 hours was established based on the median value in the present sample. The fourth asset was the receipt of free or reduced price health insurance benefits from the center by the lead teacher. The fifth asset was the use of an evidence-based curriculum in the preschool classroom. This information was based on teacher report and included the following curricula: Creative Curriculum, High Scope, Project Construct, and West Ed. If the teacher did not report using any curriculum in the classroom then that site was not given credit for this asset. The sixth asset was whether or not the teacher held an annual parent-conference to meet with each child’s parents to discuss their development. The seventh asset was based on the lead teacher’s mean item score on the twelve items from the Gallup-Q 12, a measure of staff morale and employee attitudes about their work environment. A cut point for this asset was established at the median value of 4.71 on a 5-point scale, where teachers with mean item scores higher than this were said to have the asset. Scores on the Gallup Q-12 were not structural indicators of quality in the sense that they can be regulated through public policy. However, the Gallup Q-12 scores were included in the cumulative asset model because they served as a proxy for the quality of the administration in the early care and education settings.
Although the present study began with a nine asset model, a final cumulative asset model with seven assets was utilized in analyses. Group size was not included as an asset because it had the lowest bivariate correlation with the ECERS-R total scores and the Arnett CIS total score. NAEYC accreditation status was also not included in the index of assets due to its limited variability in the present sample in which only four programs reported being accredited by NAEYC. The distributions of assets for the entire sample are presented in Table 3.6.

Table 3.6

<table>
<thead>
<tr>
<th>Distribution of Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
</tr>
<tr>
<td>1: Staff-Child Ratio ≤ 1:8 (N = 107)</td>
</tr>
<tr>
<td>2: Lead Teacher Education ≥ 2-Year College Degree</td>
</tr>
<tr>
<td>3: Lead Teacher Annual Training Hours ≥ 25 Hours</td>
</tr>
<tr>
<td>4: Lead Teacher Receives Health Insurance Benefits</td>
</tr>
<tr>
<td>5: Use of Evidence-Based Curriculum</td>
</tr>
<tr>
<td>6: Annual Parent-Teacher Conference</td>
</tr>
<tr>
<td>7: Staff Morale ≥ 4.71</td>
</tr>
</tbody>
</table>

Following this, classrooms were divided into four groups based on their total number of assets. The determination to utilize four asset groups was based on the distribution of assets across classrooms sampled. Those classrooms with an inadequate asset level had between zero and two assets (n = 26), classrooms with a minimal asset level had three assets (n = 31), classrooms with a good asset level had four assets (n = 29), and those classrooms
with an excellent asset level had between five and seven assets \( (n = 27) \). A 4 X 4 two-way between-subjects analysis of variance with state and asset level as main effects was then conducted to evaluate how programs differing in their cumulative number of assets varied in level of observed quality as measured by both the ECERS- R and the Arnett CIS total scores. The results from the ANOVA indicated that neither the main effect for state nor the interaction effect of state by asset level were statistically significant for either the ECERS-R total score or the Arnett CIS total score. As seen in Table 3.7, the main effect of asset level proved to be statistically significant for both the ECERS-R and Arnett CIS.

Table 3.7

<table>
<thead>
<tr>
<th>4 (State) X 4 (Asset Level) Two-Way Analysis of Variance for ECERS-R Total Score and Arnett CIS Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
</tr>
<tr>
<td>ECERS-R Total Score</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Asset Level</td>
</tr>
<tr>
<td>State X Asset Level</td>
</tr>
<tr>
<td>Error</td>
</tr>
<tr>
<td>Arnett CIS Total Score</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Asset Level</td>
</tr>
<tr>
<td>State X Asset Level</td>
</tr>
<tr>
<td>Error</td>
</tr>
</tbody>
</table>

Note. \( \eta^2 \) = effect size * \( p < .05 \). ** \( p < .01 \).
For the ECERS-R, Scheffe post hoc tests indicated that (a) classrooms with inadequate classroom levels of assets had significantly poorer observed quality ($M = 3.87$) than classrooms with a good level of assets ($M = 4.75$) and those with an excellent level of assets ($M = 4.99$) and (b) classrooms with a minimal asset level ($M = 4.23$) had lower ECERS-R total scores than classrooms with an excellent level of assets. For the Arnett CIS, Scheffe post hoc analyses indicated that only classrooms with an excellent level of assets ($M = 3.56$) were found to have statistically significantly higher scores than those classrooms with an inadequate level of assets ($M = 3.14$).

