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Exploring the Interrelationship of Structure and Process in Family Child Care: The
FCCERS-R and “Combined” CLASS

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Abstract

Exploring the Interrelationship of Structure and Process in Family Child Care: The
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This study examined the correlations between two prominent family child care environmental rating scales, the Family Child Care Environment Rating Scale - Revised (FCCERS-R) and the “Combined” Classroom Assessment Scoring System (“Combined” CLASS), both of which were used during the pilot study of Washington State’s Quality Rating Improvement Program, the 2010-2011 *Seeds to Success*. For the purposes of this cross-sectional, secondary data analysis, 42 family child care centers drawn from five communities in Washington State provided data for this analysis. Caregiver participants were female and were ethnically representative of Washington State. No child outcome data were recorded. When examining the within-scale overlap of the individual measures, most within-scale subscale scores were moderately to highly correlated. When examining the relationship between the FCCERS-R and “Combined” CLASS subscales, results show that there were only low correlations across subscales between the two

instruments. Lastly, this study examined the underlying factor structure among all of the items from both measures. Through component analysis, three primary components were identified: Structure (FCCERS-R; 17 items), Process (CLASS; 7 items), and Intellectual Development (CLASS; 3 items). These findings suggest an opportunity to reduce the number of items used to assess family child care quality within each of these underlying domains. By reducing the items on the FCCERS-R in particular (from 43 to 17 items), it might be possible to reduce the time and resources needed to administer the entire measure. This potentially could reduce the time of administration by hours and significantly reduce the time needed to train coders. By potentially increasing efficiency in administration, this study might contribute to the ability of researchers and regulatory agencies to reduce the cost of wide-scale quality measurement of child care homes. Implications and future research directions are discussed.

TABLE OF CONTENTS

LIST OF FIGURES.....	vi
LIST OF TABLES.....	vi
CHAPTER 1: INTRODUCTION.....	1
CHAPTER 2: LITERATURE REVIEW.....	4
FAMILY CHILD CARE.....	4
<i>Poor Quality Care</i>	5
SCHOOL READINESS.....	8
<i>Defining School Readiness</i>	9
<i>Theoretical Bases of School Readiness</i>	11
<i>Transactional and systems theories</i>	11
<i>Attachment theory</i>	12
<i>Developmental theory</i>	13
<i>Sociocultural theory</i>	14
<i>Dimensions of School Readiness</i>	15
<i>Self-regulation related to social competencies</i>	15
<i>Self-regulation of attention and cognitive tasks</i>	17
<i>Co-regulation</i>	18
<i>Summary of Research Regarding School Readiness</i>	19
INTERVENTIONS TO IMPROVE QUALITY IN EARLY CARE SETTINGS.....	20
<i>Intervention Studies</i>	21
<i>High/Scope Perry Preschool Project</i>	22
<i>Carolina/Abecedarian Project</i>	22

<i>The Chicago Parent-Child Study</i>	23
<i>Nurse-Family Partnership</i>	24
<i>Infant Health and Development Project</i>	25
<i>Early Head Start Research and Evaluation Project</i>	25
<i>Correlational Studies</i>	26
<i>The Family Child Care Study (FCC)</i>	26
<i>The Study of Early Child Care and Youth Development (SECCYD)</i>	27
<i>Cost, Quality, and Outcomes Study (CQO)</i>	28
<i>Summary of Intervention/Correlational Studies Regarding Early Child Care</i>	29
STRUCTURAL AND PROCESS MEASURES.....	30
<i>Provider Characteristics</i>	32
<i>Professional development (training)</i>	32
<i>Caregiver education</i>	34
<i>Caregiver compensation and turnover</i>	35
<i>Caregiver mental health status</i>	36
<i>Classroom and Program Characteristics</i>	37
<i>Staff-child ratios and class size</i>	37
<i>Use of academic curricula</i>	40
<i>Use of social emotional curricula</i>	41
<i>Use of behavioral support plans</i>	42
<i>Use of data to guide individualized instruction and intervention</i>	43

<i>Access to parent training and education</i>	44
<i>Access to Health Services</i>	45
<i>Access to mental health consultation and direct mental health services</i>	45
<i>Accreditation by accrediting organizations</i>	47
<i>Process Variables</i>	48
<i>Positive Relationships Between Caregivers and Children and/or Families</i>	48
<i>Interactions with peers</i>	52
<i>Interactions with high quality physical environment and materials</i>	53
<i>Summary of Structural and Process Elements of Child Care</i>	55
OBSERVATIONAL MEASURES OF CLASSROOM AND CHILD CARE ENVIRONMENTS	56
<i>Early Childhood Environment Rating Scale – Revised Edition (ECERS-R)</i>	58
<i>Reliability</i>	59
<i>Validity</i>	59
<i>Family Child Care Rating Scale-Revised (FCCERS-R)</i>	60
<i>Reliability</i>	61
<i>Validity</i>	61
<i>Classroom Assessment Scoring System (CLASS)</i>	61
<i>Limitations</i>	62
<i>Reliability</i>	62

<i>Validity</i>	63
<i>Classroom Assessment Scoring System: Toddler Version (Toddler CLASS)</i>	64
<i>Reliability</i>	65
<i>Validity</i>	65
<i>Classroom Assessment Scoring System - Combined Version (“Combined” CLASS)</i>	65
<i>Summary of Environmental Measures</i>	67
PROPOSED STUDY.....	68
<i>Statement of the Problem</i>	68
<i>Purpose of the Study</i>	70
CHAPTER 3: METHODS.....	72
SEEDS TO SUCCESS.....	72
<i>Participants</i>	72
<i>Measures</i>	73
<i>Classroom Assessment Scoring System - Combined (“Combined” CLASS)</i>	73
<i>CLASS measurement</i>	73
<i>Environmental Rating Scales (ERS)</i>	76
<i>ERS measurement</i>	76
<i>Procedure</i>	77
<i>Statistical Analysis for Research Questions</i>	79
CHAPTER 4: RESULTS.....	81
CHAPTER 5: DISCUSSION.....	89

A COLLAPSED SCALE.....	91
HEALTH AND SAFETY.....	94
THE UTILITY OF A COLLAPSED SCALE.....	94
LIMITATIONS.....	95
POTENTIAL IMPLICATIONS AND FUTURE DIRECTIONS.....	98
REFERENCES.....	99

LIST OF FIGURES

Figure Number	Page
1. Scree plot of dimensional structure	86

LIST OF TABLES

Table Number	Page
1. Combined CLASS and FCCERS-R Subscales	82
2. Item Level Score Distributions	83
3. FCCERS-R and Combined CLASS Scale and Subscale Correlations.....	84
4. Identified components, eigen values, and variance explained.....	86
5. FCCERS-R and “Combined” CLASS components and loadings.....	88

Chapter 1

Introduction

Each year, millions of children in North America attend some type of child care. The majority of these children attend family child care, which describes nonfamilial care in private homes for children (Frankel, 1994). While family child care is often convenient for parents and less costly than center-based care or preschool, evidence indicates that quality of care in private homes is by-and-large quite poor (NICHD, 2001).

Unfortunately, a vast body of research has resolutely shown that low quality child care is associated with poor developmental and educational outcomes (NICHD, 2001; Shonkoff & Phillips, 2000). During the first five years of life, children develop rapidly and face many social, behavioral and pre-academic hurdles. In a relatively short burst, children must develop methods to self-regulate emotions and behaviors, learn to adhere to classroom rules, and begin the basic processes of learning. These early abilities related to learning and self-regulation, called school readiness, underpin overall development and predict later educational and social outcomes (e.g, Belsky et al, 2007). Due to complex social and economic factors, disadvantaged children are more likely to attend family child care than other types of early care. Thus, a large population of children in need of high quality care do not have access to it.

In order to redress this significant societal problem, it is first necessary to improve quality in child care environments. To this end, state run quality monitoring systems, called Quality Rating Improvement Systems (QRIS) have been moving forward with large-scale monitoring of child care facilities. This already resource heavy process has been made more difficult by the fact that there is very little consensus about how quality

is best measured (Shonkoff & Phillips, 2000). Measurement of child care quality is typically divided into two related spheres: structural and process variables (Mashburn et al., 2009). Structure describes aspects of care that can be readily quantified, such as staff:child ratios, while process describes the intimate interactions that occur between children and caregivers.

Mirroring the theoretical divide between the importance of structure and process, two prominent, global early care assessments skew heavily toward each of these two different components. The Environmental Rating Scales (ERS) (Harms, Clifford & Cryer, 1998), which includes the Early Childhood Environment Rating Scale - Revised (ECERS-R) and the Family Child Care Environmental Rating Scale – Revised (FCCERS-R), is weighted toward structural elements of early care programs, while the Classroom Assessment Scoring System (CLASS) (Pianta, La Paro & Hamre, 2008) is focused on process variables that include observable interactions between children and caregivers, peers and materials, and also includes activities (Mashburn et al., 2009; Pianta, La Paro & Hamre, 2008).

While the ECERS-R has been the most commonly used measure in research and program progress monitoring over the past 25 years, the CLASS measure has been gaining prominence (Mashburn et al., 2009). In Washington State’s *Seeds to Success* pilot study of a QRIS system, both the ERS and CLASS were utilized, allowing researchers to compare and contrast the two measures. Pertinent to this study, the FCCERS-R was used, as was the “Combined” CLASS, which was an approach to using the CLASS in a family child care setting.

With resources devoted to child care often scarce, it is imperative that efficient measures of environmental assessment be implemented. If structure and process are related, then perhaps a combined measure could capitalize on this interrelationship. Accordingly, if items that comprise the FCCERS-R (largely a structural measure) and the “Combined” CLASS (a process measure) are correlated, then there is the potential to maximize quality assessment while reducing the number of items administered, thus saving critical resources. This study is a preliminary investigation into this potential interrelationship.

Chapter 2

Literature Review

Family Child Care

Over the past three decades, a dramatic change has occurred regarding the early experiences of young children in the United States: Employment of married women with children has grown from a rate of only 37% in 1975 to over 65% in 1999, with employment of women caring for young infants growing at the fastest rate (Frankel, 1994; NICHD, 2001). Reflecting these sharp changes in employment, the ways in which young children are cared for have changed significantly during this time, with vast numbers of children entering nonmaternal care (NICHD, 2001). Children develop more rapidly during the first 5 years than during any other period of the lifespan and thus face multiple developmental hurdles related to socializing, learning and self-regulating behaviors (Shonkoff & Phillips, 2000). If not properly supported by caring parents and caregivers, children might be inadequately prepared for these complex developmental challenges. Therefore, considering the millions of families that rely on day care, finding and developing adequate care represents a significant challenge for parents, child care providers, and policymakers (Rusby, Smolkowski, Marquez, & Taylor, 2008).

The crucial role that family child care plays in modern society is of particular importance. Family child care can be described as care that occurs in a private home that may or may not include parents of children under care (Kontos, 1994). Typically, family child care settings include fewer children and are less stringently regulated than child care centers, or what is often called center care. Results from earlier studies show more

children are cared for in family child care settings than in child care centers, with 9.2 million children under 5 being cared for by kith and kin providers, 2.4 million children cared for in licensed child care homes (compared to 5.8 million children attending center care) (Frankel, 1991; Kontos, Howes, Shinn, & Galinsky, 1995; Fuller et al., 2004). This disparity is in large part due to the fact that family child care is often the most affordable and convenient option available to many families (Frankel, 1994). Often parents are also attracted to aspects of family care that reflect their own beliefs about caregiving (Kontos et al., 1995).

Far less is known about family child care than center care, including relations between structural and process quality, the two main components that comprise child care quality. Structure is defined as the readily quantified, such as types of books available, while process describes the complex social interactions that occur between caregivers and children (Burchinal, Howes, & Kontos, 2002; Raikes, Raikes, & Wilcox, 2005).

Unfortunately, what is known is that family child care generally yields quality ratings that are poor (Barnett, 2008; Kontos et al., 1995). Frankel (1994) noted that “when FDC [family child care] is good, it can be very good; when it is bad, it can be horrid.” (p. 557)

Poor Quality Care

Overall, the following is what is known from the research in regard to quality of family child care through a literature search using the ERIC database, searching the terms “family child care,” “quality,” and “measures.” Broadly, quality of family child care is quite poor (Barnett, 2008; Kontos et al., 1994). Coley et al. (2001), in a multistate study using the Family Day Care Environmental Rating Scale (FDCERS), found that only 35% of family child cares studied could be rated as “good.” (The FDCERS is the

environmental measure the FCCERS ultimately replaced.) In another multistate study, Loeb et al. (2004), in a study of nearly 200 child care homes, found that average FCCERS scores were generally deemed “inadequate” (mean score = 2.8). Two other studies showed that over 70% of family child cares were rated as “inadequate” (Fuller & Kagen, 2000; Maxwell & Kraus, 2005). In regard to child outcomes, while center care has demonstrated small, short-term positive effects (0.10 to 0.15 standard deviation units) in regard to both cognitive and language development, family child care has shown only negligible effects. In fact, some studies have shown that there is a negative effect related to behavioral outcomes (Barnett, 2008; NICHD Early Care Research Network, 2002). In regard to academics, evidence shows that family child care typically does not include as many learning activities as center care (Paulsell et al., 2006).

Researchers have identified numerous reasons why family child care is rated so poorly. First, not only is the quality of care frequently low in family child cares, the children attending home-based care are particularly prone to developmental difficulties due to group characteristics. Specifically, children in home-based care are more likely to come from economically disadvantaged, minority populations (Raikes et al., 2005). Thus, there exists the potential for a powerful feedback loop to develop, in which the children most vulnerable to cognitive, social emotional and health difficulties are enrolled in settings least capable of responding to their needs. Children in poor quality care typically experience multiple, and frequently interrelated, risk factors (e.g., poverty, inconsistent, harsh parenting, or abuse) and are thus highly vulnerable to negative developmental trajectories (McCartney et al., 2007).

Beyond a lack of social and physical resources available to family child care, a second reason for lower quality is the lack of regulation (Kontos et al., 1995). Some researchers have hypothesized that only 9% of child care homes are in compliance with various state standards (Kontos et al., 1995). Frankel (1994) found that while 274,000 homes were registered in the 1990's, there were likely more than 1.5 million *unregistered* homes. Frankel (1994) also stated that the vast majority of family child care homes were not accessible to outside scrutiny. Writing 18 years ago Frankel (1994) noted that this lack of oversight meant that much less was known about family child care providers' capacity to form caring relationships with children or to provide a safe and nurturing environment. More recently there has been growing interest in both research and initiatives supporting regulation in family child care (Barnett, 2008). For instance, many local, state and federal agencies, such as the U.S. Department of Health and Human Services (DHS), have funded initiatives devoted to regulating family child care (Porter & Kearns, 2005). Despite the existence of these initiatives, according to the National Association for the Education of Young Children, as of 2007, there has not been any measurable rise in number of regulated family child cares (NAEYC, 2007).

While in recent years there has been an increasing emphasis on regulating, monitoring, and improving the quality of family child care, there is still much researchers, parents and policymakers do not know about quality of family child care (Kontos et al., 1995). The central concept of quality of care is particularly salient to parents, who overwhelmingly want what is best for their children. The sections below will discuss what the literature states about quality of care. It should be noted that much of the research comes from center care, preschool and more general studies of child

development, with fewer studies available that are derived directly from family child care. Because of the dearth of research related directly to family child care, it is necessary to rely on these other related strands of research. There is a significant amount of research on the relationship of family child care quality to school readiness.

School Readiness

In this section, school readiness will be described, and evidence will be presented that relates school readiness to child care quality. Specifically, ample evidence supports the notion that quality of early care is associated with behavioral, social, cognitive, and academic outcomes (e.g., Belsky et al, 2007). This review of school readiness will begin by defining school readiness, paying particular attention to the increasing shift from academic readiness to behavioral self-regulation. Following a review of the most prominent theories underpinning the concept of school readiness, the review returns to reemphasize the importance of behavioral self-regulation in regard to preparing for school. This aspect of school readiness is particularly pertinent to family child care for a multitude of reasons. While many families choose family child care because it is convenient and mirrors familial child-rearing beliefs, many families choose family child care simply because it is the most cost-effective option available (Kryzer et al., 2007). Because of this, economically disadvantaged families are represented disproportionately in family child care. Beyond specific difficulties related to a lack of resources related to poverty, children in family care are also more likely to be impacted by other risk factors, such as having parents who are chronically depressed and have attained low levels of education. Child abuse is also more common in disadvantaged homes (Kryzer et al, 2007). What this means is that children entering family child care are quite vulnerable to

developing maladaptive behavior patterns and are woefully unprepared to participate in an organized school setting. To begin, below is a brief review of research related to the importance of school readiness.

There is an increasing concern on the part of parents, researchers, and policymakers that children often are not prepared for kindergarten and elementary school (Barnett, 2008). In a survey conducted by the National Center for Early Development and Learning, 46% of kindergarten teachers reported that over 50% of their students did not have the skills to function effectively in class (Rimm-Kaufman, Pianta, & Cox, 2000). This survey aligns with broader evidence showing that young children are often unprepared for school, particularly those children living in poverty (Blair, 2002; High, 2008). In a secondary analysis of the National Institute of Children's Health and Development's (NICHD) Study of Early Child Care and Youth Development (SECCYD), in which 1,364 children were tracked from early child care through middle school, McCartney and colleagues (2007) found that income was a significant unifying factor in determining children's level of school readiness. In a secondary analysis of the Study of Child Care (SECC), Downer and Pianta (2006) found that academic readiness appeared to be well established by the end of preschool and endured the transition to kindergarten and elementary school. Given these findings, the developmental period of early childhood represents a sensitive period of development, in which both competencies and deficiencies can crystalize (Kramer, Calderella, Christensen, & Shatzer, 2010).