**Discussion**

The current research study utilized Brofenbrenner and Morris’s (2006) bioecological framework as the guiding theory for the investigation of quality in early care and education programs. The cumulative asset model proposed in the present empirical investigation of quality in center-based preschool programs provides support for the bioecological framework and the notion that quality of early childhood programs is best understood as a “culture” or climate of systems working together to produce high quality care and education. In other words, quality cannot be determined by any one single structural variable, but rather through an examination of many structural features that exist in different systems in relation to the child experiencing the care. For example, many variables measured in the present study exist at the level of the microsystem, or the setting that the child directly participates in, which is the preschool classroom. Such microsystem level variables can be measured through structural assets such as teacher education and training, teacher-child ratio, and the use of an evidence-based curriculum. Furthermore, the process quality measures, the ECERS-R and Arnett CIS also assess quality at the microsystem level and describe the experiences of
children in the classroom. To continue, the mesosystem, or the interactions between two more Microsystems in which the child is involved is represented in the present study by the asset regarding whether or not an annual parent-teacher conference is conducted, representing communication about children’s development between parents and staff. Next, the exosystem level includes the other people and places that the child him or herself may not interact with often but that still have a large affect on him or her, such as the relationship between staff and administration, which is represented in the present investigation by the Gallup Q-12 measure. The regulations of early care and education programs are measured in the current study by investigating differences in quality between states. Finally, the “macrosystem” of societal values, beliefs and attitudes is what guides different societies and communities in developing and implementing child and family policies related to early care and education programs. Although this system is not directly measured in the current study, societal values in relation to the importance of care and education in the early years can influence state regulations and policies related to early childhood programs as well as the beliefs and values of staff and administration and the importance placed on ensuring high quality care.

The present study employed a state-level representative sample of center-based preschool classrooms to explore the ability of structural indicators of quality in early care and education programs to predict process quality as measured through observational assessments, within the bioecological framework. Structural aspects of early childhood programs are those features which are most amenable to regulation and have lower rates of measurement error, such as descriptives of workforce characteristics including teacher education level and amount of training, and aspects of the classrooms often determined at the
level of the program or state regulations, such as group size and staff-child ratio. Process quality, which is directly experienced by children in the classroom, was measured with ECERS-R, an often used and psychometrically sound global measure of quality in early childhood programs, and the Arnett CIS, a tool for evaluating the quality of teacher-child interactions in the classroom. Furthermore, center-based preschool programs were sampled from four Midwestern states making comparisons between states in terms of structural and process indicators of quality possible. Additionally, the current research study developed a cumulative index of seven program assets that were found to predict observed program quality. Notably, classrooms with five or more assets received statistically significantly higher ratings on the ECERS-R and Arnett CIS.

Center-based preschool programs sampled in the present study had a mean ECERS-R score of 4.44, indicating a global quality rating in the minimal to good range. Additionally, classrooms had an average total score of 3.37 on a 4-point scale for the Arnett CIS. Furthermore, the single strongest predictor of quality as measured by the ECERS-R was the use of an evidence-based curriculum. Much of the previous research on the relationship between structural and process quality of early childhood programs has failed to include a measure of the type of curriculum used. Work by Raikes and colleagues (2006) utilizing a similar data set did not find a statistically significant relationship between using a curriculum and quality in center-based preschool classrooms. However, the specification was not made that the curriculum be evidence-based including such models as the Creative Curriculum, High Scope, Montessori, Project Construct, and West Ed but excluding locally developed or teacher-designed curriculums. This finding emphasizes the importance of incorporating an
evidence-based curriculum model to positively impact the quality of preschool-age children’s early care and learning environment.

Additionally receipt of health insurance benefits, which served as a proxy for teacher wages in the present study, and holding an annual parent-teacher conference were found to be positively related to observed quality in this study. Similarly, strong associations have been found between observed process quality and the availability of employee benefits, such as health insurance (Whitebook et al., 1990). In fact, in a study of 96 preschool classrooms in three states, teacher wages accounted for 13% of the variance in observed process quality beyond the effects of compliance with regulation of staff-child ratio and other structural indices of quality (Phillips et al., 2000). Furthermore, holding formal conferences with parents as well as other self-reported quality practices were found to have a modest relationship with observed quality in work by Holloway and associates (2001).

The present study did not however find a statistically significant effect of other center-level structural components related to the quality of care provided, such as group size and ratio. Previous multi-state longitudinal studies of early care and education programs have found the number of children and staff present in a classroom to be related to observed quality (Helburn, 1995, NICHD Early Child Care Research Network, 1999a, Phillipsen et al., 1997). However, work by Phillips, Mekos, Scarr, McCartney, and Abbott-Shim (2000) also failed to find a statistically significant bivariate correlation between observed process quality, as measured by the ECERS and the Assessment Profile for Early Childhood Programs, and either group size or ratio compliance in a similar study comparing quality in child care centers across three states. Regulations in regards to teacher-child ratio ranged from 1:10 to 1:15 with rates of compliance with ratio requirements ranging from 83% to 93% in preschool
classrooms sampled across the three states. Furthermore, only one of the three states regulated group size in preschool age classrooms, requiring 20 or fewer children. One potential explanation for not finding a statistically significant difference between classroom composition of the number of children and adults is the limited range in the current sample. The average group size for a preschool age center-based classroom in this study was 11, which is considerably lower than the recommended group size for NAEYC accreditation standards (ranging from 16 to 20 depending on the ages of the children). For instance, in the sample of classrooms from Iowa and Kansas, group size ranged from a minimum of two children to a maximum of 12 and 15 children, respectively. This restricted range in terms of group size raises questions about the representativeness of those center-based preschool programs that agreed to have an observation conducted in these states. This finding contrasts sharply with results from the National Day Care Study (Ruopp et al., 1979), which found group size to be the strongest and most consistent predictor of preschool children’s experiences in the classroom. However, group size in that study ranged between eight and 36 children across three study sites (Ruopp et al., 1979).

One surprising finding of the present study was the absence of statistically significant differences in observed classroom quality between the programs sampled in the four different states. This finding could be due to limited variation in the regulation of structural aspects of center-based preschool age programs, such as group size, ratio, and teacher qualifications. Work by Phillips and colleagues (2000) identified regulatory context to be significantly related to the quality of care provided in center-based classrooms. However, the three states included in the study varied significantly in terms of their regulation of child care programs with Massachusetts having some of the most stringent regulations of center-based child care
in the United States, Georgia having some of the least stringent regulatory policies, and Virginia falling in between the two (Phillips et al., 2000). For example, Massachusetts required a group size of no larger than 20, a teacher-child ratio of 1:10, and that teachers received at least 20 hours of child-related training. In contrast, Georgia had no regulation of group size in preschool classrooms, required a staff-child ratio of 1:15, and only recommended that teachers receive some training every three years. In comparison, the present study had one state (Kansas) that regulated a maximum group size of 20 children between the ages of 30 months and six years and three states that did not regulate group size. Furthermore, regulations of staff-child ratio ranged from 1:8 for three-year-old preschoolers (Iowa) to 1:12 for four-year-olds (Iowa and Nebraska). Additionally, training requirements for preschool teachers in the present study ranged between six (Iowa) and 12 (Missouri and Nebraska) hours annually.