Defining School Readiness

While there is general agreement that children frequently are unprepared for the challenges of school, there is considerably less consensus about how school readiness

should be defined (Lewitt & Baker, 1995). Historically, definitions of school readiness have been limited in two ways: one, through school competencies, which were narrowly confined to intellectual and academic abilities; the second way was to examine these competencies as residing strictly *within* the child (Blair, 2002; Shonkoff & Phillips, 2000). Taken together, this outdated conceptualization of school readiness reflected the notion that a child's genetic make-up would unfold to reveal predetermined cognitive abilities.

However, over the past three decades, advances in neuroscience, developmental psychology, and social sciences have aligned to support a more nuanced and dynamic appreciation of how children learn and develop (Downer & Pianta, 2006; Hamre & Pianta, 2001). First, current theorists conceive of school readiness as a multidimensional construct that includes both cognitive preparedness and social-emotional or behavioral readiness for participation in class settings (Downer & Pianta, 2006; Pianta & Stuhlman, 2004).

One particular aspect of school readiness lacking in past research has been a focus on behaviors (Shonkoff & Phillips, 2000). Aligning with theory, recent empirical evidence supports the idea that conceptualizations of readiness should include social behaviors (Shonkoff & Phillips, 2000). In a secondary analysis of data from the large ($N = 511$) Cost, Quality, and Outcomes (CQO) study, researchers found that social processes underlie academic competencies (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002). Recently, ecologically minded theorists have eschewed the idea that children are responsible for their own development and have focused on the transactional contexts within which children develop and learn (Shonkoff & Phillips, 2000). Aligning with

these views, Blair (2002) posited that readiness involves levels of influence tied to family, peers, and the broader community. In other words, children are not innately ready or not ready for school; they require support from families, schools, child cares and communities. Multiple theoretical constructs support these evolved conceptualizations of school readiness.

Theoretical Bases of School Readiness

Four separate but interrelated theories create the framework that supports school readiness: transactional and systems theories, attachment theory, developmental theory, and sociocultural theory (Shonkoff & Phillips, 2000). Each of these models has evolved along similar lines, moving away from a lack of understanding of individual differences and context toward increasingly complex notions of childhood development (Garcia Col et al., 1996). These changes reflect the current evolution of factors related to school readiness. Each theory will be described and discussed below.

Transactional and systems theories. Transactional and systems theories have greatly influenced notions of early childhood assessment, intervention and classroom quality (Bronfenbrenner, 1979; Sameroff & Friese, 1990). Broadly, transactional and systems theories propose that development occurs within a complex, dynamic web of relationships between children on the one hand and parents, caregivers, peers and the broader environment on the other. Therefore, development occurs both within the child and outside the child, with constant transactions occurring between the two spheres (Bronfenbrenner, 1979; Sameroff & Friese, 1990). A crucial facet of transactional-ecological models is the understanding that the child impacts the environment at the same time the environment is affecting them (Sameroff & Friese, 1990).

Bronfenbrenner's (1979) ecological-systems model provided a framework in which individuals develop within a series of nested structures: the intimate relationship of the child-mother dyad and the immediate environment, including the school (microsystem); the interconnections between the microsystems (mesosystem); the social structures supporting the child (exosystem); and the broader societal, cultural context (macrosystem). Each of these contexts transacts with the other, creating a powerful mechanism of change. Because of the complexity inherent in such a system, no two children develop in the exact same environment, not even twins (Bronfenbrenner, 1979). These interrelated theories imply that assessment and interventions of early child care occur at a systems level, in which multiple levels of influence must be considered.

Attachment theory. Bowlby (1988) developed attachment theory to explain basic human processes related to survival, fear, and security. At its most elemental level, attachment theory states that children's development occurs within the context of a relationship with at least one primary caregiver (Bretherton, 1992). Consistent with ecological systems theory, attachment theory proposes that later relationships are formed atop the foundation of these early attachment relationships (Bowlby, 1988). Reflecting these theoretical ideas, ample research has shown that the quality of mother-infant attachment is a crucial component of the development of wide-ranging social-emotional, academic, and cognitive outcomes (Main, Kaplan & Cassidy, 1985; Spangler & Grossman, 1993).

Securely attached infants will seek proximity (both physical and psychological) with a caregiver when experiencing stressful situations, thus using the caregiver as a secure base. Because the caregiver is able to provide soothing reassurance, infants are

provided with stable, safe opportunities to develop effective self-regulation skills (Carlson et al., 1989). Further, a securely attached infant develops the confidence to explore the environment; thus, the attachment system helps activate the exploratory behavioral system. This bimodal, complimentary system allows the infant to explore the environment and gain mastery in crucial social and cognitive domains (Bretherton, 1985). Evidence shows that attachment relationships bolster children's sense of competence and efficacy (Cassidy, Parke, Butkovsky, & Braungart, 1992).

Attachment theory relates to family child care because child care providers form attachment relationships with the children for whom they care. Reflecting the importance of these non-maternal attachment relationships, there has been increasing interest in the research world in this topic over the past 20 years (Elicker, Fortner-Wood, & Noppe, 1999; Shonkoff & Phillips, 2000). The recent conceptualization of child care providers' relationships with children is consistent with Bowlby's (1988) theory, which stated that attachment relationships are not individual traits, but distinct to dyads. Research has shown that children who develop secure attachments to either their mothers or child care providers tend to be more socially skilled in their interactions with both adults and peers than children lacking secure attachments (Howes et al., 1995). Therefore, as the child begins to spend more time in care settings, she depends increasingly on the nurturing, sensitive qualities of the teachers and care providers.

Developmental theory. Developmental theory also underpins concepts related to school readiness and inform both assessment and intervention (Shonkoff & Phillips, 2000). Developmental theories propose that children mature along a series of typical stages (Shonkoff & Phillips, 2000). Because theorists delineate distinct stages of

development, it allows researchers and interventionists a better understanding of what constitutes both normative and atypical development. Further, developmental research has proposed that there are transformational periods, called developmental phases, in which children experience rapid psychological reorganization (Brazelton, 1992). These periods of profound social-emotional and neurological change offer interventionists opportunities to make changes in children that can be enduring (Shonkoff & Phillips, 2000).

While developmental theorists such as Piaget (1952) proposed that all children develop systematically across social, cognitive, and psychological domains, there has been a more recent emphasis on the unique contexts of the development of individual children (Shonkoff & Phillips, 2000). Family child cares provide variable contexts within which young children develop and learn. A vast amount of current scientific evidence supports the idea that early experiences, particularly those related to caregiving experiences, greatly impacts individual child development. While earlier theorists were concerned with developmental impacts in relation to nature versus nurture, modern researchers are more concerned with precisely how environment impacts biology (Shonkoff & Phillips, 2000).

Sociocultural theory. Recent sociocultural theories propose that children can only be understood within a broader cultural context (García Coll et al., 1996; Tucker & Herman, 2002; Vygotsky, 1978). In other words, while cognitive, social, and affective developmental processes are likely similar for all children, social and cultural forces likely impact development in significant ways (García Coll et al., 1996; Vygotsky, 1978). Reflecting ideas formulated by Bronfenbrenner (1979), García Coll et al. (1996)

proposed that children differentially develop via a dynamic interaction between proximal and distal ecologies. Shonkoff and Phillips (2000) noted that culture transcends the entire ecological system, affecting broad concepts related to child care and impacting the intimate relations parents and caregivers have with children. The authors also stated that culture impacts the developmental expectations society maintains for children. García Coll and her colleagues (1996) stressed the importance of considering racism as a constant, dynamic factor in the lives of minority children. McLoyd (1990) noted that minority children are frequently viewed through the lens of a deficiency model, in which they are compared and contrasted unfavorably with middle-class white children. The author stressed that minority children should not be viewed as being deficient or deviant merely because they differ from children from the dominant culture.

Dimensions of School Readiness

Mirroring the theoretical complexity of school readiness, there are multiple ways to delineate the dimensions that help define school readiness. Some researchers have identified three distinct dimensions: general classroom competence, approaches to learning, and interpersonal classroom behaviors (McDermott, Leigh, & Perry, 2002). The National Education Goals Panel listed the following domains as contributing to school readiness: physical well-being and motor development, social and emotional development, approaches toward learning (including motivation), language development (including emergent literacy), and cognition and general knowledge (including mathematics and science) (National Research Council, 2008).

While there are multiple ways to describe school readiness, there is empirical support for focusing on self-regulation as a cornerstone of early development impacting

all domains of behavior (Shonkoff & Phillips, 2000). Blair (2002) posited that self-regulation is a key component in understanding school readiness because self-regulatory skills underlie many of the behaviors associated with school competency and adjustment. These behaviors include the ability to pay attention, express feelings and inhibit impulses (Shonkoff & Phillips, 2000). Blair (2002) noted that recent advances in developmental neuroscience have shown that areas of the brain responsible for self-regulation (e.g., emotion, memory, and attention) show rapid growth during the preschool years (Blair, 2002). The author further proposed that self-regulatory skills are as crucial to school readiness as intelligence. His theory of school readiness supports the delineation of two basic, interrelated dimensions associated with emotionality and attention: regulation of emotion related to social competencies and self-regulation of attention and strategies related to cognitive tasks (Blair, 2002).

Self-regulation related to social competencies. Much recent research supports the proposition that self-regulation and social emotional awareness and skills are crucial to children's development (Blair, 2002; Downer & Pianta, 2006; O'Connor, 2010). As has been noted previously, much of this research involves settings distinct from family child care but helps inform important general aspects of child development and outcomes. In a secondary analysis of the SECC, Downer and Pianta (2006) found that children's social competence played a significant mediating role between early experiences and academic functioning in elementary school. Highlighting the dual contribution to school readiness of both intellectual and social factors, evidence showed a relationship between teachers' ratings of social competence and scores related to reading, phonemic ability, and long-term retrieval (Downer & Pianta, 2006). In a secondary analysis of the SECCYD,

Rudasill and Rimm-Kaufman (2008) found that children's ability to regulate behavior was a key contributor to school readiness and underlay successful academic and social adjustment. The researchers suggested that effortful control, which is the capacity of an individual to inhibit a dominant response in favor of a subdominant one, was a key component of self-regulation. They also stated that effortful control was significantly associated with relationships with teachers and peers. The authors noted further that levels of effortful control frequently predicted the quality of relationships the children maintained with teachers (Rudasill & Rimm-Kaufman, 2008). Reinforcing the notion that cognitive abilities and social skills are intertwined, in a longitudinal, correlational study involving 490 first-graders, Pianta and Stuhlman (2004) found that school functioning depended on two sets of interrelated competencies: early literacy and language on the one hand and relationship skills on the other.

Self-regulation of attention and cognitive tasks. Self-regulation of attention and the capacity to focus on tasks without emotional disequilibrium have been shown to relate to school readiness (Blair, 2002). Dearing, McCartney, and Taylor (2009) proposed a cognitive advantage hypothesis, which stated that children's later academic achievement is supported indirectly by early school readiness skills related to cognitive skills. In a secondary analysis of the SECC, Downer and Pianta (2006) found that a child's cognitive abilities, measured at 54 months of age, were the most robust predictors of academic achievement and cognitive abilities in the first grade. Ample evidence indicates that children who are less distractible and demonstrate moderate to low levels of emotional intensity are rated by their teachers as being better learners than children without these characteristics (Blair, 2002; Martin, Drew, Gaddis, & Moseley, 1988).

Theorists have hypothesized that well-regulated children are more able to elicit behaviors from others that promote learning (Eisenberg, Sadovsky, & Spinrad, 2005).

Co-regulation. Drawing from the attachment literature, it is important to understand the role of adults, particularly parents and caregivers, in the development of self-regulatory skills (Pianta & Hamre, 2009; Pianta & Stuhlman, 2004). Children do not develop in a social vacuum, and adults provide necessary social-emotional and intellectual support in order for children to develop (Joseph & Strain, 2003; Pianta & Hamre, 2009). This positive support typically occurs within nurturing, sensitive relationships (Shonkoff & Phillips, 2000). A key component of school readiness frequently involves the dynamic relationships that develop between children and their teachers (Pianta & Stuhlman, 2004). Specifically, Pianta and Stuhlman (2004) found that children's relationships with teachers helped children access materials and improve social interactions with peers. The authors noted that these two aspects of classroom interactions significantly contributed to school readiness. They further stated that measures of teacher-child relationships might better forecast subsequent adaptation in classroom settings than more general indicators of social competence or behavioral problems (Pianta & Stuhlman, 2004). Hamre and Pianta (2001) found similar results in a correlational study of 179 children followed longitudinally from kindergarten through eighth grade, concluding that negativity in teacher-child relationships (characterized by over-dependency and conflict) was a significant predictor of a wide range of negative academic and behavioral outcomes.

Lisonbee, Mize, Payne, and Granger (2008) proposed that teachers help young children regulate hypothalamic-pituitary-adrenal (HPA) activity, a biologically rooted

chain that governs stress reactivity. Paralleling the attachment literature related to HPA activity, the authors found that children experienced more stress (as measured by cortisol levels) when relationships with teachers were rated as conflictual (Lisonbee et al., 2008).

Summary of Research Regarding School Readiness

School readiness is a complex and evolving concept that currently reflects a conceptual balance between biological make-up and experience (Shonkoff & Phillips, 2000). Drawing from multiple theories of ecological systems, attachment, and developmental psychology, present theorists conceive of school readiness as a multidimensional construct that encompasses intellectual, motivational, physical, and social-emotional abilities (Shonkoff & Phillips, 2000). Increasingly, theorists and researchers have been focusing on social-emotional elements of school readiness, particularly the multiple facets of self-regulation (Blair, 2002). Because of the importance of school readiness relative to positive child outcomes, it is a crucial focus of child care research. Put simply, young children require positive social and educational experiences in order to develop emotionally and ultimately achieve academically. Because of the overrepresentation of disadvantaged children in family child care, school readiness is a particularly salient focus of family child care (Kryzer et al., 2007). Thus, high quality family child care gives disadvantaged children opportunities to improve school readiness and thus achieve positive long-term outcomes.

Over the past four decades early childhood interventions have been implemented with increased success with the intention of improving child outcomes in school (Belsky et al., 2007). Below is a discussion of the intervention research.

Interventions to Improve Quality in Early Care Settings

In this section early childhood intervention and correlational studies will be described and discussed. As noted earlier, due to the scarcity of research directly related to family child care, it is crucial to reference studies related to both center care and preschool. Due to the heterogeneity of family child care, it might not be possible to relate these other studies directly to family child care. However, these studies provide important research regarding the crucial nature of early childhood child care and educational environments. Broadly, strong evidence shows that early interventions aimed at improving school readiness are effective (e.g., Belsky et al., 2007). More specifically, there is ample evidence that economically and socially disadvantaged children benefit disproportionately from early interventions in regard to cognitive, language, literacy and social emotional abilities (National Research Council, 2001). This point is particularly salient in regard to family child care due to the fact that children in family child care are more likely to be disadvantaged than children in other forms of care (Frankel, 1994; Rusby et al., 2008). What will be shown below is that there are significant long-term gains made by children in intervention programs (Barnett, 2008). This evidence is apparent in both intervention studies and more recent correlational studies.

A vast amount of scientific literature supports the concept that early childhood intervention programs demonstrate positive short- and long-term benefits across cognitive, academic, language, health, motor, social emotional, and behavioral domains (e.g., Belsky et al., 2007; Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). These gains are distributed unevenly across various types of care: preschool; center-based care; and family child care. Meta-analyses of studies covering the past

twenty-five years have shown that preschool education produces an average immediate effect of 0.50 of a standard deviation unit on cognitive development, which is equivalent to an 8-point increase on a standardized assessment (Camilli et al., 2010). To put this into context, an increase of one-half a standard deviation unit is large enough to reduce *by half* the school readiness gap between disadvantaged children and the national average (Barnett, 2008). According to these same studies, preschool improves social emotional development by a smaller, yet still significant amount of 0.33 standard deviation units (Camilli et al., 2010). Conversely, center care has shown only small, short-term effects (0.10 to 0.15 standard deviation units) regarding both cognitive and language development, while family child care has demonstrated no effect on cognitive development (Barnett, 2008; NICHD Early Care Research Network, 2002).

Unfortunately, much less is known about the extent to which high quality family care settings impacts outcomes relative to other types of care (Rusby et al., 2008). Therefore, much of the evidence discussed below is derived from studies based in center care. In order to better understand the qualities inherent in high quality programs, below is a review of both intervention studies and correlational studies that follow children from entry into child care through the school years.

Intervention Studies

The review of interventions will begin with a series of historically significant interventions implemented in the Sixties and Seventies (The High/Scope Perry Project, the Abecedarian Project, and The Chicago Parent-Child Study) and then will continue with more recent studies. Much of the research on early intervention involves preschool

programs in which educational and intellectual outcomes are measured. There will also be a description of more targeted programs focusing on prenatal care.

High/Scope Perry Preschool Project. In two well documented, randomized control trials, students living in poverty and enrolled in high-quality preschools showed significant gains relative to peers not receiving similar services (Barnett, 2008). The High/Scope Perry Preschool Project (begun in the 1960's) and the Abecedarian Project (begun in the 1970's) both demonstrated that early learning programs could generate positive short- and long-term results (Barnett, 2008; Campbell et al., 2002; Schweinhart et al., 2005). In the case of the Perry Preschool Project, enrolled children ($N = 123$) were provided preschool each weekday for two-and-a-half hours, and mothers received weekly one-and-a-half hour home visits while children were 3-4-years-old (Schweinhart et al., 2005). Data were collected annually from ages 3 – 11, then at ages 14, 19, 27 and 40. Results demonstrated increased scores on cognitive tests when contrasted with children who were not enrolled in a high-quality preschool. Further, in a follow-up at age-40, participants showed significant categorical gains: Compared to peers, they were more likely to have better jobs and earn higher salaries, were less likely to have been arrested or served time in jail, and were less likely to be receiving government assistance (Schweinhart, 2004).

Carolina Abecedarian Project. Students enrolled in the Abecedarian Project were provided support in both preschool and elementary school (Campbell & Ramey, 1995). The students were drawn from a university town, and 98% of the participants ($N = 111$) were African American. Treatment included educational child care eight hours per day, five days per week. Unlike Perry/High Scope, treatment extended beyond the traditional

school year. The intervention included a home-school liaison and a curriculum designed to provide activities focused on cognitive, language, social, and motor development. Similar to results from the High/Scope Perry Preschool Project, students in the treatment group scored higher on cognitive and reading tests, had lower rates of teen pregnancy, were less likely to be enrolled in special education, and more likely to go to college, be employed, and own their own home (Campbell et al., 2002; Sandall & Schwartz, 2008).

Cognitive gains seen early on typically demonstrated fade-out, whereby large gains in IQ (in some cases an increase as large as a 0.76 standard deviation units) gradually diminished over time when compared to the control groups. These results are consistent with research concerning the enduring effects of high quality pre-K education and child care. For instance, there is ample evidence that early gains in cognitive scores do not maintain in later childhood (Gray et al., 1982; Reynolds, 1994), and several literature reviews have shown mixed findings regarding outcomes on achievement tests. It should be noted that these results are based upon quasi-experimental methods (Aos et al., 2004).

The Chicago Parent-Child Study. According to Barnett (2007), the most rigorous long-term, large-scale study of pre-K is the quasi-experimental, longitudinal Chicago Parent-Child (CPC) study. Chicago's public schools began CPC in the later 1960's and provided low-income children with half-day preschool, kindergarten and some follow-up in elementary school (Reynolds, 2000). The preschool program used two certified teachers and an assistant in each classroom of 18 children, and a thorough parent outreach program (Barnett, 2007). In this study, researchers did not use a control group, but instead compared outcomes to a matched comparison group from the same

neighborhoods from which the intervention group was drawn (Reynolds, 2000).

Researchers found that low-income children participating in high-quality preschools had higher rates of educational attainment and lower rates of juvenile arrest than their peers (Reynolds, Ou, & Topitzes, 2004). Using a comparison group to determine effect sizes on test scores, researchers found that test scores improved for the experimental group by 0.35 to 0.77 standard deviation units, depending on the statistical measures used (Barnett, 2007). Because it was a half-day preschool similar to the High Scope/Perry Preschool Program, Barnett (2007) posited that the CPC was a replication of the Perry study. The CPC demonstrated similar, positive long-term effects in regard to test scores through middle school, arrest rates, special education, and high school graduation (Barnett, 2007). Similar to the Perry study, cognitive scores demonstrated fade-out, but at eighth grade were still 0.20 standard deviation higher than those of peers (Barnett, 2007).

Nurse-Family Partnership. Another randomized control trial that studied the effects of early intervention is the Nurse-Family Partnership, a multi-site study aimed at preventive care for first-time mothers (Olds et al., 1999). In this program, trained registered nurses visited mothers from the end of the first trimester of pregnancy through the second year of the child's life (Olds, 2005). Three large trials were conducted in Elmira, NY ($N = 400$), Memphis, TN ($N = 1135$), and Denver, CO ($N = 73$). Through didactic teaching and both medical and psychological support, the nurses provided consistent support weekly for the first six weeks after birth, then bi-weekly until the child reached 21 months. Results indicated a reduction in dysfunctional care of children and improvement in maternal life course, including an increase in the interval between subsequent births and a reduction in future pregnancies (Olds, 2005).

Infant Health and Development Project. In the Infant Health and Development Program (IHDP), researchers implemented a randomized control trial with parents of low-birthweight children ($N = 985$) (Martin et al., 2008). Enrolled parents were given 3 years of home visit services, and children were given full-day child care modeled after the Abecedarian Project (Martin et al., 2008). Intervention mothers reported a decreased use of harsh discipline and lower levels of emotional distress (Martin et al., 2008). While positive parenting behaviors were initially reported, long-term effects faded by the time participants were re-assessed in a fifteen-year follow-up (Martin et al., 2008). The only broad, lasting effect was maternal employment, although the higher birth-weight group maintained significant IQ gains of 8 points (Martin et al., 2008). Some researchers hypothesized that parenting behaviors are frequently entrenched and difficult to alter over long periods (Martin et al., 2008).

Early Head Start Research and Evaluation Project. Early Head Start is another important source of information regarding early childhood interventions and outcomes. Early Head Start is a federally funded intervention for pregnant women and their children from birth through age 3 (Administration for Children and Families (ACF), 2004). Early Head Start provides comprehensive health and educational services that include child care, comprehensive health and mental health services, screenings and services for children with disabilities, and extensive family outreach (ACF, 2004). In a randomized control trial, the Early Head Start Research and Evaluation Project, researchers followed 3,001 families across seventeen programs, including seven home-based programs (Chazan-Cohen et al., 2007). Participants received health, educational, and family support services through weekly home visits or through services at the Early Head Start

centers (ACF, 2002). Researchers found that children in Early Head Start experienced significant gains across cognitive, language, and social emotional domains. Further, parents in the experimental group scored higher on aspects of the home environment and parenting behavior (ACF, 2008).

Correlational Studies

Recent correlational studies have also demonstrated significant cognitive, academic and social gains (NICHD Early Care Research Network (ECRN), 2001; Rusby et al., 2008). While intervention studies have greatly informed the knowledge base regarding early care quality, much recent research has focused on large, correlational studies, which are less prone to selection bias effects. Below are three prominent studies that will be described and discussed: the Family Child Care Study, the NICHD SECCYD, and the Cost, Quality and Outcomes study.

The Family Child Care Study (FCC). Originally called the Family Child Care and Relative Care Study, The Family Child Care Study (FCC) is the largest investigation of child care homes to date (Burchinal, Howes, & Kontos, 2002). Investigators selected three sites in California, North Carolina, and Texas, representing varying economic and regulatory conditions (Burchinal et al., 2002). Researchers recruited families in which the mother worked at least 15 hours per week and their primary method of care was family care, including care by a relative. Because no lists of unregulated child care homes existed, investigators used random digit dialing to obtain participants. The sample included 226 ethnically diverse families and their providers (Burchinal et al., 2002). Trained observers rated the overall quality of the family child care using the Family Day Care Environment Rating Scale (Harms & Clifford, 1989) and the caregiver involvement

scale (Arnett, 1989) and also counted the number of children in each home (Burchinal et al., 2002). Using multiple regression analyses, the researchers found that caregiver characteristics, such as training, were the best predictors of quality of care. Analysis also determined that structural characteristics, such as adult:child ratios, were not significantly associated with overall quality, nor was teacher sensitivity when caregiver characteristics were controlled. One surprising finding in this study is that children in larger homes were generally provided higher quality care, a finding that runs counter to previous studies of child care centers (Burchinal et al., 2002).

The Study of Early Child Care and Youth Development (SECCYD). In the NICHD's SECCYD, 1,364 children in a wide array of nonmaternal child care environments were tracked for 14 years, allowing for multiple secondary data analyses. The study population was diverse, although it did not include children who were born with disabilities (NICHD ECRN, 2001). Data were collected across cognitive, language, social-emotional, behavioral, and relational domains (NICHD ECRN, 2001). In a secondary analysis of these data, Belsky et al. (2007) found that high quality of care was linked to positive outcomes in mathematics, memory and vocabulary. Vocabulary in particular is a salient predictor of future school success (Belsky et al., 2007). While the authors had detected increases in behavioral problems related to dose of care, this effect faded out by the third grade. Also utilizing this data set, Dearing, McCartney, and Taylor (2009) found that increases in the number of episodes in high quality care decreased the association between poverty and low achievement in middle childhood. The researchers also found that high quality care predicted higher scores on both math and reading in elementary school. Overall, researchers found that child in higher quality care

experienced moderate gains in language and cognitive development than those in lower quality care (NICHD ECRN, 2001).

Cost, Quality, and Outcomes Study (CQO). In the Cost, Quality, and Outcomes Study, researchers followed over 800 children from age 3 through 7 across sites in four states (Burchinal et al., 2002). The study examined the relationships between the cost and quality of early care and developmental outcomes (Peisner-Feinberg et al., 2000). Within each state, a stratified random sample of nearly 100 infant, toddler, and preschool centers was drawn from state licensing lists, balancing for-profit and non-profit centers (Peisner-Feinberg et al., 2000). Individual preschool and infant/toddler classrooms were randomly selected from each center to represent each program (Peisner-Feinberg et al., 2000). In order to gauge outcomes, researchers used select centers, stratified by levels of quality and economic status of children (Peisner-Feinberg et al., 2000). Educational and developmental outcomes were assessed annually over a four-year period through tests, teacher ratings and parent reports (Peisner-Feinberg et al., 2000).

Overall, researchers determined that the majority of centers in the United States demonstrated poor to mediocre quality (Peisner-Feinberg et al., 2000). Quality of care was found to be associated with staff-child ratios, staff education, and administrators' experience. Teacher wages and training were also related to quality, as were licensing standards. Researchers also found that high quality care was correlated with basic cognitive skills (e.g., language and math) and social skills. Specifically, the data indicated that children at-risk for poor developmental and educational outcomes are affected more by the quality of care than other children. For certain outcomes, such as math skills and behavioral problems, children whose mothers had lower levels of

education were more likely to be impacted negatively by low quality care and conversely received more benefits from high quality care than peers. The influences of child care quality were sustained through the second grade. Assuming that these results reflect similar processes occurring in family child care homes, they are crucial to understanding the importance of early care in general. Finally, the CQO results indicated that the quality of child care settings was related to cognitive development, while the quality of teacher-child relationships were associated with social-emotional development through the early school years (Peisner-Feinberg et al., 2000). In other words, early child care significantly impacts school readiness.

Summary of Intervention and Correlational Studies Regarding Early Child Care

Despite the paucity of research directly related to family child care, overall research in early childhood settings have demonstrated that quality of care experiences are associated with child outcomes, even after adjusting for socio-economic status and parenting practices (Burchinal et al., 2002). High quality programs tend to share the following common traits: they begin during the first three years of life, are more intensive and aimed at two generations instead of one, and include caregivers who are well-trained. (Barnett, 2007; Chazan-Cohen et al., 2007). Disadvantaged children are impacted more by high quality programs than other children (Barnett, 2008). Because of the relatively poor quality of family child care, there exists an added importance to finding ways to improve the quality of family care settings: The children who are most vulnerable to social emotional and environmental stressors are attending child care environments that are least able to meet their needs. This point supports the notion that measuring quality is

a vital component in meeting the challenges faced by millions of children in family child care.

In order to understand how quality in early care environments is measured, it is necessary to understand the concepts of process and structure. Conceptually, modern instruments that measure quality, such as the FCCERS-R and “Combined” CLASS, rely on notions of process, structure or a combination of the two. In the following section, structural and process measures will be discussed in detail.

Structural and Process Measures

In this section, the importance of structural and process concepts that underlie measurement of child care quality will be described and discussed. Broadly, both concepts are crucial in understanding how child care quality is measured (Mashburn & Pianta, 2007). Until quite recently, measuring child care quality has focused more on center care rather than family child care, which is why most of the studies below will be derived from the center care literature (Kryzer et al., 2007). While it is not completely known whether or not evidence from these studies can be *directly* applied to family child care, there are data that strongly suggest family child cares are impacted similarly by levels of structure and process (largely in the form of caregiver-child interactions) (Mashburn & Pianta, 2007).

While there is consensus that child care quality is important, there is considerably less agreement about what constitutes high quality care and how it is best measured (Mashburn & Pianta, 2007; Phillips et al., 2000). Typically, measures of early care quality are divided into two related but separate variables: structural and process variables (Mashburn et al., 2009). According to the National Institute for Early

Education Research (NIEER), structural variables describe aspects of early care that are readily quantifiable, such as staff-child ratios, class size, level of teacher education and training, access to support services, adoption of a specific curriculum, and staff compensation (NIEER, 2004; Phillips et al., 2000). Because they are easily quantified, structural variables often are the focus of regulation, financing, and policy intervention (Mashburn & Pianta, 2007; Phillips et al., 2000).

The literature also has shown that structural variables can be broken down further into two separate components: provider and classroom characteristics (Mashburn & Pianta, 2007). Classroom characteristics focus on the aspects of program structure, such as staff-child ratios, classroom size, access to curriculum and learning materials, all of which can be quantified easily. (Phillips et al., 2000). Provider characteristics typically focus on education and training (Mashburn & Pianta, 2007).

Process variables, on the other hand, focus on the intimate interactions experienced by children (Mashburn & Pianta, 2007). Theory and recent empirical evidence indicate that process measures are more closely associated with outcomes than structural measures. Process variables typically are observed in the classroom and can be divided into two spheres: physical and social environments. While there are multiple ways to delineate process variables, they are commonly described as proximal interactions that occur within the classroom. These interactions typically occur between children and caregivers, peers and materials (Mashburn & Pianta, 2007).

Mashburn and Pianta (2007) theorized that structural and process variables are interrelated. In describing process variables, the authors posited that interactions with the social and physical resources in a classroom are the *direct* mechanisms through which

children learn and develop. On the other hand, structural variables *indirectly* impact children's development by impacting these proximal processes (Mashburn & Pianta, 2007; Phillips et al., 2000). In other words, structural elements are important only in that they support more intimate classroom processes, such as social and intellectual interactions between children and caregivers. For instance, Mashburn and Pianta (2007) posited that teachers with training in emergent literacy (a structural variable) would be more capable of individualizing language-based interactions with their students (a process variable).

The following sections will describe and structural and process elements that impact child care quality. Structural measures are discussed first. They are divided into provider characteristics and classroom and program characteristics.

Provider Characteristics

Evidence shows that provider characteristics are important factors in determining the quality of care (National Research Council, 2006; Shonkoff & Phillips, 2000). In other words, who the provider is impacts child development (Bordin, Machida, & Varnell, 2000; Burchinal et al., 2002). Professional development (training) and caregiver education are typically included within studies of structural elements, while caregiver compensation and mental health status are variables more recently included in studies (Phillipsen, Burchinal, Howes, & Cryer, 1997).

Professional development (training). Multiple experimental and quasi-experimental studies have demonstrated that professional development improves overall child care quality (Burchinal et al., 2002; Domitrovich et al., 2009; Kontos, Howes, & Galinsky, 1996; Saracho & Spodek, 2007; Sterling & Hirallal, 1998). In a correlational

study of 200 licensed child care homes, when controlling for teacher-child ratio, caregiver training was found to be the structural component that most reliably predicted observed quality childcare (Burchinal et al., 2002). It is important to note that the enhanced effectiveness of caregiver training is a relatively recent phenomenon, with the history of training associated with overall ineffectiveness (Ball & Cohen, 1999). Recently, training has veered away from antiquated, strict didactic approaches and moved toward more experiential models (Mashburn & Pianta, 2007). Mentoring or coaching approaches, in which caregivers receive hands-on or internet-based support and feedback, have been shown to be key components to developing effective training programs (Mashburn & Pianta, 2007).

Aligning with this supportive, experiential approach, numerous recent studies have shown that professional development improves child outcomes across multiple caregiver competencies. In a randomized control trial involving 121 toddlers, Cain, Rudd, and Saxon (2007) found that teachers receiving professional development training were more likely to engage in joint attention with children. Joint attention has been implicated in impacting language development in young children (Rudd, Cain, & Saxon, 2008). In a correlational study, Burchinal and colleagues (2002) found that child care home providers demonstrated less detached interactions with children after they had received training related to child development. Research also has shown that teachers receiving professional development training provided richer learning environments (Clarke-Stewart et al., 2002). In a meta-analysis, experimental results demonstrated that caregiver training improved overall caregiver competencies and improved child behavior in child care (Fukkink & Lont, 2007). Professional training also has been shown to

improve caregiver attitudes and perceived competence toward inclusion of children with disabilities (Baker-Ericzen, Mueggenborg, & Shea, 2009). A second correlational study of over 2,000 daycare providers and administrators found that the single most important factor in determining whether or not programs included children with disabilities was training related to disabilities (Essa et al., 2008). While there has been mixed evidence in regard to social-emotional outcomes related to caregiver training, a meta-analysis of such studies indicates that researchers may be understating child outcomes (Zaslow et al., 2006).

Caregiver education. Level of caregiver education has been demonstrated to be associated with overall classroom quality (Arnett, 1989; Howes, 1997; Saracho & Spodek, 2007). This evidence aligns with the overarching concept that children's learning is greatly dependent on the caregivers with whom they interact (National Research Council, 2000). Put simply, teachers matter. Broadly, learning is based on the structure and support caregivers provide, the activities they choose, and the concepts they target. These domains are enhanced by specific knowledge related to child development and learning, which appear to be associated with educational levels (National Research Council, 2000).

There is ample evidence that structural factors impact child development. In a meta-analysis of over 40 studies involving education level and early childhood programs, Saracho and Spodek (2007) found that teachers with bachelor's degrees in early education were generally more responsive to children and provided more activities related to language development and emergent literacy than teachers without college degrees. The authors concluded that early child care programs would benefit from an

influx of caregivers with specialized college degrees in early childhood studies. In a secondary data analysis of the CQO study, which included over 500 infants, toddlers, and preschool-aged children, Burchinal et al. (2002) found that caregivers with formal education in early childhood studies generally were more sensitive in their interactions with children and overall provided higher quality care. Torquati, Raikes, and Huddlestone-Casas (2007) noted that early childhood teachers with Child Development Associate (CDA) degrees predicted overall classroom quality. Finally, Raikes, Raikes and Wilcox (2005), in a study of 120 childcare family homes, found that caregivers with higher levels of education were associated with higher quality childcare environments. The authors concluded that education and training are particularly important to child care home providers because homes typically are poorly regulated.