The current study developed a cumulative index of seven assets from a group of structural indicators of quality that had been identified in previous literature as predictive of higher process quality in observational assessments of early childhood programs. Although, some information may be lost when dichotomizing continuous variables, an index of assets is particularly informative because it is developed by establishing a critical value, in essence a “tipping point” at which the variables are most predictive of quality in early care and education programs. Cumulating assets provided a method of describing the relationship of structural components to observed process quality as an alternative to linear statistical analyses, which have previously failed to produce reliable, consistent predictors of quality in early childhood classrooms.
Furthermore, a cumulative asset model addresses the issue of multicollinearity, or the pattern of association between variables that occurs when such variables are strongly associated with each other, by identifying a critical cut point at which the variable can be considered an asset and then summing the number of assets present in a particular program. One possible explanation for why the results across studies can be inconsistent is because they are affected by which variable in a highly correlated or collinear group is entered into the equation. Multiple regression analyses in the present study tested the relationship between continuous structural predictors of quality to observed process quality as measured by the ECERS-R and Arnett CIS and demonstrated evidence of multicollinearity. For instance, although the overall regression models were statistically significant, only one of the eight individual predictor variables has a statistically significant t-ratio. Additionally, many of the predictor variables were correlated more highly with one another than with the outcome variables, which included scores on the ECERS-R and Arnett CIS observational measures. This evidence points to multicollinearity among the structural variables related to process quality and provides support for using a cumulative asset model to more clearly explain this relationship.

Specifically, center-based preschool-age classrooms with an excellent asset level indicating five or more assets had statistically significantly higher quality as measured by the ECERS-R and Arnett CIS. This finding supports the idea that multiple structural features of early care and education programs set at a critical value work together to create a climate of high quality child care. In other words, there does not seem to be one particular feature of early childhood programs or one regulable aspect at the level of the child care provider or
center itself which strongly and consistently predicts higher quality, rather a “culture of quality” must exist.

Limitations

As with any study, several limitations of this research should be acknowledged. Foremost, is the relatively small sample of center-based preschool age programs ($N = 113$). This study is nonexperimental in design. Although programs were randomly selected using a stratified sampling procedure, the selection of the preschool age classroom to be observed was less random in nature in that the director could recommend a teacher that might be interested or the child care provider who answered the phone could elect to participate. Furthermore, the sample in this study was limited in regards to some components of early care and education programs that have been previously shown to be related to the quality of care provided. For example, very few of the programs were accredited by the national child care accrediting organization, NAEYC ($n = 4$). In addition, a limited number of preschool age programs were operated in collaboration with Head Start or Early Head Start ($n = 8$). Nevertheless, the sample produced was selected utilizing stratified random sampling, which allowed for a certain number of programs in each of the four states that both received and did not receive child care subsidy funds. The sample also allowed for a limited number of programs participating in a Head Start partnership. However, this subsample was limited because the number of Head Start partnerships in these states was small.

Conclusions

In conclusion, the present study did not find statistically significant differences among states in scores on process measures of global quality including the ECERS-R and the Arnett CIS. Previous research on the quality of care provided in early care and education
programs, has found state-based influences (Helburn, 1995; Phillips et al., 2000). This inability to detect a statistically significant impact of state on quality of care in center-based preschool programs could be due to the limited variation in regulation between the four Midwestern states sampled. For example, a limited range in terms of group size was found in the states of Iowa (range: 5 – 12) and Kansas (range: 2 – 15). In fact, three of the four states had classrooms sampled with group sizes well below NAEYC accreditation standards. The range of group size in the present study contrasts sharply with the range of group size in the National Day Care Study of eight up to 36 preschool age children, which found a statistically significant effect of class size on quality (Ruopp et al., 1979). Potential explanations for the small numbers of children present during observations of the classrooms could have to do with the time of day or day of the week in which the program was observed or some unknown characteristic of those programs which agreed to be observed.

Furthermore, data from the present sample was skewed in regards to the number of training hours teachers reported completing in the previous year. For example, Iowa ($n = 4$), Missouri ($n = 12$), and Nebraska ($n = 2$) all had teachers who reported completing over 100 hours of training. One possibility is that these teachers were pursuing degrees in higher education and therefore, spending a large number of hours completing classes related to child development or early childhood education. The finding brings up important considerations in measurement of professional development activities.