Caregiver compensation and turnover. Research suggests that caregiver compensation is one of the more robust factors related to classroom quality, with higher wages generally being associated with higher observed global quality (Phillips et al., 2000; Torquati, Raikes, & Huddlestone-Casas, 2007). Unfortunately, early child care providers generally are poorly compensated, with wages typically nearing poverty levels (Ackerman, 2006; Torquati, Raikes, & Huddlestone-Casas, 2007). For instance, one third of early care providers in Missouri were reported to be on public assistance (Torquati, Raikes, & Huddlestone-Casas, 2007). The National Child Care Staffing Study found that turnover in childcare is approximately 26% annually, meaning that children often are deprived of consistent care (Whitebrook, Howes, & Phillips, 1990). Torquati, Raikes, and Huddlestone-Casas (2007) hypothesize that these high rates of turnover are related to poor compensation. Johnston and Brinamen (2006) theorized that low wages negatively

impact caregiver-child interactions by degrading caregivers' self-esteem. High turnover is particularly troubling in light of the importance of consistent care in establishing attachment relationships (Bowlby, 1988). In fact, evidence indicates that the high turnover rates pervasive in early care have shown negative effects on attachment relationships between children and their providers (Galinsky, Howes, Kontos, & Shinn, 1994).

Caregiver mental health status. While training and education are domains traditionally targeted by researchers, there has been a growing emphasis on the mental health status of caregivers (Chazan-Cohen et al., 2007). Research in this area parallels studies drawn from mother-child attachment relationships, specifically the focus on evidence that depression typically impairs maternal sensitivity and increases intrusive, harsh parenting (Chazan-Cohen et al., 2007; Chung et al., 2004). Emotional problems, such as depression, have been shown to negatively impact sensitive and responsive caregiving, thus impairing attachment relationships (Shonkoff & Phillips, 2000).

Considering the low wages and stressful environments observed in child care, it is not surprising that early care providers are vulnerable to both mental health and morale problems (Alkon, Ramler, & MacLennan, 2003). Wandersman (1981) found that family child care providers, in particular, are vulnerable to emotional strain due to the fact that they often care for their own children, thus burdening them with competing roles. In a correlational study of 1,217 nonfamilial caregivers, Hamre and Pianta (2004) found that levels of self-reported depression by early childhood teachers were associated with less sensitive, more withdrawn and more intrusive interactions with children. It should be noted that the authors reported that the relationship between depression and poor quality

caregiving was more pronounced for family child care providers. In a correlational study involving 119 preschool teachers, Gilliam and Shahar (2006) found that teachers reporting depressive symptoms tended to expel and suspend students more frequently. The researchers posited that teacher depression likely had a detrimental impact on teacher-child interactions.

Classroom and Program Characteristics

While caregiver characteristics are related to child outcomes, there is also ample evidence that characteristics of individual classrooms are associated with learning and development (Shonkoff & Phillips, 2000). Typically, two core elements of program structure are measured: staff-child ratios and class (or group) size, which, along with teacher training and education, comprise the “iron triangle” of child care research (Phillipsen et al., 1997). A description of the commonly used classroom variables in current research includes the following: the use of academic and social emotional curricula, the use of behavioral support plans, the use of data to guide individualized instruction and intervention, availability of parent training and education, access to health services; and access to mental health services and consultation.

Staff-child ratios and class size. Two closely related variables are staff-child ratio and class size, both of which critically impact the quality of both learning and development (National Research Council, 2000). Overall, research shows strong associations between low staff-child ratios, small class sizes and cognitive, academic and social gains (Howes et al., 1992; Phillipsen et al., 1997). Low-income children, in particular, benefit from the combination of low staff-child ratios and small class sizes

(National Research Council, 2000). Lower staff-child ratios are associated with higher quality classrooms and programs (Camilli et al., 2010; Raikes, Raikes, & Wilcox, 2005).

In regard to ratios specifically, Camilli et al. (2010) found via a meta-analysis of 161 center-based programs that lower ratios demonstrated a significant, positive impact on cognitive abilities. The researchers hypothesized that lower ratios (typically 7-8 children per caregiver) allowed caregivers to divide children into small groups, in which they could more easily attend to the individual needs of the children. Specifically, they noted that disadvantaged children likely had more frequent and better opportunities to learn about classroom processes, such as lining up and raising one's hand, while teachers could provide more individualized instruction. In a secondary data analysis of 414 children in center care in the large-scale National Childcare Staffing Study, Howes, Phillips, and Whitebrook (1992) found that center based programs adhering to Federal Intra-agency Day Care Requirements (FIDCR) ratios (9 children per 1 caregiver) were more likely to be rated as "good" or "very good" in regard to caregiving activities. The authors further stated that children in classrooms rated positively in caregiving activities, in turn, were more likely to be securely attached to their teachers. Demonstrating the link between regulable features and process elements, the authors also showed that securely attached children in the study were likely to be more socially competent with their peers. It should be noted that daycare quality is very sensitive to small adjustments in ratios, emphasizing the power of the transactional model. Howes, Phillips, and Whitebrook (1992) found that centers adhering a ratio of 1:8 (per California regulations) predicted higher quality than those aligned with a ratio of 1:9 (per FIDCR).

While related, the effects of ratio and class size have been disentangled in some studies (National Research Council, 2000). For instance, there is evidence that lowering the teacher-child ratio without also reducing class size does not produce beneficial results (Mosteller, 1995; National Research Council, 2000). In other words, there is an interaction effect between the two variables. Similar to lower ratios, small class sizes generally encourage more intimate interactions between children and their peers and teachers (Camilli et al., 2010). For instance, both the High/Scope Perry Preschool and the Abecedarian programs had class sizes of 12 to 13 children, thus supporting more individualized, sensitive care (Ramey & Campbell, 1984). As with smaller caregiver-child ratios, small class sizes allow caregivers to provide more nurturing, responsive attention (National Research Council, 2000).

Nurturance, responsiveness and attachment security are themes that are integral to smaller, more intimate classrooms because they frequently relate to higher scores on global quality and high quality social interactions (National Research Council, 2000). In a small study of 41 toddlers in family child care homes, Elicker, Fortner-Wood, and Noppe (1999) found that class size was a significant indirect predictor of attachment security. While empirical evidence overwhelmingly supports the link between small ratios and class sizes to higher quality care, contrarily, Burchinal and colleagues (2002), in a secondary data analysis of the Family Child Care and Relative Study, reported that child care homes with *more* children overall provided higher quality care. The authors noted that caregiver education and training were likely confounding elements in this study, where caregivers with higher levels of education and training were likely working in homes with more children.

Use of academic curricula. There is strong evidence that the implementation of academic curricula in early education settings is associated with later academic and cognitive gains (Downer & Pianta, 2006; Shonkoff & Phillips, 2000). In a secondary data analysis of the National Institute of Child Health and Human Development's (NICHD) Study of Early Child Care (SECC), Downer and Pianta (2006) found that classrooms focusing on specific math, literacy, and language instruction generated higher scores in reading, phonemic awareness, and long-term retrieval. In a randomized control trial in 44 Head Start classrooms, Domitrovich et al. (2009) showed that teachers trained in evidence-based curriculum targeting emergent language, literacy, and social emotional development talked with students in more cognitively complex ways, established a more positive classroom climate, and increased their use of antecedent behavioral strategies. In another study of 91 ethnically and economically diverse preschool children, Jambunathan, Burts, and Pierce (1999) found that the use of developmentally appropriate practices (DAP) was a significant predictor of peer acceptance. The authors theorized that developmentally appropriate curricula promoted opportunities for social development.

While there is much less known about the use of academic curricula in family child care, there is evidence that such curricula produce similar benefits in home care (Goodman & Andrews, 1981). In a small study of 51 children in family child care, researchers reported that children receiving curricular support from a consultant preschool teacher for 2 – 4 hours per week showed significant gains on cognitive performance when compared to a comparison group (Goodman & Andrews, 1981).

Use of social emotional curricula. Overall, the use of social emotional teaching strategies predicts positive child outcomes across a broad array of measures (Calderella et al., 2009; Saigeetha, Burts, & Pierce, 1999). Research in this domain frequently focuses on specific curricula. In a large, randomized control trial of over 1,700 students and 150 teachers, Webster-Stratton, Reid and Stoolmiller (2008) reported that the *Incredible Years Classroom Management and Child Social and Emotional curriculum (Dinosaur School)* showed positive results in regard to Head Start students' social emotional competence and self-regulation, along with fewer conduct problems. This study also demonstrated benefits for the teachers, who gained positive classroom management strategies and increased contact with parents. In a qualitative study based in Jamaica, Baker-Henningham et al. (2009) reported that *Dinosaur School* curriculum demonstrated beneficial effects in regard to children's appropriate behavior, interest, and enthusiasm, with the overall classroom atmosphere also improving. *Strong Start* also demonstrated meaningful improvements in children's internalizing and peer-related behaviors, particularly for children at greatest risk for such difficulties (Calderella et al., 2009; Kramer et al., 2010).

Promoting Alternative Thinking Strategies (PATHS) also has been shown to impact social-emotional functioning of young children. In a mixed block design, Domitrovich, Cortes, and Greenberg (2007) found that preschool-aged children exposed to the *PATHS* intervention demonstrated higher emotion knowledge skills and were rated by both teachers and parents as being more socially competent. Riggs et al. (2006) showed that *PATHS* had positive impacts on children's inhibitory control verbal fluency. Finally, in a study based in Northern Ireland, researchers demonstrated that children

taught with an enriched, social-emotional curriculum experienced a higher-quality learning experience, with increased levels of emotional, social and physical well-being (Walsh et al., 2006). While each of these studies demonstrated results specifically in social emotional domains, empirical evidence indicates that gains in emotion knowledge are strongly related to a broader range of competencies, such as cognitive abilities, language development, self-regulatory skills, and overall school competence (Garner & Wajid, 2008). In a correlational study of 74 preschoolers, the researchers measured emotion knowledge and aspects of school readiness concurrently and found that the association between teacher-child closeness and school competence was mediated by emotion knowledge.

Use of behavioral support plans. Evidence has shown that children learn better in classrooms using behavioral management strategies to prevent and redirect negative behaviors (Good & Grouws, 1977). Reflecting the ecological systems framework within which children learn, evidence has demonstrated the importance of behavior control in relation to later academic outcomes (Bulotsky-Shearer et al., 2008). Specifically, children exhibiting behavioral problems in pre-K programs are likely to experience academic difficulties later in school. In a study of Head Start children, students who received higher cooperative behavior ratings and lower problem behavior ratings from teachers scored better on cognitive assessments and behavior ratings at the end of kindergarten (U.S. Department of Health and Human Services, 2006). Further evidence indicates that teachers who adopt behavior management strategies have students who are more engaged than peers in classrooms where these strategies are not present (Emmer & Stough, 2001). The importance of positive behavioral support is reflected by a study

showing that at-risk first graders receiving behavioral support perform similarly to typical peers both academically and socially (Rimm-Kaufman et al., 2010).

Use of data to guide individualized instruction and intervention. Broadly, evidence shows that using systematic data-collection to inform individualized instruction is considered best practice (Herman et al., 2010). Specifically, Carey and Dimmitt (2008) posited that successful implementation of evidence-based practices depends upon efficacy trials, identifying children who need services through data-driven assessment, and ongoing evaluation of data. Numerous studies involving data collection and individualized interventions have focused on discrete treatment groups, with autism spectrum disorders being frequent research targets. Lovaas (1987) demonstrated that children with autism could improve intellectual, social and adaptive functioning through discrete trial learning, a method that relies heavily upon data collection and individualized instruction. Callahan, Henson, and Cowan (2008) stated that service providers should utilize data-based decisions to individualize effective instruction and treatment of children with autism. Research also has indicated that data-collection and analysis are essential in determining effective strategies for promoting social and communicative behaviors of children with autism (Meadan et al., 2009).

In a review of interventions of children's antisocial behaviors, Walker and Horner (1996) presented evidence that effective, individualized strategies involve a careful analysis of data. The authors suggested that, absent the careful consideration of data, interventions are highly unlikely to succeed. Evidence also has shown that social-emotional functioning of children with autism spectrum disorders can be improved through relationship-focused interventions, which involve individualized treatment based

upon child data (Mahony & Perales, 2003). Romano et al. (2006) demonstrated that data-collection is an essential component of intervening with children exhibiting persistent hyperactivity.

Access to parent training and education. While early care has demonstrated the ability to promote positive development and learning, there is evidence parents and the home environment are stronger predictors of child outcomes (Belsky et al., 2007; Shonkoff & Phillips, 2000). Parent training and education have been empirically shown to be effective strategies to improve overall parenting practices (Gross et al, 2003). These strategies have demonstrated efficacy with a wide range of children, including disadvantaged children and children with disabilities (Helfenbaum-Kun & Ortiz, 2007; MacIntyre, 2008). A wide array of effective parent training and education have been developed, some targeting broad skill sets, others developed for specific purposes, such as improving language skills or reducing sleep problems (Reese, Sparks, & Leyva, 2010; Wade, Ortiz, & Gorman, 2010; Zubrick et al., 2005).

A meta-analytic study of the *Positive Parenting Program (Triple P)* demonstrated positive results with children with behavioral problems across multiple cultural contexts (de Graf et al., 2008). The *Incredible Years BASIC program* has been empirically shown to be effective with low-income parents of children with behavioral problems (Helfenbaum-Kun & Ortiz, 2007; McIntyre, 2008). In a randomized control trial of 208 parents of 2-3-year-old children, the training demonstrated a reduction in negative parent-child interactions and child problem behaviors and an increase in parenting self-efficacy (Gross et al., 2003). In a longitudinal study in the United Kingdom, researchers demonstrated that *Scallywags*, a secondary prevention program for children with conduct

problems, benefited children across multiple domains (Frampton et al., 2008). Ingersoll and Dvortcsak (2006) posited that a key component of parent education is ease of implementation. Along these lines, a recent increase in research on Internet-based parent training and education has demonstrated that the Internet can be an effective means of delivering such services. Results of *Infant Net* training and technology-enhanced viewing of a parenting-themed television program showed significant increase in infant social engagement and engagement with the environment (Baggett et al., 2010; Calam et al., 2008).

Access to Health Services. There is ample evidence that families of children in early care benefit from both health and mental health intervention services (Chazan-Cohen et al. 2007; Martin et al., 2008). As noted in the intervention section above, two thoroughly research interventions, the Infant Health and Development Program (IHDP), and the Nurse-Family Partnership have shown multiple long-term gains for families in early intervention programs (Martin et al., 2008; Olds, 2005).

Access to mental health consultation and direct mental health services. Cohen and Kaufman (2000) describe mental health consultation in early childhood as a “problem-solving and capacity-building intervention” (p. 4) involving the collaboration between a mental health expert and a direct service provider. Early childhood mental health consultation has become an increasingly popular practice with at-risk children, their families and their teachers due to an increasing need to support children with emotional and behavioral issues (Buysse & Wesley, 2005; Green et al., 2006). Consultation between mental health specialists and direct service providers has been shown to be an effective means of improving children’s social emotional outcomes

(Fuchs et al., 1992). In fact, the central importance of mental health consultation has been codified by Head Start under the Head Start Performance Standards (45 C.F.R. Part 1304.24). Through these standards, centers are required to provide sufficient mental health consultation to meet families' needs (Green et al., 2006).

Studies have demonstrated that children in programs receiving mental health consultation services have shown both improved social skills and an overall reduction in problem behaviors (Perry et al., 2008). It also has been shown that preschool children in programs that receive consultation services are less likely to be expelled (Fox & Hemmeter, 2009). Further, one large-scale study reported that disadvantaged, ethnically diverse children with access to child care centers with available mental health consultation exhibited significantly fewer behavioral problems (Alkon, Ramler, & MacLennan, 2003).

A wide variety of consultation methods have been used effectively, from traditional consultation with teachers and caregivers in schools and child care centers to video-conferencing techniques from remote locations (Gibson et al., 2010). A key component of the effectiveness of consultation is high teacher satisfaction with the consulting services (Babcock & Pryzwansky, 1983). In other words, one of the core reasons consultation succeeds as an effective practice is that teachers develop positive collaborative relationships with the consultants (Green et al., 2006). One qualitative study determined that children's behavioral difficulties were reduced and positive behaviors increased most effectively when consultants were integrated directly into the school program (Green et al., 2004).

Direct mental health interventions also have demonstrated efficacy (Shonkoff & Phillips, 2000). In a large-scale randomized assessment of a mental health intervention involving 3,001 Early Head Start families, Chazan-Cohen et al. (2007) found that the intervention positively impacted overall parenting and improved parent-child relationships. The authors noted that promising child factors played a significant role in moderating the impact of maternal depression. Gilliam and Shahar (2006), in a correlational study involving 119 randomly selected preschool teachers, found that teachers with depressive symptoms were more likely to expel children and would benefit from mental health services.

Accreditation by accrediting organizations. There is evidence that being accredited with organizations such as the National Association for the Education of Young Children (NAEYC) enhances child care quality (Gerber, Whitebrook, & Weinstein, 2007; Ritchie & Howes, 2003; Shonkoff & Phillips, 2000). In regard to child care homes, Raikes et al. (2005), in a correlational study of randomly selected sites across four states, found that more regulation related positively to higher quality care. The authors found that in settings where providers were less regulated, education became an increasingly important factor in determining child care quality.

Subsection Summary of Research Regarding Structural Variables

While not *directly* impacting child care quality, structure has been shown to correlate with overall child care quality through its effect on caregiver-child interactions (Mashburn & Pianta, 2007). Due to both the general lack of regulation of family child care and the dearth of research in this area, less is known about how structure impacts family child care vis-à-vis center care (Kryzer et al., 2007). With that in mind, it is still

clear that provider qualities and environmental structure impacts learning and behavior in family child care settings (Burchinal et al., 2002). In regard to family child care, particular attention perhaps should be paid to caregiver training. Due to the relative lack of regulation of child care homes, caregivers could benefit from training and coaching, which has been shown to increase caregiver sensitivity, thereby improving process (Burchinal et al., 2002).

Process Variables

There are multiple ways to delineate process variables. For instance, according to the National Institute for Early Education Research (NIEER), common process variables include the following: positive relationships between teachers and children, communication between children and adults (including use of reasoning and problem-solving), materials and toys, opportunities for art, music, science, math and dramatic play, and encouragement for parental involvement in all aspects of the program (NIEER, 2002). An elemental way to delineate process variables is to examine the proximal, observable interactions that occur within the classroom (Mashburn & Pianta, 2007). Children's interactions commonly occur in the classroom with the following: caregivers (or teachers), peers, and materials. Each variable will be discussed below, along with a section detailing the importance of sensitivity, a key component of teacher-child interactions.

Positive Relationships Between Caregivers and Children and/or Families.

Robust evidence suggests positive relationships between teachers and children predict both academic and social-emotional gains (e.g., Howes et al., 2001; O'Connor & McCartney, 2007). Building on a foundation of literature regarding parent-child

attachment, both theory and empirical evidence indicate that secure attachments to caregivers predict children's long-term learning and development (Birch & Ladd, 1997; O'Connor & McCartney, 2007). Theorists hypothesize that children with high quality classroom relationships use caregivers as a secure base from which they can explore the classroom (Howes, Matheson, & Hamilton, 1994; O'Connor & McCartney, 2007).

Emphasizing the importance of caregiver-child relationships, empirical evidence has shown that infant-parent attachment and caregiver-child attachment relationships are distinct (Elicker, Fortner-Wood, & Noppe, 1999). In other words, although previous attachment relationships frequently predict the quality of future attachment relationships, teachers and children have the capacity to create unique attachment relationships (Howes & Hamilton, 1992). Thus, a child with an insecure attachment to one or more parents likely would benefit from a secure relationship with a child care provider (Pianta, 1994). This evidence aligns with attachment theory: Bowlby (1980) posited that attachment relationships are unique to specific dyads and not indicative of an individual child's character. Buoyed by secure, supportive classroom relationships, theoretically these children feel more secure and confident in their communications and interactions with both adults and children, thus facilitating dynamic academic and social tasks (O'Connor & McCartney, 2007).

Supporting an attachment-based conceptual framework of teacher-child relationships, in a correlational study of 206 kindergartners, Birch and Ladd (1997) found that high dependency in the teacher-child relationship predicted negative school adjustment, including poor academic achievement, negative school attitudes, and less positive engagement. Further, in a longitudinal study with an attachment focus, Buyse et

al. (2009) found that early teacher-child relationships (as measured by closeness and conflict) were associated with children's psychosocial adjustment in the first years of elementary school. Birch and Ladd (1998) noted that children's behaviors are an important component of the teacher-child relationship. In a longitudinal study of 199 kindergartners, the authors found that attachment-based features of classroom relationships (i.e., conflict, dependency, closeness) predicted teacher-child relationships. Doumen et al. (2008) also found that the teacher-child relationship can be particularly salient in reducing young children's aggression. In a longitudinal study of 148 kindergartners, the authors hypothesized that teachers and children interact in a transactional relationship, whereby children's aggression led to conflict with teachers, which in turn, engendered more aggression in children.

Overall, children with high quality relationships with teachers demonstrate higher levels of academic achievement and cognitive skills in elementary school than children with lower quality relationships (Hamre & Pianta, 2001). In a correlational study of 223 rural and suburban kindergarten classrooms, Pianta et al. (2002) found that children were more likely to succeed in school when there are both a high frequency and intensity of interactions between teacher and child. These effects are potentially enduring. In a study that followed 179 children longitudinally, Hamre and Pianta (2001) demonstrated that negative relationships between children and teachers in kindergarten related to both poor academic and behavioral outcomes through the eighth grade, with children experiencing behavioral problems. The authors found that generally boys were impacted more than girls. In a nested design study in which researchers studied 2,800 randomly selected

children across eleven states, Howes et al. (2001) noted that children showed significant academic gains when they experienced close teacher-child relationships.

Beyond these broad academic and social-emotional gains, studies also have demonstrated specific, positive outcomes for disadvantaged groups. Ample evidence indicates that teacher-child relationships are particularly salient for disadvantaged and minority children (Shonkoff & Phillips, 2000). Burchinal et al. (2002) found that closer relationships between teachers and African American children were positively related to the acquisition of language skills. There is also evidence that teacher-child relationships positively impact African American and Latino children with difficulties related to aggression and problem behaviors (Meehan, Hughes & Cavell, 2003).

Evidence also suggests that parent interactions with teachers impact child outcomes (Shonkoff & Phillips, 2000). For instance, children whose parents have more positive relationships with schools have higher quality relationships with teachers (O'Conner, 2010). Overall, it is apparent throughout studies of classroom interactions that there exists an overarching transactional relationship. (A transactional relationship refers to one in which a person acts on the environment, and the environment in turn acts on that person, thus creating a dynamic relationship.) In other words, children, parents and teachers all interact with one another in ways that impact each others' relationships and, ultimately, child outcomes (Doumen et al., 2008).

Developing positive relationships with children depends markedly on a caregiver's capacity to be sensitive and responsive to a child's individual needs (Gerber, Whitebrook, & Weinstein, 2007). Sensitivity describes the capacity of a caregiver to meet the unique emotional and intellectual needs of children (Shonkoff & Phillips, 2000).

Teacher sensitivity has been implicated in improved cognitive growth in young children (Loeb et al., 2004). Burchinal et al. (2002) found that caregivers with formal training in early childhood or who attended workshops were more sensitive in interactions with children and provided better quality care than those without training.

Interactions with peers. Paralleling the literature on child-teacher relationships, children's peer relationships are strong predictors of positive outcomes across multiple domains, including socialization and academics (Ma, 2006). The literature shows that the quality of peer relationships is related to academic gains (Risi, Gerhardstein, & Kistner, 1997), language ability (Mashburn & Pianta, 2007) and social adjustment in school (Diehl et al., 1998). Further, positive peer relationships have been shown to facilitate learning, reinforce positive social behaviors, promote self-esteem, and buffer children against daily stress (Howes, 1987; Ladd, 1990; Overton & Rausch, 2002). Positive peer relationships also have been positively associated with inclusion by helping children develop positive self-esteem and a sense of competence (Overton & Rausch, 2002). In a correlational study using data from the SECCYD, evidence showed that children with higher quality relationships demonstrated higher levels of achievement than those with lower quality relationships (O'Connor & McCartney, 2007). These effects have been shown to be independent of teacher-child relationships (Ladd, Birch, & Buhs, 1999).

Drawing from the literature on parent-child attachment, children with positive, supportive peer relationships engage in more frequent exploration tasks, talk more elaborately with peers, and have better recall of activities than peers without high quality relationships (O'Connor & McCartney, 2007). There is considerable evidence that a child's interactions with classroom peers play an important role in many aspects of

school adjustment, including academic, linguistic and socioemotional domains (Birch & Ladd, 1997; Parker & Asher, 1993). Specifically, there is evidence that low peer acceptance frequently is associated with later school adjustment difficulties (Parker & Asher, 1993).

Interactions with high quality physical environment and materials. Evidence indicates that well-planned, quality environments invite children to learn and explore (Dearing, McCartney, & Taylor, 2009; Shonkoff & Phillips, 2000). High quality early care typically includes access to materials that are developmentally appropriate for children at different age levels (Dearing et al., 2009; Jambuthan, Burts, & Pierce, 1999). Centers that displayed clean, organized physical settings divided into activity areas and oriented to the child's activity were associated with positive child outcomes (Clarke-Stewart, 1987). While the inclusion of well-planned spaces is a structural aspect of care, the actual interactions that occur between children and materials qualify as a process measure. Play opportunities that improve children's social emotional, cognitive, and motor development are indicative of well-organized environments and are reflective of high quality programs (Bridgman, 1988). Howes and Smith (1995), in a secondary data analysis of 840 children in center care, found that cognitive activity was enhanced in classrooms rich in creative play activities and staffed by teachers engaging in positive social interactions. Thus, there can be a transactional relationship between learning materials and caregiver, in which the caregiver facilitates the child interactions with the materials. Included in the National Research Council's (2008) domain of Physical Environment/Materials is the notion of safety, which has been shown to be a key aspect of providing a high quality environment for children (Mulligan et al., 1992).

Overall, it has been shown that disadvantaged children benefit most from child care settings with developmentally appropriate materials (Dearing et al., 2009; Mashburn, 2008). Specifically, Mashburn (2008) found that there was a differential impact concerning academic skills for children from low-income families and literacy for non-white children. Theoretically, children in poverty develop in home environments that often lack adequate investments in developmentally appropriate learning materials (Howes & Smith, 1995). Therefore, enriched early care environments act in a compensatory fashion, allowing children access to materials that are ordinarily unavailable to them (Dearing et al., 2009). Through access to developmentally appropriate learning materials, the authors posited that the child care environment provides children with a cognitive advantage.

Summary of Structural and Process Elements of Child Care

A vast array of evidence has demonstrated that both structural and process aspects of child care are associated with child outcomes (e.g., Belsky et al., 2007; O'Connor, 2010). It is clear that small, well-structured environments that allow well-trained, educated caregivers to provide sensitive, consistent, high-quality and high-intensity interactions with children relate strongly to high quality (Mashburn & Pianta, Phillips et al., 2000; 2007; Pianta et al., 2002). Unfortunately, due to a lack of resources, in general the family child care network is not prepared to meet adequate standards related to structure and process (Hamre & Pianta, 2004). While family care settings are generally small and demonstrate acceptable staff-child ratios, they are also less regulated than center care, rarely achieving formal accreditation (Raikes et al., 2005; Torquati, Raikes & Huddlestone-Casas, 2007). Further, family caregivers often lack sufficient training and

education, are poorly compensated, and struggle disproportionately with depression, all of which impact interactions with children (Hamre & Pianta, 2004; Wandersman, 1981). Combined, these negative structural and process factors mean that family child care homes need organized, focused support in order to succeed. Accordingly, in order to understand which factors need to be supported, researchers, regulators, and child care providers themselves must be able to measure child care quality.

Overall Summary

To sum up what has been discussed so far in this paper, a vast number of children in family child care are in need of increased educational and social support, particularly because they often face multiple risk factors related to future school failure (Shonkoff & Phillips, 2000). The research overwhelmingly demonstrates that well-structured, nurturing environments provide children at risk with opportunities to develop academic, social and behavioral abilities that will allow them to succeed in school and even later in life (e.g., Campbell & Ramey, 1995; Mashburn et al. 2008). Because family child cares are poorly regulated, there is a need for more information about quality for parents, policymakers, researchers and providers. (National Research Council, 2008; Torquati, Raikes & Huddlestone-Casas, 2007). Through the increased availability of accurate information about family child care quality, policies can be formed that support high quality, parents can know where to find high quality care, and caregivers can understand what they need to do to improve care.

With the above in mind, it is clearly important to measure global aspects of quality in family care settings accurately. While the need to measure global quality is crucial, there is much debate about how to best capture it. This debate is heightened

because of the significant resources required to implement early childhood quality measures. In the following section, there will be a discussion of how quality is measured in early care environments.

Observational Measures of Classroom and Child Care Environments

In this section, the two major instruments that measure global child care quality, the Environmental Rating Scales (ERS) and Classroom Assessment Scoring System (CLASS), along with the two family child care measures derived from the ERS and CLASS, the Family Child Care Environmental Rating Scales – Revised (FCCERS-R) and the “Combined” CLASS, respectively, will be described and discussed. Mirroring evidence presented earlier, much more research has been obtained from the ECERS-R and preschool CLASS than from their family child care counterparts. (Because *Seeds to Success* is the first study to use the “Combined” CLASS, there are no data directly related to its validity or reliability.) What will be shown below is that the FCCERS-R and “Combined” CLASS *very likely* provide data that correlate with child outcomes. Because of the dearth of outcome studies related directly to family child care, this relationship cannot be known with great certainty. Reflecting the respective theoretical bases of the ECERS-R and CLASS instruments, the FCCERS-R is largely rooted in notions of structure, while the “Combined” CLASS is based on concepts related to process. Reflecting Masburn and Pianta’s (2007) core ideas on structure and process, i.e., that structure indirectly affects child care quality via its impact on process, there is important, recent evidence that the CLASS measure more strongly correlates to child outcomes than does the ECERS-R. Because the FCCERS-R and “Combined” CLASS are derived so

thoroughly from the ECERS-R and CLASS measures, it is quite possible that the family child care instruments function similarly to their center care and preschool counterparts.

In order to gauge which environments are most supportive of children's learning and development, it is necessary to find ways to measure aspects of the environment associated with positive outcomes. Choosing a specific measure depends upon the core purpose of the observations, consideration of the child population, and the domains of most interest (National Research Council, 2008). Observational measures of the environment can serve multiple related purposes: professional development, program or classroom progress monitoring, teacher/caregiver evaluation, formative assessment of programs striving to improve, and research, generally related to the relationship between program quality and child outcomes (National Research Council, 2008).

Overall, because quality of child care has been associated with modest to moderate gains in children's cognition, social skills and language, measures that predict program quality are crucial in helping providers and regulators maintain program quality (Howes et al., 2008; Peisner-Feinberg et al., 2001). While the Environmental Rating Scales (ERS), a collection of three different scales, have been the predominant measures for program quality in high-stakes assessments, numerous other instruments have been developed recently. Some, including the Classroom Assessment Scoring System (CLASS), have become increasingly popular with researchers and education professionals.

These measures have also been used extensively to measure child care quality in states' Quality Rating Improvement Systems (QRIS). A QRIS is a systemic approach to assess, improve and communicate the level of quality in early and school-age care

programs responsible for the education and care of hundreds of thousands of children each year (NCCIC, 2009). Similar to rating systems for restaurants and hotels, QRIS award quality ratings to early and school-age care programs meeting a set of defined program standards (NCCIC, 2009). As QRIS expand across the country, the need to find tools to measure quality becomes increasingly important. The two sets of tools commonly used to measure quality in QRIS states are the ERS and CLASS measures. The ERS (which includes the ECERS-R, the FCCERS and ITERS) and the CLASS (along with the Toddler CLASS) will be described and reviewed below.

Early Childhood Environment Rating Scale – Revised Edition (ECERS-R)

The Early Childhood Environment Rating Scale-Revised Edition (ECERS-R) (Harms, Clifford, & Cryer, 1998) is the most widely used measure of early childhood environments for both research and evaluation. The ECERS-R has been extensively used by researchers, practitioners, and early childhood professionals providing guidance to programs. Developers of new measures use correlations with the ECERS-R as the “gold standard” of validity (National Research Council, 2008). The ECERS-R focuses on the global quality of early childhood settings as defined by seven subscales: Space and Furnishings, Personal Care Routines, Language-Reasoning, Activities, Interactions, Program Structure, and Parents and Staff. The ECERS-R also contains items related to health and safety. Each item is rated using a 7-point scale with descriptions of indicators anchored at odd numbers, where 1 represents “inadequate situation,” 3 corresponds with “minimal,” 5 with “good,” and 7 with “excellent.”

The scale does not assess instructional practices directly; it measures global practices in the Language-Reasoning subscale. The ECERS-R is designed to be used

with one classroom or one group at a time for children 2.5 to 5 years of age, with the recommendation that outside observers set aside at least 3 hours for observation. The ECERS-R and the related measures are frequently used in high stakes testing situations and are the cornerstones of many Quality Rating Improvement Programs (QRIS) nationwide.

Reliability. Due to its frequency of use in research and program evaluation, the ECERS-R has been thoroughly examined in regard to reliability (Harms, Clifford, & Cryer, 1998). The authors posited that the ECERS-R is reliable at both the indicator and item level, and also at the level of the total score, reporting the percentage of agreement across the 470 indicators in the scale at 86.1%. In order to maintain reliability, it is necessary to be trained in the ECERS-R (National Research Council, 2008). This training is typically expensive and time-consuming, with 5-day courses costing as much as \$1,025.00. In order to attain reliability, it is necessary to be trained by someone certified in ECERS-R (National Research Council, 2008).

Validity. The authors of the scale posited that the original ECERS-R has a long history of having good predictive validity related to classroom quality, as noted by numerous studies (e.g., Peisner-Feinberg & Burchinal, 1997; Whitebrook, Howes, & Phillips, 1990). Across a wide range of studies, the ECERS or ECERS-R total scores have been shown to relate to children's social skills and language development (e.g., Burchinal et al., 2000; Howes et al., 1992). These correlations tend to be modest, between 0.06 and 0.17 across studies.

While other evidence has shown positive correlations between ECCERS-R scores and child outcomes, a recent study by many prominent early childhood researchers has

provided a notable counterpoint. In a large (2,439 children across 677 classrooms) secondary analysis using data from the Statewide Early Education Program (SWEEP) and a study by the National Center for Early Development and Learning (NCEDL), Mashburn and colleagues (2009) found that the ECERS-R global score was not associated with overall classroom quality. The authors found that only expressive language scores were related to the Language-Reasoning subscale score. Mashburn and his colleagues attributed the lack of correlation between the ECERS-R and outcomes to the fact that the scale is heavily dependent on administrative and structural aspects of programs (Burchinal et al., 2009). One criticism of the ECERS-R is that the subscales show a high degree of multicollinearity, suggesting that several of the subscales are measuring similar aspects of quality (National Research Council, 2008). Factor analysis of the ECERS-R has shown that the tool measures two factors instead of seven (Munton, Rowland, Mooney, & Lera, 1997). In other words, theoretically subscales could act as a proxy for the entire measure (Perlman, Zellman, & Vi-Nhuan, 2004).

Family Child Care Rating Scale-Revised (FCCERS-R)

The Family Child Care Rating Scale (FCCERS-R) (Harms, Cryer & Clifford, 2007) is a revision of the original Family Day Care Rating Scale (FDCRS) and uses the same format as the ECERS-R described above to rate family child care programs (Harms & Clifford, 1989). It is used for children from birth to elementary school age. The increasing popularity of family child care centers has led to an increase in the use of the FCCERS-R for research purposes, although there are still few studies regarding quality of family care and child outcomes (National Research Council, 2008). The FCCERS-R is designed to assess children from birth through school age due to the fact that many home

care settings accommodate children with a wide age range (Harms, Cryer, & Clifford, 2007).