All four states place some type of regulation on either child-staff ratio or group size as well as regulating training requirements for teachers. In fact, in terms of child care related policies there are more similarities between the states than differences. For instance, all four states require licenses for child care centers which means that monitoring visits to ensure
adherence with regulations occurs annually for all centers in three state and biannually for centers in Iowa. However, Missouri does have some center-based license-exempt care, which is often operated by a church or religious organization and is not required to meet state licensing regulations and therefore, does not receive monitoring visits.

Although quality did not vary systematically by state context in the present sample, there was a wide range of global classroom quality observed. Scores on the ECERS ranged from 2, indicating very poor quality care, to 6.44, indicating quality that was in the good to excellent range. The mean rating for global classroom quality was 4.44 on the ECERS, which is comparable to other multi-state studies of the quality of center-based preschool age care that was also found to be mediocre (Bryant, Burchinal, Lau, & Sparling, 1994; Hegland & Oesterreich, 2005; Helburn, 1995; Whitebook, Howes, & Phillips, 1989). To continue, the quality of teacher-child interactions was measured by the Arnett CIS, with the average score in the classrooms sampled being 3.37 on a 4-point scale. This high average points to a ceiling effect, which may be representative of some of the psychometric limitations of this scale.

Despite these caveats, this study provides valuable information about quality of care being provided in center-based preschool age child care programs in the four states sampled. The present study serves to further develop an understanding of the relationship between structural indicators of quality and the process quality that is actually experienced by children in the early childhood classroom. Furthermore, this study provides a unique perspective in which to examine child care quality, a cumulative model of program assets. This method of describing quality utilizing a group of quality indicators set at critical values or cut points to determine whether or not an asset provides a clear, understandable means of describing quality for researchers, policy makers, and parent consumers alike. The cumulative asset
model also provides support for the notion of a “culture of quality”, which exists in early childhood programs and classrooms that offer high quality care.

Future research should examine the use of a cumulative asset model in more widely varying regulatory contexts to ascertain if a similar model can be used across states or if variations in the assets included within the model must be made. Further studies could also examine the changes in the predictive ability of a cumulative asset model over time. For instance, do those structural assets which best predict process quality in early care and education programs change when particular indicators related to quality become more high stakes or tied to funding? Additionally, studies should incorporate measures of child outcomes, which could then be related to the cumulative assets present in that program as well as the observed quality of care provided in the classroom. This idea of a “culture of quality” or the notion that multiple good things tend to be present in high quality early childhood programs has implications for policy related to early care and education.

Knowledge of the combination and critical values of structural components of early care and education programs such as staff-child ratios, teacher education and experience, professional development of staff can help policymakers in developing regulations of child care programs which ensure good quality care is being provided. Furthermore, an index of those structural aspects, which best support, a culture of high quality in center-based preschool programs can serve to inform state quality improvement initiatives.

Additionally, the findings from the present study supporting the utilization of a cumulative index of program assets have implication for child care practitioners. Such as asset model is informative and can clearly communicate information regarding the quality of early child care programs to the public, primarily consumers of child care such as parents. To
continue, results suggest that the use of evidence-based curriculum model is the single most beneficial component of a program that leads to higher process quality in preschool age classrooms.

Future research regarding the quality of early care and education programs should incorporate the use of a cumulative asset model in predicting quality of care and determine if additional assets are necessary to define a more comprehensive model or if such a model varies by location of the child care program. Further research in this area would benefit from inclusion of a measure of programs compliance with state regulatory standards, as well as more detailed information about the use of curriculum and assessment practices in the classroom.
References


centres in the EPPE sample: Observational profiles. (Technical Paper No.6).