Reliability. The authors reported that in their own studies they maintained interrater reliability at 88.5% across all indicators. For the total scale score, the correlation across all items was 0.77. It was reported in the manual that there is high internal consistency, with an α of 0.90, meaning that the total FCCERS score likely represents a single global construct. However, it should be noted that two of the subscales, Personal Care Routines and Parents and Provider, demonstrated relatively low alphas, 0.46 and 0.39 respectively, meaning that they should be interpreted with caution. Consistent with the ECERS-R, training is both expensive and time-consuming (National Research Council, 2008).

Validity. Validity information was not available to be reviewed. However, Kontos et al. (1996) reported that FDCRS scores predicted children's social and language skills. In regard to face validity, the FCCERS-R appears to reflect both important structural and process aspects of child care, with emphasis on structure. The FCCERS-R thoroughly reflects its "parent" measure, the ECERS-R, using many of the same subscales, items and indicators. In this regard, the FCCERS-R appears to be a valid measure of structural aspects of family child care quality.

Classroom Assessment Scoring System (CLASS)

The recently developed Classroom Assessment Scoring System (CLASS) (Pianta, La Paro, & Hamre, 2007) provides an assessment of the overall classroom for both home- and center-based child cares and preschools. Supported by developmental theory and empirical research, the CLASS measure is based upon the concept that interactions

between adults and children are the central mechanism of child learning and development (Burchinal et al., 2002; Buyse et al., 2009; Hamre & Pianta, 2005). The authors of the CLASS posited that the measure offers a way to assess and discuss classroom quality across the preschool to third grade period. Although the methods used by teachers change as children mature, the authors proposed that the dimensions used within the CLASS provides users with a common language and metric to discuss quality throughout these early grades (Pianta, La Paro, & Hamre, 2007). At its broadest level, the CLASS divides measures of classroom quality into three domains: Emotional Support, Classroom Organization, and Instructional Support. At a narrower level, each of these domains is divided into dimensions: Positive & Negative Climate, Teacher Sensitivity, Regard for Student Perspectives, Behavior Management, Productivity, Instructional Learning Formats, Concept Development, Quality of Feedback, and Language Modeling. Observers rate each dimension in 4 twenty-minute intervals using a 7-point Likert scale.

Limitations. A limitation in the CLASS is that only 9 indicators focus on classroom practice, and there are no items specifically related to mathematics and literacy (National Research Council, 2008). However, in an 11-state evaluation of preschool programs, the CLASS instructional climate score provided the best prediction of gains in language and literacy as compared to other measures (Howes et al., 2008).

Reliability. Through intensive training sessions that provide observers with a clear understanding of the instrument's purposes and procedures, the authors' own studies of the CLASS indicated that participants achieved an average interrater reliability of 87% (Pianta, La Paro, & Hamre, 2007). As with the ECERS-R training, CLASS training is time-consuming and expensive. The authors of the CLASS stated that

reliability may be attained only via certified instruction (Pianta, La Paro, & Hamre, 2007). Group training costs \$3,000, which covers three days of intensive instruction.

Validity. The CLASS is a relatively new instrument, yet there exists appreciable evidence that its results predict positive child outcomes. In fact, the Office of Head Start (OHS), per the Improving Head Start for School Readiness Act of 2007, lists the CLASS as the sole instrument deemed both reliable and valid for the purposes of assessing quality in Head Start programs (Office of Head Start, 2008). The CLASS dimensions are derived from extensive observations of teacher-child interactions and an extensive review of constructs assessed in other instruments (Pianta, La Paro, & Hamre, 2007). In regard to criterion validity, the domains of Emotional support, Classroom organization and Instructional support correlate with teacher reports of depression and adult-centered attitudes.

Concurrent validity was tested through a comparison with the ECERS-R and demonstrated that classrooms with higher CLASS scores were rated higher on interactions from the ECERS-R, with correlations ranging from 0.45 – 0.63 (Halle et al., 2010). Pianta et al. (2005) also reported that the CLASS has been compared to the Snapshot, a time-sampling measure, in order to assess the percentage of time spent on specific classroom activities. Because the CLASS does not assess the quantity of activities, there were low, albeit significant, correlations between the CLASS Instructional Support domain and the amount of time spent on literacy and math as measured by the Snapshot. The results showed that children in classrooms with high CLASS scores were more often engaged and spent more time in meaningful interactions with teachers (Halle et al., 2010).

In regard to predictive validity, results from the National Center for Early Development and Learning study showed that CLASS scores for classroom quality are associated with children's performance across the preschool year (Howes et al., 2008). In the correlational study noted in the ECERS-R section, Mashburn et al. (2009) noted that the CLASS was moderately predictive of academic, language and social emotional outcomes. The authors also noted that there was an association between low CLASS scores and problem behaviors. The most robust predictor of positive academic gains was Instructional Support. The Emotional Support domain was associated with improvement in children's expressive and receptive language scores, social competence, as well as decreases in teacher-reported behavior problems (Mashburn et al., 2008). Lastly, the Classroom Organization domain has been associated with children's self-control, engagement, and literacy gains (Ponitz et al., 2009; Halle et al., 2010).

Classroom Assessment Scoring System: Toddler Version (Toddler CLASS)

The Classroom Assessment Scoring System: Toddler Version (Toddler CLASS) is a more recent version of the CLASS measure geared toward assessing the quality of toddler child care. Washington State is the first state to include the Toddler CLASS in a QRIS system (Joseph et al., 2011). The format is very similar to the Pre-K and CLASS Elementary versions described above, with the instrument designed to capture process quality, rather than structural quality (Pianta, La Paro, & Hamre, 2008). The nine key dimensions are similar to the ones used the other CLASS measures, although the indicators have been altered to match the developmental levels of the children. The authors of the Toddler CLASS note that the measure can be used with children from 15 – 36 months.

Reliability. In a study performed by the authors, interrater reliability was established at 80% within 1 point on the scale across 5 videotaped segments (Thomason & La Paro, 2009). In regard to internal consistency, a Cronbach's α of 0.88 was obtained on the dimension related to Emotional Climate: Positive & Negative Climate; Teacher Sensitivity; and Regard for Student Perspectives. Per the above notes about the CLASS, training is expensive and time-consuming.

Validity. Per the other CLASS measures, the Toddler CLASS attained construct validity through a thorough review of existing measures, including the ITERS. Further, according to Thomason and La Paro (2009), the Toddler CLASS has been supported further by its correlation to other traditional measures of quality in early childhood education, including teacher education, group size, teacher-child ratio and child care quality rating systems. The authors reported that additional validity information would be forthcoming.

Classroom Assessment Scoring System - Combined Version ("Combined" CLASS)

Because family child cares typically include both toddlers and pre-K-aged children, a combined version was developed for the *Seeds to Success* field test by the Childcare Quality and Early Learning (CQEL) team (Joseph et al., 2011). The combined measure captured each of the items on both the Toddler and Pre-K scales, including 11 dimensions. A preliminary step was taken by the CQEL team to assess similarities between the Toddler and Pre-K versions at the level of behavioral indicators for the various dimensions. Overall, the research team compared and contrasted the individual dimensions and determined which dimensions measured unique facets of both toddler and preschooler behaviors. Within the Emotional Support domain, it was determined

that the indicators for each dimension were identical across the two measures (Joseph et al., 2011).

Regarding the Classroom Organization domain, it was determined that Behavior Management of the Pre-K version and Behavior Guidance of the Toddler CLASS were parallel in assessment of behavior. Thus, an inclusive term, Behavior Management, was used to describe both toddlers and preschoolers. It was also found that Productivity and Instructional Learning Formats were applicable only to preschoolers. Therefore, these two dimensions were only used to rate preschool-aged children and their providers.

Lastly, within the Instructional Support domain, the CQEL team found that the Concept Development dimension only applied to preschool-aged children, and the Facilitation of Learning and Development dimension was only applicable to toddlers. The indicators for Quality of Feedback and Language Modeling were found to be identical. Therefore, a single rating was used to rate classroom experiences of both toddlers and preschool-aged children (Joseph et al., 2011). Because this measure was developed for the *Seeds to Success* study, there are no validity or reliability data available that are distinct from the individual CLASS measures.

Validity. In regard to face validity, the “Combined” CLASS appears to be a useful measure of process quality in a family child care home that includes aspects of both the preschool CLASS and the Toddler CLASS. Because the CLASS measure is designed to promote understanding of child development across preschool and school settings, the “Combined” CLASS is a rather natural amalgam of the two measures (Pianta, La Paro, & Hamre, 2007).

Summary of Environmental Measures

The evidence above shows that both the FCCERS-R and “Combined” CLASS are important, if not critical, measures of quality in family child care. Because family child care is generally of poor quality and in need of both monitoring and improvement, it is necessary to use instruments that are both accurate and cost-effective. While both instruments are presented as “global” measures by their respective authors, they clearly measure different aspects of child care, with the “Combined” CLASS measuring process, and the FCCERS-R capturing both structural and process aspects of quality, but skewing heavily toward structure. While the FCCERS-R (and its predecessors, the FDCERS and FCCERS) have been the dominant methods of measuring quality in family child care, there is evidence that the CLASS measures are gaining in stature, and this fact could translate into the “Combined” CLASS becoming an important future measure. The increased prominence of the CLASS is supported by convincing evidence related to center care and preschool presented by Mashburn and his colleagues (2009) showing that the CLASS better predicted child outcomes, such as aspects of school readiness, than did the ECERS-R. While the Mashburn et al. study casts doubt on the utility of the ECERS-R (and by extension, its derivative measures, such as the FCCERS-R) in predicting school readiness, there have been earlier studies that indicate the ECERS-R predicts both social skills and language development (e.g., Burchinal et al., 2000; Howes et al., 1992). In other words, while the CLASS model of quality measurement is proving ascendant, it is difficult to ignore the historical importance of the ECERS-R and the FCCERS-R. Therefore, due to both the prominent use in research and the predictive abilities of the FCCERS-R and “Combined” CLASS, it is important to learn more about how they

interrelate to one another. Because of the sheer expense and effort required to implement both measures, it is very useful to know whether or not they correlate with one another. If they are redundant, perhaps there are ways to reduce one or both measures in order to reduce the costs of implementation.

Proposed Study

Statement of the Problem

A large body of research has demonstrated that children make substantial gains in high quality child care programs in regard to school readiness and other child outcomes, such as health and long term social gains (e.g., Belsky et al., 2007; Kontos et al., 1995; Martin et al., 2008; Schweinhart et al., 2005). While there is much less evidence specifically associating high quality family child care with outcomes, the evidence that exists suggests that children in family child care would benefit as much, or perhaps even more, than children in center care from high quality care (Barnett, 2008; Downer & Pianta, 2006). The reason for this is that children in family child care are often disadvantaged relative to other types of care, and the evidence strongly suggests that children who are disadvantaged benefit disproportionately from high quality care (e.g., Belsky et al. 2007; Burchinal et al., 2002; McCartney et al., 2007; Raikes et al., 2005). Unfortunately, children in family child care are often afforded quality of care that is quite poor (Raikes et al., 2005). Quite simply, family child care is in dire need of improvement. In order to improve family child care systematically, it is patently necessary to use instruments that are accurate, cost-effective, and whose measurements relate to child outcomes, including school readiness. While there is considerable scientific agreement about the association between high quality child care programs and

positive child outcomes, there is much less agreement regarding the best way to measure quality regarding child care (Barnett, 2008; National Research Council, 2008).

Historically, researchers had relied on structural measures to determine quality (Barnett, 2008). Less complex and more regulable than process measures, structural measures are still prominent features of many child care regulations (Raikes, Raikes, & Wilcox, 2005). More recently, however, there has been an increased emphasis on using process measures to determine program quality (Mashburn et al., 2009). This trend is supported by theory and research (Mashburn et al., 2009). Ecological-systems theories in particular emphasize the importance of proximal interactions between individuals and the environment in determining development (Bronfenbrenner, 1979), while recent correlational studies have demonstrated that process measures are more sensitive to levels of classroom quality than structural measures (e.g., Mashburn et al., 2009).

Two family child care environmental measures, the FCCERS-R and the “Combined” CLASS, are designed to evaluate global quality. Despite the increased understanding of how well specific measures determine global quality, there is still much that is not known about how well these measures capture quality and whether or not they capture the same aspects of quality. For this study, there is also concern that very little is known regarding the comparison of the FCCERS-R and “Combined” CLASS measures with family child care populations. Because the “Combined” CLASS and FCCERS-R are expensive to implement, it is crucial to determine whether or not they measure distinct aspects of child care quality.

Purpose of the Study

The purpose of this study is to compare and contrast the FCCERS-R and “Combined” CLASS global environmental measures regarding quality of family child care. Specifically, this study is focused on which aspects of family child care quality are being measured. This secondary data analysis will focus on examining the relationship between the subscales and items of both the “Combined” CLASS and the FCCERS-R. In other words, do they measure the same thing? If they do measure similar aspects of family child care, it might be possible to reduce the number of subscales or items in order to make the process of measurement more efficient and cost-effective. This study examined the correlations between the two measures during the pilot study of Washington State’s Quality Rating Improvement Program, the 2010-2011 *Seeds to Success*. The specific research questions are as follows:

Research question #1: What degree of within-scale overlap (i.e., correlation) exists within the subscales of the FCCERS-R and “Combined” CLASS? There were two separate analyses to address this question, one for each environmental measure.

Hypothesis #1: It was hypothesized that within each measure, most subscale scores will be moderately to highly correlated. If this is the case, it provides support for identification and dimension reduction.

Research question #2: Building on the results of research question #1, what is the relationship between the FCCERS-R and “Combined” CLASS domains?

The purpose of this question is to address the linear relationship of the two environmental measures. In other words, how much of the variance is shared among the two measures?

Hypothesis #2: It was expected that there would be some domain overlap in the form of moderate correlation coefficients, particularly regarding the domains that relate to interaction.

Research question #3: Using a cross-battery approach, is there sufficient correlation (i.e., common co-variance) among the items from both measures to reduce the dimension structure of the scales?

The purpose of this question is to determine what unique, uncorrelated dimensions would result if a cross-measure or cross-battery approach were used. The question holds important implications for the efficiency of assessing the care settings as well as financial implications.

Hypothesis #3: Without knowing the results of the principal component analysis, a hypothesis is difficult to pinpoint. However, based on previous research it is likely that the two measures possess distinct domains.

CHAPTER 3

Methods

Seeds to Success

Data for this secondary analysis are from the baseline evaluation of the *Seeds to Success Modified Field Test, Year Two*, which was overseen by the Department of Early Learning and Thrive by Five Washington. *Seeds to Success* is the pilot program for Washington State's Quality Rating and Improvement System (QRIS). In this section, the participants, measures, and procedures of the *Seeds to Success* will be described, followed by a description of the analyses for the proposed study.

Participants

Data were collected from a sample of 50 preschool classrooms and 45 toddler classrooms from 50 child care centers across five Washington State communities: Clark, East Yakima, Kitsap, Spokane, and White Center. A total of 4,532 children participated in the pilot study. For the purposes of this analysis, 42 family child care centers drawn from each community provided data for this analysis. Participants were female and were ethnically representative of Washington state. There were 2 measures collected for the *Seeds to Success* research study in regard to family child care. Both measures are described below along with their psychometric properties.

Measures

Classroom Assessment Scoring System – (“Combined” CLASS). As discussed earlier, the CLASS measures the overall quality of interactions in the classroom (Pianta, LaParo, & Hamre, 2007). The measure is divided into three domains: Emotional

Support, Classroom Organization, and Instructional Support. Each of the domains is comprised of either three or four dimensions of quality that are scored on a Likert scale of 1 – 7 based upon the presence or absence of specific indicators. Emotional Support is comprised of three dimensions: Positive and Negative Climate, Teacher Sensitivity, and Regard for Student Perspectives. Classroom Organization is comprised of Behavior Management, Productivity (Pre-K only), and Instructional Learning Formats (Pre-K only). Instructional Support is comprised of Concept Development (Pre-K only), Quality of Feedback, Language Modeling, and Facilitation of Learning and Development (Toddler only).

As listed above, each domain is comprised of dimensions of quality based on the presence or absence of specific indicators observed in the classroom or child care home (Pianta, LaParo, & Hamre, 2007). Researchers used the “Combined” CLASS, which was comprised of both the CLASS and a pilot version of the Toddler CLASS. The “Combined” CLASS was developed specifically for the *Seeds to Success* study by the Childhood Quality and Early Learning Center for Research and Training (CQEL) at the University of Washington. This is the first study in which the “Combined” CLASS was used.

CLASS measurement. Video footage of child care home and centers were used to code interactions. This method is an accepted practice of the CLASS authors and has been used in previous studies (Pianta, LaParo, & Hamre, 2007). In each of the five communities listed above, trained videographers filmed two hours of footage in each classroom or child care home. One videographer was used for each site visit. Videographers were recruited for each site and were trained in the use of Kodak pocket

video cameras via a webinar that lasted approximately one hour. The webinar focused on using correct angles and using wide-angle shots as often as possible. The webinar included visual examples of both well- and poorly-framed shots. Videographers used a monopod to ensure clear footage. Videographers signed an agreement that they would abide by specifics of a protocol produced by CQEL. Videographers were instructed to stay in areas that would not intrude on either staff or children. Specifically, *Seeds* protocol required videographers to avoid interacting with staff and children.

Videographers were also instructed to avoid filming ERS coders, who were typically at the same site at the same. (Generally ERS measures and CLASS videos were collected at the same time to limit intrusion into the child care settings.) Footage did not include any activities that took place outside, e.g., typical outdoor play. Videographers were encouraged to be silent while filming. Videographers were instructed to focus on the Lead Teacher, per CLASS protocol. CLASS videographers were instructed to begin filming as soon as children began arriving. Upon commencement of filming, videographers first swept the child care center or home and then focused on the primary caregiver and her interactions with children across different activities. The overarching goal for videographers was to capture a holistic picture of the particular classroom or home. Two hours of footage was required for each visit. Quick pans were discouraged, and slow pans were recommended in order to reduce distractions. Videographers were instructed to angle the camera for a broad shot of the classroom or home, with consistent focus on both the caregiver and children. In family child care home, where it was often more difficult to capture a single wide view, videographers were encouraged to pan slowly between activities, particularly when children were segregated into specific age

groups. Videographers were instructed to focus on the faces of children and caregivers. During small group activities, videographers were advised to focus attention on the teacher, but also to pan the camera through the classroom slowly. Videographers were instructed that student engagement was a crucial facet of filming. Videographers recorded visual and auditory data of both children and caregivers. Within 1 day of the visit, the videographers were required to mail the videotapes to a team of trained coders at the University of Washington.

Videos were coded within 1 – 2 days of arrival at CQEL. Coders were trained by Karen LaParo, one of the co-authors of the CLASS measures and CQEL team leader, Gail Joseph, a certified CLASS trainer. Coders were required to reach 80% interrater reliability across five training videos. In order to achieve reliability on an individual domain, coders were required to score within a single point of the target score. Furthermore, coders were required to achieve 80% reliability with a single video from the team gold standard. Consistent with CLASS coding guidelines, raters coded four 20-minute segments of video, using 10 minutes to code each segment. Coding occurred at the CQEL office. Coders sat in private cubicles and used computers with headphones. The initial coder on a specific video chose the four segments of video that were most amenable to coding (i.e., contained the most clear activities between children and caregivers). Following raters coded the same time segments. Reliability checks were employed throughout the year in order to maintain interrater reliability. The videos were de-identified and kept in a secure location. Particular attention was paid to video production quality, with CLASS coders rating videos on a 7-point Likert-scale related to the overall quality of the video. Across all videos, the mean score was 5.50. Trained

observers visited child cares for live coding when videotaping was not possible due to cultural prohibitions to videotaping (Joseph et al., 2011). Across the six Preschool CLASS coders who met these standards, the mean agreement was 87%. Across the five Toddler CLASS coders who met the above standards, there was a mean agreement of 90%.

Environmental Rating Scales (ERS). Each of the three ERS instruments (ECERS-R, FCCERS-R, and ITERS) were used in the pilot study. The 38 items on the scale are divided into seven subscales: Space and Furnishings, Personal Care Routines, Listening and Talking, Activities, Interaction, Program Structure, and Parents and Provider.

ERS measurement. Trained observers visited child care homes to conduct live scoring of the FCCERS-R (Joseph et al., 2011). Coders were trained by Anthippy Petras, CQEL's Director of Reliability and Training. Trainees were required to pass a series of two interrater reliability assessments against the trainer's ratings. Reliability checks were completed and documented by each coder prior to observations using live classroom observations. Reliability spreadsheets could be downloaded from the CQEL internal website and uploaded into the appropriate online drop-box. Across both trainings and reliability checks, the mean FCCERS-R agreement was measured at 93% (Joseph et al., 2011).

Coders were instructed to spend at least 3 hours in each setting while coding, and visits often exceeded this time limit considerably in order to capture certain activities (e.g., naptime). It was not unusual for scoring to last 4 -5 hours. During the observation coders wrote notes and scored on a paper scoring sheet. Before ERS coding started, coders noted the number of children and caregivers and age ranges of children in a

particular setting on the scoring sheet. Unlike CLASS videotaping, if there were more than one provider, coders were instructed to average the quality of interactions of both providers. Similar to CLASS videographer protocol, ERS coders were instructed to be as unobtrusive as possible and avoid interactions with children and caregivers unless absolutely necessary. Coders were advised to stay in corners or on the edges of rooms whenever possible. Because ERS coders were required to search for specific materials (e.g., dress-up materials for dramatic play) or be close enough to overhear caregiver-child verbal interactions, it was in fact impossible to avoid some interactions with children. In case of inadvertent interactions, coders were advised to respond minimally, e.g., responding to questions with, “I’m here to visit this morning.” Coders were instructed to remind caregivers that they should not alter activities to meet specific expectations. Coders were also instructed to ask caregivers for permission before opening drawers or cabinets. As with the CLASS coding, coders then entered scores into a secure online form via *Survey Monkey*, and the original scoring sheet was mailed back to the UW team. If there were any questions about scoring a particular item, coders could post queries on a project discussion board featured on the internal CQEL website. By maintaining two sets of data, the UW team ensured that multiple copies of data existed (Joseph et al., 2011).

Procedure

The *Seeds to Success* research team filed an opt-out application with the University of Washington Internal Review Board due to the fact that the study involved no outcome data. Once approved, consent forms were sent to the various teachers and caregivers at individual sites. The *Seeds to Success* researchers used a quasi-experimental model to evaluate the effects of coaching, professional development, and

financial incentives on classroom quality (Joseph, Feldman, Brennan & Cerros, 2010). The pilot study was used to determine whether or not the *Seeds to Success* model could feasibly be expanded across the state (Joseph et al., 2010). Participating providers volunteered to enroll in Washington State Department of Early Learning QRIS field test. Due to budget constraints in 2008, the field test was suspended. However, Thrive by Five implemented a modified version of the field test and invited providers who had volunteered originally. Baseline data were collected in the fall of 2010, and post data were gathered in spring of 2011. Treatment groups were provided with coaching in which videotaped classroom activities were used to inform both didactic and reflective support. Coaches and participants were allowed significant freedom in regard to the ways in which the training could occur. Coaching topics included curriculum and learning environment, relationship development, leadership and management practices, and family and community partnerships (Del Gross et al., 2010). Caregivers and coaches were responsible for devising Quality Improvement Plans (QIP) in order to guide program improvement. Treatment group participants also received didactic materials in support of literacy and working with mixed-age groups. Caregivers also attended professional development trainings in which they were given information about Washington State Early Learning and Development Benchmarks (Del Grosso et al., 2010).

In the five communities chosen to participate in the *Seeds to Success* pilot study, 7,200 hours of coaching were provided to participants, and over \$300,000 in incentives was disbursed in the form of scholarships for caregivers, professional development support, release time for professional development activities, quality improvement grants

(in White Center and East Yakima), and assessment grants (Del Grosso et al., 2010). On average, coaches delivered an average of four coaching sessions per month for family care providers, center directors, and teachers, totaling 6 to 11 hours per month.

Statistical Analyses for Research Questions

All data analyses were carried out using SPSS Version 19.0.0, and all statistical analyses were carried out with an α threshold of 0.05. Descriptive statistics were used to describe the measures, the subscales and their psychometric properties. Individual item response patterns were examined to identify any potentially problematic missingness. Histograms were examined to assess whether there was sufficient variance within each item to be included in correlational analysis and to identify items exhibiting non-normal response patterns.

Question #1 was answered through an examination of the within scale correlation matrices. When examining the relationship between these subscales, correlational analyses are appropriate because they characterize the common co-variance between two continuous scale measures.

Question #2 was answered through an examination of subscale correlations across both instruments. This analysis included each of the 10 subscales of both the FCCERS-R and “Combined” CLASS measures, and because all subscale measures are continuous, Pearson’s r correlations are appropriate.

With respect to question #3, a principal component analysis was carried out with 48 individual items of both the FCCERS-R and the “Combined” CLASS (38 FCCERS-R items and 10 “Combined” CLASS items). Principal component analysis is appropriate to identify underlying dimensions that drive co-variance patterns among individual items.

Items with minimal or no variance, such as Negative Climate, were excluded from the correlational analysis because minimal variance suggests that the items did not discriminate well between child cares. Scree plots of the FCCERS-R and “Combined” CLASS measures guided identification of the underlying dimensional structures, along with inspections of component loadings and item content.

CHAPTER 4

Results

This study is a cross-sectional, secondary data analysis examining the relationship of two early childhood environmental quality measures: the FCCERS-R and the “Combined” CLASS. Table 1. presents a description of the FCCERS-R and “Combined” CLASS scale and subscale scores from the *Seeds to Success Modified Field Test, Year Two*.

A total of 38 family child cares were evaluated using the FCCERS-R, and a total of 34 family child cares were evaluated using the “Combined” CLASS; a total of 30 family child cares were evaluated using both measures. The reason for this disparity is due to the fact that the “Combined” CLASS was only used in family child cares that served a combined group of both toddlers and preschool-aged children, but was not used when only toddlers or preschoolers were attending. In these cases, either the Toddler CLASS or the standard CLASS measure was used. In contrast, the FCCERS-R was developed to measure child care quality from birth to age 12 and thus was used across child care type.

There was no item-level missingness in the CLASS scoring. In contrast, the FCCERS-R sanctions excluding item-level scoring when appropriate. For example, some child cares did not offer services for children with disabilities, some offered no sand and water play, some did not have audio and visual materials, and some did not have sufficient enrollment to measure child interactions and group time.

Table 1. Combined CLASS and FCCERS-R Subscales

Measures	M	SD	Range
<u>FCCERS-R (<i>n</i> = 38)</u>			
Space and Furnishings	3.88	1.30	1.67-6.50
Personal Care Routines	2.74	1.09	1.17-6.50
Listening and Talking	4.50	1.41	1.33-6.67
Activities	3.31	1.05	1.70-5.91
Interaction	5.25	1.45	2.25-7.00
Program Structure	5.05	1.64	1.00-7.00
Parents and Provider	5.17	1.15	2.50-7.00
<u>CLASS (<i>n</i> = 34)</u>			
Emotional Support	5.79	0.46	5.00-6.75
Classroom Organization	5.11	0.77	3.67-7.00
Instructional Support	2.79	0.72	1.75-4.50

The lowest subscale score of the FCCERS-R was for Personal Care Routines, and the highest subscale score was for Interaction. The widest range of scores on the FCCERS-R data was observed in the Program Structure subscale, with scores ranging from 1.00 to 7.00. The lowest subscale score of the “Combined” CLASS was for Instructional Support, and the highest subscale score was for Emotional Support. The widest range of data for the “Combined” CLASS occurred in the Classroom Organization subscale.

Inspection of item level score distributions revealed that the majority were sufficiently normal to proceed with the correlational analysis. Inspection of histograms indicated that less than 1/3 (*n* = 10) of items exhibited potentially problematic departures

from normality. Item level distributional analyses outlined in Table 2 identified 8 of these 10 items with statistically significant non-zero kurtosis, and two of these were excluded from further analysis due to prohibitively high kurtosis and their potential to distort findings in dimensionality assessment.

Table 2. Item Level Score Distributions

	Mean	SD	Kurtosis	% Missing
FCCERS-R items				
Furniture for routine care, play and learning	3.71	1.87	-.68	9.5%
Meals/snacks	1.74	1.48	4.70	9.5%
<i>Music</i>	3.37	1.62	.14	9.5%
<i>TV and video</i>	3.48	2.02	-.78	35.7%
Math/number	3.37	1.38	.51	9.5%
<i>Dramatic play</i>	4.00	1.77	-1.02	9.5%
<i>Provisions for professional needs</i>	5.92	1.46	1.15	9.5%
Blocks	3.58	2.00	-.96	9.5%
Space for privacy	3.74	2.40	-1.56	9.5%
Sand and water play	3.24	2.13	-1.13	11.9%
Use of books	3.61	1.94	-.93	9.5%
Free play	4.84	2.07	-1.29	9.5%
Helping children use language	4.82	1.57	-.36	9.5%
Promoting acceptance of diversity	2.82	1.09	5.19	9.5%
Supervision of play and learning	4.95	2.13	-1.10	9.5%
Discipline	4.87	1.68	-.75	9.5%
Schedule	4.92	2.25	-.99	9.5%
Provision for relaxation and comfort	4.76	1.46	-.97	9.5%
Arrangement of indoor space for child care	3.21	2.31	-1.15	9.5%
Interactions among children	5.26	2.05	-.26	19.0%
Indoor space used for child care	4.87	1.70	.68	9.5%
Health practices	2.32	1.74	.78	9.5%
Provisions for parents	4.89	1.41	.63	9.5%
Provider-child interactions	5.89	1.64	.51	9.5%
<i>Fine motor</i>	3.42	1.90	-.98	9.5%
<i>Active physical play</i>	1.34	.878	21.98	9.5%
Art	3.95	2.05	-1.20	9.5%
Nap/rest	2.65	2.40	-.57	11.9%
Display for children	3.00	1.19	2.02	9.5%
Diapering/toileting	1.92	1.65	2.60	9.5%
Nature/science	3.84	1.60	.17	9.5%
Opportunities for professional growth	5.11	1.66	.037	9.5%
Helping children understand language	5.08	1.73	-.27	9.5%
Group time	5.47	1.81	.067	19.0%
Greeting/departing	5.84	1.82	.161	9.5%
Safety practices	1.97	1.60	1.77	9.5%
“Combined” CLASS items				
Quality of feedback	2.97	1.27	-.33	19.0%
Teacher sensitivity	5.47	.71	-.06	19.0%
Positive climate	5.50	.96	-.50	19.0%
<i>Negative Climate</i>	1.03	.17	34.00	19.0%
Language modeling	4.06	1.01	-.36	19.0%
Behavior management	5.53	.90	-.65	19.0%
Facilitation of learning and development	2.59	1.10	-.71	19.0%
Productivity	5.53	1.16	1.55	19.0%
Instructional learning formats	4.29	1.22	.81	19.0%
Concept development	1.56	.66	-.39	19.0%
Respect for student perspectives	5.24	.86	.16	19.0%

Bolded items indicate statistical significance

Table 3 presents intra- and cross-scale correlations for the FCCERS-R and the “Combined” CLASS.

Table 3. FCCERS-R and “Combined” CLASS Scale and Subscale Correlations

FCCERS-R	1	2	3	4	5	6	7	8	9	10
Space	.									
Personal	.73	.								
Listening	.64	.58	.							
Activities	.74	.65	.59	.						
Interaction	.63	.53	.75	.54	.					
Program	.64	.49	.43	.65	.49	.				
Parents	.44	.33	.50	.49	.38	.24	.			
CLASS										
Emotional	-.09	.18	.05	.02	.06	.16	-.24	.		
Classroom	.19	.25	.13	.09	.06	.05	.00	.47	.	
Instruction	-.01	.16	-.11	.08	-.06	.14	-.25	.65	.62	.

All coefficients in bold denote statistical significance at $p < 0.05$

With the exception of the Program Structure and Parents and Provider pair, all correlation coefficients within the FCCERS-R subscales were statistically significant at an 0.05 α level. Per Cohen (1992), for this study, correlations of 0.50 and above are considered strong correlations; coefficients between 0.30 and 0.50 are considered moderate; and coefficients from 0.10 to 0.30 are considered small. The highest correlation within the FCCERS-R scale was observed between the Interaction and Listening and Talking subscales ($r = 0.75$), followed closely by the comparison of Space and Furnishings and Activities ($r = 0.74$) and also Personal Care Routines and Space and Furnishings ($r = 0.73$). With respect the “Combined” CLASS intra-scale correlations, the highest coefficients were observed between Emotional Support and Instructional Support ($r = 0.65$). The lowest correlation occurred between the Emotional Support and Classroom Organization subscales ($r = 0.47$), but all were statistically significant. With respect to the covariance shared among subscales from both measures, none of the correlation coefficients reached statistical significance, with the strongest correlation observed at - 0.25.

Before principal component analysis was carried out on the combined items of both the FCCERS-R and “Combined” CLASS measures, specific items were removed from analysis due to either missingness or insufficient variance. On the FCCERS-R, the following two items were excluded due to missingness: Children with disabilities; Use of TV, video, and/or computer. One FCCERS-R item, Active physical play, was excluded due to insufficient variability. One CLASS item, Negative Climate, had zero variance, with each score equaling 1 on the Likert scale.

A scree plot figure was used to examine principal component analysis on the remaining items. Three primary factors were identified through scree plot examination (Figure 1) that accounted for 41.96% of the variance (below elbow) (Table 4).

Figure 1. Scree plot of dimensional structure

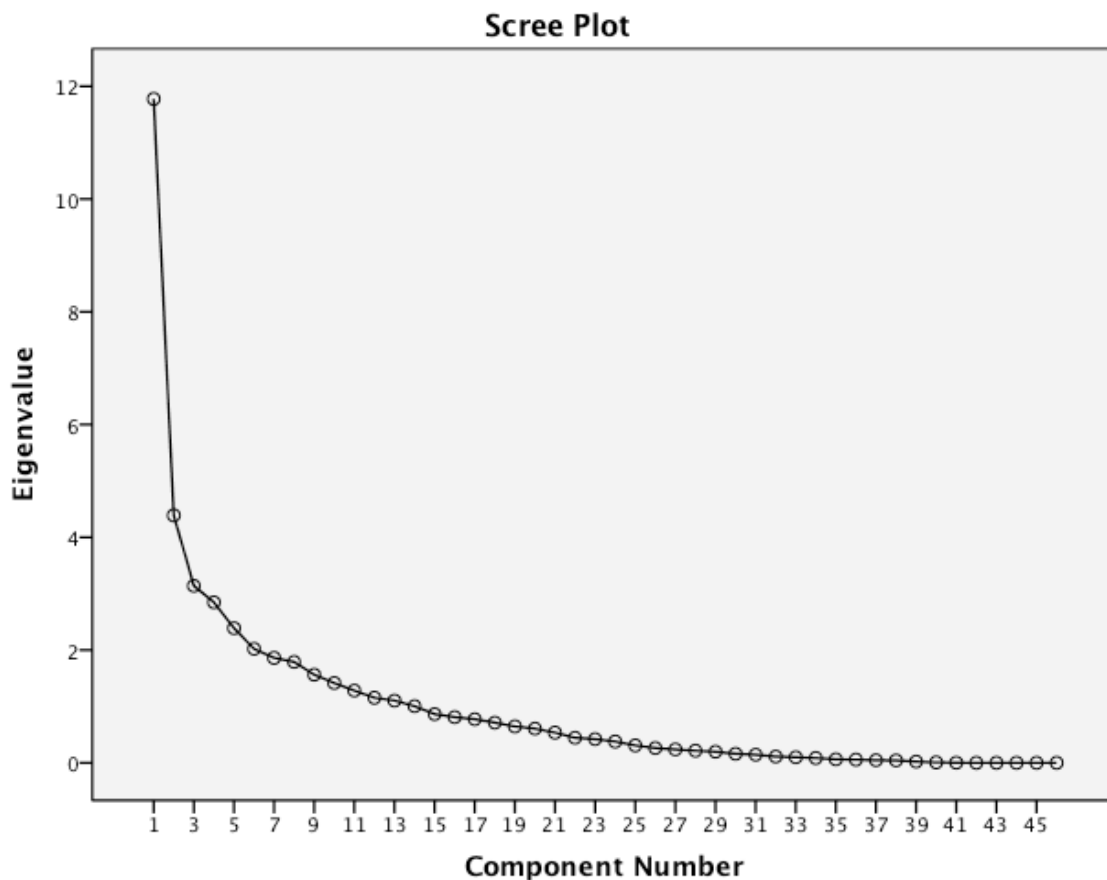


Table 4. Identified components, eigen values, and variance explained

Components	Total (eigenvalue)	% of variance
1. FCCERS-R Structure	11.78	25.60
2. CLASS Process	4.39	9.54
3. CLASS Intellectual Development	3.14	6.83
Total	19.31	41.96

The items that loaded onto the 3 components are shown below in Table 5. Items that loaded onto Component 1 came exclusively from the FCCERS-R and included 30 items. The FCCERS-R items are wide-ranging and might be conceptualized best as a structural measure. Component 2 is comprised of items solely derived from 7

“Combined” CLASS items. Component 2 can be conceptualized best as a measure of process. Component 3 is comprised of 3 “Combined” CLASS items. Component 3 might be conceptualized best as a measure of intellectual development.