CHAPTER 4: GENERAL CONCLUSIONS

General Discussion

The purpose of the present research was to describe the relationship between structural features of center-based preschool programs and process quality that was observed in the classrooms. This relationship was examined using observational data about the global process quality and the quality of teacher-child interactions collected in a sample of 113 center-based preschool classrooms in four Midwestern states using the Early Childhood Environment Rating Scale – Revised Edition (ECERS-R) and the Arnett Caregiver Interaction Scale (CIS). In addition, lead teachers and center directors completed a telephone survey, responding to questions related to structural indicators of quality.

Quality of care in preschool age center-based classrooms in four Midwestern states was still found to be mediocre, with an average of 4.44 on a 7 point scale for the ECERS-R. However the mean score on the Arnett CIS was 3.37 on a 4-point scale, indicating a possible ceiling effect. This limited range of scores on the Arnett CIS made it less likely to detect differences in quality between classrooms.

Furthermore, bivariate correlations indicated that the strongest single predictor of observed process quality as measured by the ECERS-R in this sample was the use of an evidence based curriculum. This finding demonstrated the value of utilizing such a curriculum to guide activities, interactions, planning, and assessment in early care and education programs. Additionally, receipt of health insurance benefits and holding an annual parent-teacher conference were also found to predict observed process quality as measured by the ECERS-R. Total scores on the Arnett CIS were not found to be statistically significantly correlated with any of the structural predictor variables.
Other structural indicators, which had previously been shown to be related to process quality, were not found to be statistically significantly related to observed global quality. For instance, group size in the present sample had a mean of 11 which is far below the standards recommended for NAEYC accreditation, which range from 16 – 20 depending on the ages of the children in the group. In addition, data regarding annual training hours completed by lead teachers was skewed, with a few states with teachers with very large number of hour. These large numbers of training hours could be reported by teachers who were completing degrees at that time. These findings bring into question the representativeness of the classrooms that agreed to be observed in relation to the total population of preschool age center-based classrooms in the Midwest.

Another surprising finding was the lack of effect of state on the quality of center-based preschool programs. One possible explanation was that states sampled had similar regulatory contexts. In fact, in terms of child care related policies there are more similarities between the states than differences. For instance, all four states require licenses for child care centers which means that monitoring visits to ensure adherence with regulations occurs annually for all centers in three state and biannually for centers in Iowa.

Finally, a cumulative asset model was created to represent a group of structural indicators at the program, provider, and classroom level, which have been shown to be related to observed process quality. Classrooms with the largest number of assets had the highest rating of observed process quality, supporting the idea that multiple structural features work together to create a climate of high quality care.
Recommendations

The present study has implications for theory building in terms of the value of understanding quality using a multivariate cumulative asset model. In other words these structural indicators of quality do not occur in isolation, giving credence to the idea that there is a “culture of quality” or that good things go together to lead to children experiencing higher process quality in the classroom. Furthermore, this cumulative asset model addresses issues of multicollinearity of predictor variables.

To continue, the current research has implications for early childhood professionals and teachers regarding the importance of using an evidence-based curriculum in the classroom. In addition, examining quality using a cumulative asset model provides practitioners and parent consumers with a clear and understandable means of evaluating program quality through assets and in general makes more sense when communicating to the public rather than using different metrics.

Information obtained from the ability of cumulative asset model to predict observed process quality can also aid in guiding the decisions of policy makers in terms of what combination of regulations will produce the greatest likelihood of high quality care. However, caution is given that such regulations are only effective if they are enforceable.

Finally, future research should attempt to sample programs from states with a wider range of regulations and to include a measure of compliance with regulatory context. Based on current early childhood initiatives at the state level, it may also be informative to examine the influence of quality rating systems on the quality that is actually observed in early care and education programs. To continue, future research regarding the quality of early care and education programs should incorporate the use of a cumulative asset model in predicting
quality of care and determine if additional assets are necessary to define a more comprehensive model or if such a model varies by location of the child care program. Further research in this area would benefit from inclusion of a measure of programs compliance with state regulatory standards, as well as more detailed information about the use of curriculum and assessment practices in the classroom.
### Correlations of Predictor Variables and Outcome Variables

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