Table 5. FCCERS-R and “Combined” CLASS components and loadings

Item	Components		
	1	2	3
FCCERS-R items			
Furniture for routine care, play and learning	.801		
Math/number	.753		
Blocks	.737		
Space for privacy	.730		
Dramatic play	.701		
Sand and water play	.686		
Use of books	.671		
Free play	.654		
Helping children use language	.644		
Promoting acceptance of diversity	.617		
Supervision of play and learning	.613		
Discipline	.609		
Schedule	.605		
Provision for relaxation and comfort	.605		
Arrangement of indoor space for child care	.598		
Helping children understand language	.593		
Interactions among children	.578		
Indoor space used for child care	.569		
Health practices	.557		
Provisions for parents	.528		
Provider-child interactions	.526		
Art	.525		
Nap/rest	.520		
Display for children	.491		
Diapering/toileting	.484		
Nature/science	.483		
Opportunities for professional growth	.476		
Group time	.461		
Greeting/departing	.439		
Safety practices	.415		
CLASS items			
Quality of feedback		.837	
Teacher sensitivity		.796	
Positive climate		.745	
Language modeling		.650	
Behavior management		.625	
Facilitation of learning and development		.576	
Productivity		.516	
Instructional learning formats			.722
Concept development			.545
Respect for student perspectives			.487

CHAPTER 5

Discussion

This study examined the relationship between two prominent instruments for measuring child care quality in family child care settings: the FCCERS-R and “Combined” CLASS. This study was the first of its kind to employ the “Combined” CLASS measure. The three major aims of this study were to: 1) examine the within-scale overlap of the subscales; 2) examine the relationship between the FCCERS-R and “Combined” CLASS domains, and 3) examine the underlying variance structure for all items from both measures. The answers to these questions could help make assessment of family child care settings more efficient and cost-effective and also less intrusive.

This is important because family child care settings are generally of poor quality and serve millions of disadvantaged children in North America (Belsky et al., 2007). Evidence suggests that disadvantaged children benefit disproportionately from high quality care (Downer & Pianta, 2006). Therefore, there is much to gain from improving family child care. By streamlining the process to measure quality of child care, it might be possible to develop systems to improve family child care on a broad basis.

As had been hypothesized, most within-scale subscale scores were moderately to highly correlated. This finding aligns with previous research examining both the ECERS-R (e.g., Munton, Rowland, Mooney, & Lera, 1997) and CLASS measures (Pianta et al., 2007). For instance, studies have shown that the ECERS-R, from which the FCCERS-R is derived, does not contain 7 distinct measures of classroom quality (as the authors claim), but perhaps 1 or 2 distinct factors (Munton et al., 1997; Scarr, Eisenberg & Deater-Deckard, 1994). While the “Combined” CLASS has not been evaluated

previously, research involving the preschool CLASS measure has demonstrated moderate to high correlations across subscales (Pianta et al. 2007). The answers to Question #1 laid the groundwork for the following questions by confirming the intra-subscale cohesiveness of the two measures.

In regard to aim #2, while it was expected that there would be some domain overlap in the form of moderate correlation coefficients, particularly regarding the domains that relate to interaction, results show that there were only small correlations across subscales between the two instruments. It was noted that the highest correlation between the FCCERS-R Interaction subscale and any of the “Combined” CLASS subscales (which all putatively measure “interaction”) was 0.19. From this result, it can be concluded that the FCCERS-R and “Combined” CLASS are measuring interaction in different ways. Considering that the CLASS measure is specifically designed to capture interactions, these data thus provide evidence that while the FCCERS-R measures a global notion of family child care, perhaps it does not capture more nuanced aspects of family child care particularly well.

In regard to underlying dimensions shared between both measures, three primary components were identified: “Structure” (FCCERS-R; 26 items), “Process” (CLASS; 7 items), and “Intellectual Development” (CLASS; 3 items). These findings suggest an opportunity to reduce the number of items used to assess child care quality within each of these underlying domains. This is important for efforts aimed at increasing efficiency in assessment, particularly in an era of decreasing educational financial resources. Broadly, the evidence from this study supports the assertion that the FCCERS-R and “Combined” CLASS are measuring different aspects of child care quality.

A Collapsed Scale

Evidence from this study suggests that a collapsed scale could be created using a cross-battery approach, as has been performed in other assessment areas (Flanagan, Ortiz, & Alfonso, 2007). As noted above, the data suggest that a new instrument composed of both the FCCERS-R and “Combined” CLASS would have three separate components: structure; process; and intellectual development. All of the items that comprised Component 1 (Structure) came from the FCCERS-R. Of the 30 items that comprised the “Structure” component, 10 items are associated directly with what can be termed structural elements: Indoor space used for child care; Furniture for routine care, play, and learning; Provision for relaxation and comfort; Arrangement of indoor space for child care; Display for children; Space for privacy; Blocks; Dramatic Play; Schedule; and Opportunities for professional growth. Seven more items contain elements of process (e.g., interactions between children and caregivers), but are much more heavily weighted toward structure: Nap/rest; Art; Math/number; Nature/science; Sand and water play; Promoting acceptance of diversity; Provisions for Parents. As an example, the majority of indicators of Sand and water play include references to the availability of materials related to Sand and water play (i.e., structural elements), but there is an indicator that requires that supervision be appropriate for the children based on ages and abilities (i.e., a process element). Therefore, because these 7 items are largely structural, they should be included within Component 1. The remaining 13 items that loaded onto this component fall squarely outside of a notion of “Structure.” These 13 elements are as follows: Greeting/Departing; Diapering/Toileting; Health practices; Safety practices; Helping Children understand language; Helping children use language; Using books; Supervision

of play and learning; Provider-child interaction; Discipline; Interactions among children; Free play; Group time. While there are aspects of each of these 13 items that reflect structural elements, each item would be impossible to measure without observing interactions between caregivers and children. For instance, while the Using books item contains indicators that reflect availability of books (i.e., a structural measure), it is not possible to score high on this item without observations of caregivers reading to children or encouraging children to read. Therefore, once these 13 items have been removed from Component 1, 17 items ultimately fit adequately within a “Structure” component. Therefore, Component 1 is comprised of these 17 items.

It should be noted that it might be possible to reduce the number of items in Component 1 further by removing the items that do not load as highly as the other “Structural” items and also those that do not seem to fit as a structural measure in terms of content validity. In other words, if Component 1 is indeed a measure of structure, then the fewest and best items that characterize the domain could be incorporated into a revised measure, while those that seem secondary in terms of validity and psychometric performance could be removed. For instance, 5 items loaded above .7: Provision for relaxation and comfort, Math/number, Blocks, Space for Privacy, and Dramatic Play. It is possible that these items might best serve as a measure of the underlying structural component. Further, as will be shown below, items on Component 1 that relate to process could be considered for removal because the basic content of these measures are already included in Components 2 and 3, which both relate to process.

It should also be noted that the decision to reduce dimension structures requires statistical and conceptual evidence; this study only provides preliminary evidence. It is

also important to note that one should be cautious in reducing a measure to fewer items based upon the practical application of an instrument. In the case of this particular study, program monitoring was a crucial aspect of using these environmental measures. If individuals running family child cares became aware that a reduced scale existed, it might be possible for them to tailor their environments to meet the limited demands of the test.

All items that loaded onto Component 2 came from the “Combined” CLASS measure. Component 2, which might best be conceptualized as a measure of “Process,” is comprised of items solely derived from 7 “Combined” CLASS items (see Table 5). Largely because the CLASS is designed as a process measure, all of these measures are closely associated with process and can be included in Component 2. Because CLASS items are coded simultaneously, there is no reason to collapse this component any further because it would not reduce the amount of time required to complete the assessment, and thus no efficiency would be gained.

Each item that loaded onto Component 3 came from the “Combined” CLASS measure. Component 3, which might be conceptualized best as a measure of “Intellectual Development,” is comprised of 3 “Combined” CLASS items: Instructional Learning Formats; Concept Development; and Regard for Student Perspectives. Each of these subscales can be included in Component 3. It should be noted that Regard for Student Perspectives is conceptualized on the CLASS instrument as an aspect of Emotional Support. However, Regard for Student Perspectives not only reflects a caregiver’s sensitivity to emotional needs, it also relates to the capacity of a caregiver to respond to the unique intellectual and academic needs of a child. Therefore, it fits easily under the rubric of Intellectual Development.

Health and Safety

While the collapsed scale might provide a useful and reliable measure of overall child care quality, incorporating notions of both structural and process elements, it could be argued that there is one significant limitation that should be addressed: it does not include items focused on health and safety issues. While one could posit that these issues are best addressed by state and county licensing agencies, perhaps it would be prudent to include three items from the FCCERS-R that loaded onto Component 1 but did not fit the definition of process: Diapering/toileting; Health practices; and Safety practices. While it might be anticipated that family child cares that scored high on the proposed collapsed measure would likely also be safe and sanitary, issues of safety and health are paramount and perhaps be included within this collapsed scale.

The Utility of a Collapsed Scale

The development of a collapsed scale, if one were created and demonstrated to be both valid and reliable, could greatly reduce the time, effort and resources needed to administer the FCCERS-R but not the “Combined” CLASS. In particular, it would alleviate the need to administer the entire FCCERS-R, reducing the number of items used from 43 to 17 (or perhaps even fewer). Because the FCCERS-R requires observations of specific times (e.g., nap time, meals and snacks), a collapsed measure would significantly reduce the time needed to administer the entire FCCERS-R. It is not uncommon to require 4-5 hours to administer the entire battery. A reduced scale might only take an hour, thus saving as much as 4 hours from an observation. Beyond saving resources and being more efficient, a shorter observation time would also be much less intrusive for the family child cares.

Beyond the actual time to administer a collapsed FCCERS-R scale, there is reason to believe that training would be simpler than that related to the full measure. Structural elements are generally easier to perform than process elements because structural elements typically require counting or cataloguing physical items, as opposed to judging the nuanced interactions of caregivers and children (as is necessary to rate process). This could reduce the amount of time required to train new FCCERS-R coders.

This new, theoretical instrument would not reduce the time and resources needed to implement the “Combined” CLASS in any significant way. First, only Negative Climate was removed from the collapsed scale. (This subscale was removed prior to principal component analysis due to insufficient variability.) Second, the “Combined” CLASS requires a set time to measure any of the process measures. In other words, even if the measure were reduced to a single subscale, it would require virtually the same amount of time to administer as it would the entire measure. If both measures were administered simultaneously, it would be possible to take data in approximately two hours. This could be a notable benefit for a research team.

Limitations

While this study presents important findings for the field of early childhood education and educational psychology and has several strengths, it also possesses a number of important limitations. First, child outcome data were not available. While it was possible to conduct a preliminary investigation indicating that a scale reduction was feasible and possibly warranted, it is not possible to know how scores from such an instrument would relate to outcome data. In other words, it would have been helpful to examine whether a relationship existed between scores derived from the collapsed

instrument and typical early childhood academic, social-emotional and intellectual measures. Although there have been studies to show relationships between related scales (ECERS-R and the standard CLASS preschool measure), family child cares are not well studied, and it is possible that structural and process measures are weighted differently in regard to their effect on child outcomes.

Second, although the size of the study was quite large compared to typical early childhood intervention studies, ultimately the findings would be strengthened by the inclusion of more family child care homes. Additional childcare centers would also likely improve resolution of the underlying covariance structure within the context of this principal component analysis.

Third, beyond the small number of child care homes, the study would also have benefited from the inclusion of child care homes outside of the state of Washington. At present, it is difficult to generalize the findings outside of Washington. Therefore, due to the small sample size and state-specific data, it is difficult to generalize these findings to other states. This study will not only need to be validated in other settings, but will also need to be compared against important new outcome measures. Larger sample sizes and outcome data might allow for other statistical analyses, such as structural equation modeling.

Fourth, this study was limited slightly by the inclusion of family child care homes with only female caregivers. While this is consistent with the vast majority of child care homes, it is possible that data would be affected by issues related to gender.

Fifth, children with disabilities were not represented in this study. Therefore, it is not possible to generalize from this study to classrooms with significant numbers of children with disabilities.

Sixth, it should be acknowledged that different modes of administration were employed: the FCCERS-R was administered “live,” while the “Combined” CLASS was administered using videotape. By utilizing different modes of administration, coders might have different perspectives on the same environment, thus affecting estimates of either structure or process. For instance, a FCCERS-R coder could seek out a specific type interaction, while the “Combined” CLASS coder would be bound by the limitations of what was recorded by the videographer. On a broader level, it is possible that coders experience an environment differently when using a particular method. Accordingly, these differences could also affect measures of common co-variance between the FCCERS-R and the “Combined” CLASS, thus potentially confounding results.

Finally, there were a number of process items loaded highly onto Component #1, which has been proposed to reflect “structure.” For instance, both Helping children with language (.644) and Supervision of play and learning (.613) loaded highly onto Component #1. It is possible that Component #1 is not solely a structural measure, and the high correlations might relate to a global measure of quality measured by the FCCERS-R. However, as others have noted, if the FCCERS-R is designed to measure separate domains of structure and interaction, one would expect to observe these dimensions reflected in the underlying variance structure. (National Council of Research, 2008).

Potential Implications and Future Directions

Based upon the limitations stated above, future research should include larger numbers of family child cares across other states. It would also be beneficial to have access to child outcomes measures in order to determine whether or not a collapsed measure predicts child outcomes. If findings replicate what has been found here, it would then be possible to test the validity and reliability of a collapsed instrument comprised of both FCCERS-R and “Combined” CLASS measures. Beyond these technical considerations, it will also be necessary to measure social validity in regard to the measure’s implementation.

On a final note, the implications of a reduced scale could be far-reaching, particularly in regard to the notion of social justice. As has been noted, family child care settings are neglected as research subjects. Therefore, the ability to measure and monitor quality more efficiently would be beneficial to the broad goal of increasing child care quality. Considering that family child cares are typically composed of children who are often disadvantaged, this is potentially a significant future trend in research and quality monitoring.

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Appendix 1. Component 1 loadings with descriptions (from FCCERS-R)

Item	Description	Indicator to reach mid-range score (5)
Indoor space used for child care	Indicators include damage, appropriate size of furniture, lighting, ventilation	Children have room to move about; use of natural lighting
Furniture for routine care, play, and learning	Furniture suitable size for children, not damaged, convenient	Furniture is well taken care of; tables kept clean with bleach before eating
Provision for relaxation and comfort	Refers to soft furnishings available	Children have access to soft furnishings that are separated from other play areas
Arrangement of indoor space for child care	Space allows for observation of children and also open enough to provide for activities	Arrangement of space is such that different activities can occur simultaneously
Display for children	Refers to artwork and activities displayed for children	Multiple artwork made by children that is at eye-level
Space for privacy	Refers to space that children can use to relax, play, and be away from others	Use of a protected area and perhaps has clear rule about the space being private
Blocks	Use of appropriate blocks and separation of space to play with blocks	Blocks are properly sorted by type
Dramatic play	Refers to materials used for dramatic play, including materials that can be used to augment play (such as furniture)	Dramatic play materials are sorted by type to make it easy for children to use throughout the day
Schedule	Refers to a visual schedule that reflects a variety of play activities	Children do not have to wait long for transition to new activities
Opportunities for professional growth	Refers to resources available related to professional improvement, and increased access for providers for education	Caregiver has at least 10 resources that cover various aspects of child development or working with families
Nap/rest	Refers to the entire process of children napping along with materials	Mats are kept at a minimum distance of 36 inches in order to promote hygiene
Art	Refers to materials used to encourage free expression,	Toddlers have access to art materials at least 3 times

	also includes wide range of materials	per week
Math/number	Refers to availability of math-related materials	Many different types of math materials are available for much of the day
Nature/science	Availability of science and nature related materials	Children have active outdoor experiences twice a week
Sand and water play	Children have access to indoor and outdoor sand and water play materials	Children have a variety of sand and water play materials
Promoting acceptance of diversity	Wide variety of materials related to diversity	Dramatic play materials are made available that represent multiple races and ethnicities
Provisions for parents	Refers to communication between parents and caregivers, plus information made available about child development, etc.	Parents have access to a handbook that reflects philosophy of program